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BNSF Mission Wye Feasibility Study Report Revision 3

April 2019

Quality information

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List of Acronyms and Abbreviations

°C	degrees Celsius
µg/kg	microgram per kilogram
µg/L	micrograms per liter
ACM	asbestos containing material
AECOM	AECOM Technical Services, Inc.
ALS	asphalt-like substance
amsl	above mean sea level
ASTM	American Society for Testing and Materials
bgs	below ground surface
BNSF	BNSF Railway Company
CCR	Construction Completion Report
CECRA	Comprehensive Environmental Cleanup and Responsibility Act
cfm	cubic feet per meter
COC	constituent of concern
DEQ-7 Standards	MDEQ Circular DEQ-7 Numeric Water Quality Standards
ERCLs	environmental requirements, criteria, or limitations
FRTR	Federal Remediation Technologies Roundtable
FS Report	Feasibility Study Report
FS Work Plan	Feasibility Study Work Plan
GIS	Geographic Information System
GPS	global positioning system
HHRA Amendment	Human Health Risk Assessment Amendment
IAM	Interim Action Memorandum
IAMA	Interim Action Memorandum Addendum
IC	institutional control
MCA	Montana Code Annotated
MDEQ	Montana Department of Environmental Quality
mg/kg	milligrams per kilograms
mm Hg	millimeter mercury
MNA	monitored natural attenuation
MRL	Montana Rail Link
OM&M	operation, maintenance, and monitoring
PCE	tetrachloroethylene
PID	photoionization detector
PRAO	Preliminary remedial action objective

RBSL	risk based screening levels
RCRA	Resource Conservation and Recovery Act
RETEC	Remediation Technologies, Inc., or The RETEC Group, Inc.
ROD	record of decision
ROI	radius of influence
ROW	right-of-way
RRA	revised risk assessment
RSL	regional screening level
RV	recreational vehicle
SAP	Sampling and Analysis Plan
SSCL	site-specific cleanup level
SSL	soil screening levels
SVE	soil vapor extraction
TCE	trichloroethylene
TCLP	toxicity characteristic leaching procedure
trans-1,2-DCE	trans1,2-dichloroethene
USEPA	United States Environmental Protection Agency
VMP	vapor monitoring point
VOC	volatile organic compound

1.0 Introduction

This *Feasibility Study Report* (FS Report) has been prepared by AECOM Technical Services, Inc. (AECOM) on behalf of the BNSF Railway Company (BNSF) and presents an evaluation of technologies for remediating constituents of concern (COCs) and reducing risk at Mission Wye in Livingston, Montana. This report has been prepared per the Montana Department of Environmental Quality (MDEQ) Comprehensive Environmental Cleanup and Responsibility Act (CECRA), the MDEQ April 30, 2012 letter requesting additional work (MDEQ 2012a), and the *Feasibility Study Work Plan Revision 3* (FS Work Plan; AECOM 2013a) submitted to MDEQ on April 4, 2013, and approved by MDEQ on April 11, 2013 (MDEQ 2013). The report evaluates potential remedial technologies to address the environmental impacts at Mission Wye remaining after the implementation of interim actions and pilot tests in accordance with the preliminary remedial action objectives (PRAOs) further discussed in Section 1.4.

A previous draft FS Report was submitted to MDEQ in November 2014 (AECOM 2014a). This FS Report has been modified in response to comments that were received on the previous draft from MDEQ in December 2015 (MDEQ 2015a). Revisions are based on subsequent discussions held among MDEQ, BNSF, and AECOM; and current site conditions following implementation of pilot testing conducted at Mission Wye in 2015 and 2016.

Risks associated with Mission Wye were characterized in a Human Health Risk Assessment Amendment (HHRA Amendment) (AECOM 2014b); the document was approved by MDEQ on October 10, 2014 (MDEQ 2014a) after a public comment period. The site-specific cleanup levels (SSCLs) in the HHRA Amendment were reviewed and updated based upon new toxicity information and risk assumptions, including an evaluation of potential risks to construction workers from soil vapor accumulation in trenches (MDEQ 2018), prior to preparing this FS Report. The SSCLs from the HHRA Amendment are used to identify areas where concentrations of COCs may pose an unacceptable risk, and as a tool to evaluate the effectiveness of the various alternatives at achieving protectiveness of human health and the environment.

This FS Report also includes a summary of the results obtained during and following the soil vapor extraction (SVE) and soil tilling pilot tests that were performed at Mission Wye in 2015 and 2016. The pilot testing was conducted per the FS Pilot Test Work Plan – Revision 2 (AECOM 2015a) that was approved by MDEQ on June 24, 2015 (MDEQ 2015b). Results from the pilot testing are included in the discussions throughout this document. Per MDEQ's request, the results of the July 2017 annual groundwater monitoring also are included in this FS Report in lieu of a separate report.

1.1 FS Report Organization

In addition to this introductory section, this FS Report is organized as follows:

- Chapter 1.0 presents the Introduction; Background; Purpose of the FS Report; PRAOs; and preliminary Environmental Requirements, Criteria, or Limitations (ERCLs).
- Chapter 2.0 provides a summary of the previous interim remedial actions completed, the HHRA Amendment findings, and the current groundwater monitoring program.
- Chapter 3.0 summarizes deviations from the approved FS Work Plan including changed site conditions, remedy exclusions, and completion of the soil and SVE pilot tests.
- Chapter 4.0 presents a summary of the soil tilling pilot test.
- Chapter 5.0 presents a summary of the SVE pilot test and subsequent operations.
- Chapter 6.0 provides a detailed evaluation of remedial technologies, including a summary of the conceptual site model, current site conditions and site risk characterization, and a detailed evaluation and analyses of remedial technologies to address site COCs.
- Chapter 7.0 provides the references cited in this report.

1.2 BNSF Mission Wye Background

Mission Wye is located approximately five miles east of Livingston, Montana, near the intersection of Interstate 90 and Highway 89. **Figure 1** illustrates the location of Mission Wye and surrounding property ownership. Mission Wye is an inactive seven-acre industrial landfill, which operated from approximately 1955 to 1979 and was used for disposal of acid clay filtration material from a lube oil reclamation facility and debris (e.g., wood, hoses, wire, steel bands) generated at the Livingston Rail Yard.

Acid clay sludge (clay source material) was placed in four trenches, or cells, and when a cell was filled with sludge to within two to three feet of the top, it was covered with clean soil and a new cell was excavated. The four cells were designated North, Center, South, and East cells (**Figure 2**). Per the *Phase I Report Mission Wye Remedial Investigation* (Remediation Technologies, Inc. [RETEC 1992]), the North Cell was constructed and filled first, followed by the South, Center, and East cells. Waste disposal at Mission Wye ceased in 1977.

The clay source material contained elevated levels of volatile organic compounds (VOCs), including trichloroethylene (TCE) and tetrachloroethylene (PCE), as well as low levels of toluene, ethylbenzene, and xylenes. Low concentrations of metals and polycyclic aromatic hydrocarbons also were detected in the samples of clay waste. The pH in the clay material found in the cells was low because of the sulfuric acid used in the reclaiming process. The North, Center, and South cells contained a layer of water perched on the clay material. The perched water contained hydrocarbons (including VOCs), metals, and other organic compounds. In addition, asphalt-like substance (ALS) was identified in two areas referred to as the “north parking lot” and “seep area.” The ALS material was predominantly heavy-end hydrocarbons and other organic compounds, including chlorinated VOCs. The waste cells, perched water, and ALS material were removed during interim remediation activities conducted between 1995 and 2000, as discussed further in Chapter 2.0.

Property ownership surrounding and downgradient from Mission Wye is shown on **Figures 1** and **3**. The Mission Wye property, the area located within the wye formed by active and inactive railroad tracks, is owned by BNSF and Montana Rail Link (MRL). BNSF owns the area within the 200-foot right-of-way (ROW) of the main railroad tracks that run approximately east to west and leases it to MRL. MRL owns the northern portion of Mission Wye as well as the area within a 50-foot ROW of the former tracks that run to the north. The property to the east and west of the former railroad track ROW is owned by Heart K Land & Cattle Company. Note the property ownership map accessible through the Montana Cadastral Mapping Program shows the property encompassed by Mission Wye and east to Highway 89 as “Right-of-Way” with no property owner shown because that area was conveyed to the State of Montana for highway purposes.

The railroad-owned property (property owned by either BNSF or MRL) does not have any existing structures, aside from sheds temporarily housing the SVE system equipment. Concrete pads remain in place at three locations on the railroad-owned property, including the location of the SVE system sheds. No future development is planned on the railroad-owned property. The locations of known utilities at Mission Wye are shown on **Figure 3**. The estimated location of a fiber optic line also is shown on **Figure 3** and is based on flagging that was observed in the field during the July 2017 groundwater monitoring event.

The area of COC detections in groundwater extends east of Highway 89, beyond the railroad-owned property, to encompass Monitoring Well MW-19 and the Harris Stock Well. This area consists of vacant rural land, an inactive gravel pit, and grazing land. Although some COCs have been detected during annual groundwater sampling events, results from groundwater samples collected east of Highway 89 have been below MDEQ Circular DEQ-7 Numeric Water Quality Standards (DEQ-7 Standards; MDEQ [2017a]) and/or United States Environmental Protection Agency (USEPA) regional screening levels (RSLs) since 1999 (AECOM 2016a). **Figure 4** presents the potentiometric surface map, including the groundwater flow direction, and **Figure 5** presents the concentrations of COCs reported during the July 2017 groundwater monitoring event. BNSF collected groundwater samples in July 2018. The results are presented in the 2018 Annual Groundwater Monitoring Report (AECOM 2019).

No domestic use wells exist within the former railroad wye. Residences in the area utilize shallow alluvial groundwater for domestic purposes. The nearest private wells include a water supply well located on the Glacier Development Partners property (Gravel Pit Well) and a stock well is located on the downgradient Harris property (Harris Stock Well) (**Figure 5**). Groundwater results from samples that have been collected from these wells have

been below DEQ-7 Standards (MDEQ 2017a) for VOC constituents in the 15 years they have been regularly included in the monitoring program (starting in July 2003). Immediately west of Mission Wye, a new gravel pit started operations in early 2017 (**Figure 1**). Per the 2017 Mission Wye Well Inventory Report (AECOM 2017a), no new wells were identified as a result of this new operation. East of Highway 89, the current owner of the former gravel pit verbally communicated in 2015 the intent to reclaim the gravel pit and establish a recreational vehicle (RV) park. However, the property is located in an area that is currently zoned for residential and agriculture use and the development of a RV Park is not permitted (MDEQ, 2017c). Although COC concentrations historically exceeded DEQ-7 standards off of railroad property, interim actions taken to address the COC sources have resulted in decreasing COC concentrations. More recently, the only exceedances of DEQ-7 standards occurred within the former railroad wye. Subsequent sections describe 2017 groundwater sampling results in which no COCs exceeded DEQ-7 standards.

1.3 Purpose of FS Report

Interim action cleanup levels at Mission Wye have been met for soil and groundwater through the implementation of the FS Pilot Study (see Chapters 4.0 and 5.0). The purpose of this FS is threefold: 1) document the interim remedial actions and a pilot test conducted to address risks; 2) evaluate remedial technologies for hypothetical soil vapor risks; and 3) outline the PRAOs. MDEQ will identify its preferred final cleanup in its Proposed Plan, and will solicit public comment on the Proposed Plan and FS. MDEQ will consider public comments and may make changes to the FS and preferred final cleanup; MDEQ will select the final cleanup in its Record of Decision (ROD). The final remedy will be implemented by BNSF. Successful implementation of the final remedy will lead to closure of Mission Wye and delisting from CECRA.

1.4 Preliminary Remedial Action Objectives

PRAOs are proposed for each impacted media at Mission Wye. The PRAOs allow the identification and screening of remedial alternatives that will achieve protection of human health and the environment.

The PRAOs for soil at Mission Wye include:

- Prevent migration of COCs that would potentially leach from soil to groundwater, causing exceedances of the DEQ-7 Standards;
- Prevent exposure of humans to COCs in soil at concentrations above clean-up levels; and
- Meet soil clean-up levels for COCs
- .

The PRAOs for groundwater at Mission Wye include:

- Meet DEQ-7 groundwater clean-up levels for COCs in groundwater;
- Reduce potential future migration of the impacted groundwater plume;
- Prevent exposure of humans to COCs in groundwater at concentrations above clean-up levels; and
- Comply with ERCLs for COCs in groundwater.

The PRAOs for indoor air and soil vapor at Mission Wye include:

- Prevent exposure of vapors to construction or utility workers in trenches;Prevent inhalation of COCs in indoor air above site-specific indoor air cleanup levels if occupied structures are present in the future.

1.5 Environmental Requirements, Criteria, or Limitations

CECRA provides that MDEQ must require that a final cleanup comply with applicable state and federal ERCLs. MDEQ also may require that the cleanup comply with relevant ERCLs. ERCLs are generally action-specific, contaminant-specific, or location-specific as summarized in the following bullets:

- Action-specific ERCLs: determine the manner in which the remedy must be implemented.
- Contaminant-specific ERCLs: define the allowable contaminant concentrations or prescribe a method or level of treatment required.
- Location-specific ERCLs: establish restrictions on contaminant concentrations or remedial activities based on their specific location.

Although only state and federal ERCLs are defined by CECRA as cleanup requirements, actions at Mission Wye also will comply with applicable federal, state, and local law. Preliminary ERCLs prepared by MDEQ are included as **Appendix A** in this FS Report. The preliminary ERCLs will be finalized when the remedial action is selected by MDEQ in the ROD.

2.0 Summary of Previous Actions Completed

2.1 Interim Remedial Actions

Interim remedial actions were undertaken at Mission Wye between 1995 and 2000 per the 1995 Interim Action Memorandum (IAM) (MDEQ 1995) and the 2000 Interim Action Memorandum Addendum (IAMA) (MDEQ 2000) and are detailed in the following sections. Results of the interim remedial activities were reported in the *Construction Completion Report (CCR) for Interim Remedial Action* Revision 3 (AECOM 2012), which was approved by MDEQ on March 22, 2012 (MDEQ 2012b). In addition to the interim remedial actions conducted per the IAM and IAMA, additional activities included conducting an investigation for asbestos containing material (ACM) and a soil vapor evaluation.

2.1.1 1995 IAM

The 1995 Final IAM evaluated alternatives for treatment of the source of groundwater impacts at Mission Wye. The selected treatment in the IAM was thermal desorption with liquid recovery as the primary recovery technology. The *Work Plan for Interim Remedial Action* (RETEC 1996) provided design details, remedial objectives, material handling, and excavation of source material for implementation of the selected 1995 IAM. A two-phase pre-treatment process also was included. The first phase consisted of perched water removal and the second phase consisted of excavation, neutralization, screening, sizing, and preparation of clay sludge material and contaminated soil for treatment through thermal desorption. Thermal desorption was discontinued in June 1997 due to safety, equipment, regulatory compliance, and scheduling problems.

Due to problems encountered during thermal desorption, SVE was proposed for solid waste treatment in the Vented Pile Pilot Test Workplan (RETEC 1997). The 1997 Work Plan included treatment of source material exceeding toxicity characteristic leaching procedure (TCLP) VOC concentrations in a vented pile and subsequent disposal at the Subtitle D High Plains Landfill in Great Falls, Montana. A pilot test was initiated in May 1997 with North Cell source and North Cell overburden material. The SVE pilot test was effective in reducing VOC concentrations to below regulatory limits by June 1997, and SVE-treated material was stockpiled for transport to the Resource Conservation and Recovery Act (RCRA) Subtitle D Landfill. Source material that did not pass TCLP limits remained for further treatment.

Excavation of the four cells was completed by December 1997. Treatment and disposal was discontinued due to noncompliance issues with land disposal restriction certifications and notification requirements.

2.1.2 2000 IAMA

The 2000 IAMA re-evaluated alternatives for treatment of the source of groundwater impacts at Mission Wye and the untreated source material that was excavated in 1997 following discontinuation of thermal desorption. The selected treatment action in the IAMA consisted of excavation, sampling, and possible treatment of waste prior to appropriate disposal off-site. The IAMA evaluated and documented differences between the original cleanup technologies selected in the 1995 IAM and the new cleanup remedies selected in the IAMA to complete the interim actions at Mission Wye. The remaining waste streams addressed by the IAMA included the following.

- ALS and clay waste – Excavated from the North, South, Center, and East cells, and from the ALS and seep areas. Transported to a permitted hazardous waste incinerator for disposal.
- Seep area soil – Excavated seep area soils were neutralized and sample results indicated the neutralized soils passed TCLP requirements allowing the material to be shipped to the RCRA Subtitle D Landfill.
- Confirmation samples were collected at the base of the excavations. Three samples were taken from the ALS Area, two were resampled for Total Petroleum Hydrocarbons (TPH). Four samples were taken from the Seep area, two were resampled for TPH. Two samples were taken from the South and Center cells

combined, both were resampled for TPH. Two Samples were taken from the North cell and three samples were taken from the East cell. Depths on the samples were not recorded.

- Impacted soil – SVE was used to treat excavated soil to non-hazardous and below disposal restriction levels. Treated non-hazardous soil was then transported to an off-site RCRA Subtitle D Landfill. Excavations were backfilled with clean material, covered with soil, and revegetated.
- Rocks – Rocks separated from excavated soil and waste material were washed using a high pressure washer to meet interim remediation goals. Cleaned rocks were used as backfill or were disposed on the Mission Wye property. Treated water was discharged to the ground in compliance with the Montana Pollutant Discharge Elimination System General Permit No. 1003.
- Spent carbon – Samples were collected and analyzed for TCLP VOCs and TCLP metals. Spent carbon determined to be hazardous was shipped off-site to a permitted hazardous waste incinerator or regeneration facility. Non-hazardous spent carbon was disposed at an off-site RCRA Subtitle D Landfill.
- Filter cake and debris – Filter cake and debris generated during remedial activities was resampled. Filter cake that passed TCLP was disposed at a RCRA Subtitle D Landfill and filter cake that did not pass TCLP was disposed at a hazardous waste incinerator.
- Recovered oil and water – Thermal desorption activities recovered oil and water. Recovered oil was transported to an off-site permitted hazardous waste incinerator.
- Site restoration – The areas disturbed through excavation and other remedial activities was backfilled and graded to approximate original contours while allowing for the drainage of stormwater.

The interim remedy was implemented beginning in 1995 and was finished in 2000. Subsequent groundwater monitoring was scheduled to be conducted for a period of one to three years after source excavation and treatment. Groundwater monitoring continued in accordance with Exhibit A of the Consent Decree for Mission Wye (MDEQ 2005).

2.1.3 2007 Confirmation Soil Sampling

MDEQ requested BNSF conduct additional soil sampling, both surface and subsurface, in a letter dated January 12, 2005 (MDEQ 2005). The purpose was to determine whether surface soils (zero to two feet below ground surface [bgs]) contained COCs at concentrations exceeding USEPA screening levels and to determine if subsurface (greater than two feet bgs) clay source material or impacted soil remained between monitoring wells MW-4 and MW-3 that may be a continuing source of groundwater exceedances observed in well MW-3. Samples were collected in September 2007 in accordance with the August 6, 2007, *Surface and Subsurface Soil Sampling Plans* (ENSR 2007). Results were reported to MDEQ in the *Draft Soil Sampling Results and Groundwater Treatment Work Plan* in May 2008 (AECOM 2008).

The USEPA RSLs or the MDEQ risk-based screening levels (RBSLs) for direct contact were only exceeded at one isolated surface soil sample location (SS-88d). Six surface soil locations (SS-146, SS-157, SS-83, SS-88, SBS-7D, and SS-88d) exceeded leaching to groundwater SSCLs for PCE, and one sample location (SS-88d) exceeded the leaching to groundwater SSCL for PCE and TCE. . The 2007 sampling plan indicated a composite sample would be collected from each grid location randomly selected for sample collection. However, the soil at SS-88d was black in color and MDEQ requested a discrete sample be collected from that location and analyzed in addition to the composite sample collected from the grid (SS-88). Although results from SS-88d indicated elevated concentrations of PCE and TCE, results from the composite sample collected at SS-88 were below the October 2004 USEPA Region 9 industrial soil preliminary remediation goals and the October 2003 MDEQ RBSLs, which were current at the time of sample collection, and no additional actions were taken.

Subsurface soil samples were collected from eight test pits excavated using a backhoe. Test pits were excavated to approximately 3 to 4 feet wide by 12 to 16 feet long. The depths varied between eight and nine feet deep. Sample results were included in Table 3-24 in the CCR. VOCs were detected in eight of 40 sample locations. All results were below the USEPA November 2012 residential and industrial RSLs. The November 2012 leaching to groundwater soil screening level (SSL) was exceeded in the sample collected from SBS-7D collected two feet bgs

on the west wall of Test Pit 7 (TP-7); however, no action was taken at this location to address the exceedance of the SSL because PCE and TCE levels were below the 1995 IAM and 2000 IAMA interim remediation goals. The concentrations detected in SBS-7D exceeded the residential and leaching to groundwater SSCLs for PCE and TCE.

2.1.4 2013 Activities

2.1.4.1 Asbestos Investigation and Subsequent Firebrick Removal

At the request of MDEQ (MDEQ 2012c), an asbestos investigation was conducted in April 2013. As part of the investigation, three types of firebrick were identified as potential ACM and were sampled and analyzed for asbestos. The firebrick did not meet the definition of ACM (it contained less than one percent asbestos fibers); however, MDEQ requested removal and disposal of the firebrick at a non-hazardous waste landfill. Visible firebrick was removed from Mission Wye and disposed at High Plains Landfill in Great Falls, Montana in April 2014. Results of the investigation and disposal certification have been provided in previously submitted documents (AECOM 2014c, 2013b).

2.1.4.2 Soil Vapor Evaluation at VMP-1 and VMP-2

The investigations that took place in the 1990's identified COCs that could migrate, as vapors, into indoor air. The vapor intrusion pathway was evaluated to conservatively determine if risks would exist if permanent structures were built for future residential use. The evaluation was provided in the *Soil Vapor Monitoring and Vapor Intrusion Evaluation Report* (AECOM 2014d).

The following is a summary of the data collected during the soil vapor evaluation conducted in July 2013 per the MDEQ-approved Soil Vapor Monitoring Sampling and Analysis Plan (SAP). The Soil Vapor SAP was included as Appendix B of the FS Work Plan submitted to MDEQ April 4, 2013, and reported in the MDEQ-approved *Soil Vapor Monitoring and Vapor Intrusion Evaluation Report* (Vapor Monitoring Point Report [VMP Report]) (AECOM 2014d).

- Nested soil VMPs (VMP-1 and VMP-2) were installed at two locations and were screened at approximately 12 feet bgs (deep “D” points) and 8 feet bgs (shallow “S” points);
  - VMP nest VMP-1D/ VMP-1S was installed between the former North and East cells, and
  - VMP nest VMP-2D/VMP-2S was installed near Monitoring Well MW-3.
- The vapor intrusion pathway was incomplete since there were no occupied buildings present on the railroad-owned or adjacent property west of Highway 89. However, the results of the vapor intrusion evaluation indicated that reported concentrations of trans-1,2- dichloroethene (DCE), TCE, and PCE in soil and/or groundwater may have the potential to migrate, as vapors, into the indoor air of future overlying buildings and present a health and safety risk in the event that the area is developed.

2.2 Human Health Risk Assessment Amendment

A Revised Risk Assessment (RRA) was prepared for Mission Wye in 1993 (RETEC 1993). Recommendations from the 1993 RRA, which included evaluation of direct contact and a leaching to groundwater study, were used to establish the 1995 IAM and 2000 IAMA remediation goals. The risk assessment was updated in 2014 and included a review of current regulatory toxicity data and screening levels for soil and groundwater. The HHRA Amendment was submitted for a 30-day public comment period on September 8, 2014; the document was approved by MDEQ on October 10, 2014 (MDEQ 2014a), and the Final HHRA Amendment was submitted to MDEQ on October 22, 2014 (AECOM 2014b).

In 2017, MDEQ determined that there was a potential future risk to construction workers from inhaling PCE and TCE contaminated vapors that may accumulate in trenches or excavations, which was not initially evaluated in the HHRA Amendment (MDEQ 2018). MDEQ prepared a Memo and developed SSCLs for PCE and TCE based on current toxicity and chemical parameter data to address potential hypothetical future construction and utility

worker exposure to soil vapor in a trench or excavation. The utility worker was added as an additional receptor to address potential short-term exposure, which could include working in a trench. The cumulative risk for construction workers based on direct contact with soil (incidental ingestion, dermal contact, and inhalation of ambient particulates/vapors) reported previously is protective of short term exposures, including utility work. Soil vapor SSCLs are presented in **Table 1**.

The bulleted list below includes the current and future receptors as identified in the HHRA and the MDEQ Memo:

- Industrial/commercial worker (outdoor) – evaluated for direct contact with surface soil, indirect contact of particulates and VOCs in ambient air via inhalation, direct contact with groundwater.
- Industrial/commercial worker (indoor) – evaluated for indirect contact of VOCs in indoor air via inhalation.
- Construction/excavation worker – evaluated for direct contact with surface and subsurface soil, direct contact from soil vapors coming from the subsurface via inhalation, indirect contact of particulates and VOCs in ambient air via inhalation, and direct contact with groundwater.
- Trespasser/site visitor – evaluated for direct contact with surface soil and indirect contact of particulates and VOCs in ambient air via inhalation.

To address an unforeseen future exposure scenario, a hypothetical future residential scenario also was included for evaluation:

- Resident, adult/child (outdoor) – evaluated for direct contact with surface soil, indirect contact of particulates and VOCs in ambient air via inhalation, and direct contact with groundwater at on-site and off-site locations.
- Resident, adult/child (indoor) – evaluated for indirect contact of VOCs in indoor air via inhalation.

Exposure parameters for each receptor were detailed in Section 3.5 of the HHRA Amendment, equations for calculation of exposure were detailed in Section 3.6.1 for incidental soil ingestion, dermal contact with soil, and inhalation of VOCs and particulates derived from soil. Chemical-specific parameters were discussed in Section 3.7 of that document.

2.2.1 Summary of COCs and Site-Specific Cleanup Levels

The 2014 HHRA Amendment and MDEQ Memo identified the following COCs at Mission Wye:

- Soil: PCE and TCE in surface soils (from zero to two feet bgs) and subsurface soils (two to eight feet bgs);
- Groundwater: PCE and TCE;
- Soil Leaching to Groundwater: PCE and TCE
- Vapor Intrusion (for indoor air of hypothetical future buildings): PCE, TCE, and trans-1,2-DCE; and
- Soil vapor (for contaminated vapor accumulating in excavations or trenches): PCE and TCE.

SSCLs established in the HHRA Amendment and MDEQ Memo are provided in **Table 1**.

Following the RRA, trans-1,2-DCE was excluded from being a COC due to an EPA memorandum that stated the Integrated Risk Information System found that two studies utilized in the Provisional Peer-Reviewed Toxicity Value Assessment were insufficient to support the derivation of the RfC value for trans-1,2-DCE (EPA, 2010; EPA 2014). Therefore, the EPA currently does not have enough toxicity data to evaluate risk to derive a screening level for the compound. Trans-1,2-DCE has been detected in soil vapor, but the concentrations are not nearly as high as PCE and TCE. In addition, the remedy selected to address PCE and TCE in the soil vapor also will address trans-1,2-DCE because it also is a volatile contaminant and is present in the same areas as PCE and TCE.

2.2.2 Risk Assessment Conclusions

Risks were calculated for future commercial/industrial workers, future construction/excavation workers, future visitors/trespassers (assumed adolescent), and future residents (assumed adult and child). The HHRA Amendment calculated risk for receptors and used the MDEQ-approved cumulative cancer target risk level of $1x10^{-5}$ and a cumulative non-carcinogenic hazard index of 1.0 to identify primary areas where COCs in soil exceed these levels. Groundwater concentrations were compared to DEQ-7 Standards and also considered the potential for chemicals in soil to leach to underlying groundwater. The DEQ-7 Standards current during completion of the HHRA Amendment were issued in 2012; however, the DEQ-7 standards for the COCs identified at Mission Wye did not change in the current 2017 DEQ-7 Standard version. Soil gas concentrations obtained during the 2013 evaluation discussed in Section 2.1.4.2 were compared to the USEPA RSLs for residential and industrial air.

The HHRA Amendment identified areas where remaining impacts indicated COC concentrations may pose an unacceptable risk to human health or the environment. **Table 2** provides a summary of the risk assessment receptors as requested by MDEQ. The areas, including current conditions, are summarized below by media.

- Soil – Direct Contact: The surface soil risk estimated in the 2014 HHRA Amendment was driven by elevated concentrations of PCE, and to a lesser extent TCE, at sample location SS-88d. This area was included in the soil tilling pilot test conducted in 2015. As discussed in Chapter 4.0, pre- and post-tilling analytical results from 2015 indicated post pilot test COC concentrations in surface soils are below the SSCLs (**Table 3**) and a direct contact risk is no longer present at Mission Wye. Direct contact risk for subsurface soils (construction/excavation worker only) also was evaluated in the 2014 HHRA and further developed in the MDEQ Memo. In the 2014 HHRA, there was no unacceptable direct contact risk. However, the risk evaluation did not include an evaluation of the soil vapor accumulating in an excavation or trench; therefore, that pathway was further evaluated in the MDEQ Memo and the results indicate an unacceptable risk to construction workers exists.
- Soil – Leaching to Groundwater: The leaching cleanup levels for PCE and/or TCE were exceeded at 11 surface and subsurface soil sample locations (ALSAB-2, CC-B, EC-A, EC-C, SAB-2, SBS-7D, SS-146, SS-157, SS-83, SS-88, and SS-88d). The location identification for ALSAB-2 will henceforth be used to refer to this location. Prior reports may have incorrectly identified this sample location as ALSAB-2). Analytical results are summarized in **Table 3** and locations are shown on **Figure 6**. Of those samples, two locations (SS-88d and SBS-7D) had concentrations that were 10 times the cleanup level and were included in the soil tilling pilot test in 2015. The soil tilling pilot test was performed to determine the effectiveness of tilling on surface soils and chapter 4.0 presents a summary of the soil tilling pilot test. As later discussed in that section, pre- and post-tilling analytical results from 2015 indicated post-tilling COC concentrations were below the SSCLs (**Table 3**) and no longer present a direct contact or leaching to groundwater risk. Although the other areas that exceeded the leaching cleanup levels for PCE and/or TCE were not treated as part of the tilling pilot test, empirical data indicates that contamination from the surface and subsurface soils has leached to groundwater and concentrations in groundwater have decreased because the contaminant mass has been sufficiently reduced. Localized exceedances of SSCLs occur periodically, but the decreasing trend in contaminant concentrations detected in groundwater samples indicate the bulk of the contaminant mass has been reduced.
- Groundwater: The 2014 HHRA Amendment reported that the DEQ-7 Standard for PCE and/or TCE was exceeded in samples collected between July 2010 and July 2013 from four wells (MW-3, MW-4, MW-9, and MW-22). However, PCE and TCE concentrations have continued to decrease and, during the last groundwater monitoring event conducted in July 2017, all groundwater sample results were below the DEQ-7 Standards of 5 micrograms per liter (µg/L) for PCE and TCE (**Figure 5**). The maximum reported PCE concentration during the July 2017 monitoring event was 4.7 µg/L (in MW-3) and the maximum reported TCE concentration was 0.77 µg/L (in MW-12). Recent groundwater sampling results (June and July 2017) indicate that contaminant concentrations are below DEQ-7 standards, which may indicate that interim actions have eliminated potential risks from groundwater exposure; however, subsequent monitoring would be needed to confirm that DEQ-7 standards have been achieved.

- Soil Vapor - Vapor Intrusion to Indoor Air: The results of the 2013 vapor intrusion evaluation indicated that reported concentrations of trans-1,2-DCE, TCE, and PCE in soil and/or groundwater may have the potential to migrate, as vapors, through the subsurface and into the indoor air of hypothetical future overlying buildings. Under this hypothetical future scenario, indoor air exposure may be a complete exposure pathway and present a health and safety risk to building occupants in the event that the area is developed.

- Soil Vapor – Accumulation of Subsurface Vapors in a Trench/Excavation: MDEQ identified that soil vapor accumulating in a trench was a pathway not evaluated in the 2014 HHRA Amendment. MDEQ further evaluated this pathway and identified two potential receptors exist for this scenario: the construction worker and utility worker. Exposure via soil vapor inhalation in trench/excavation was incorporated into the cumulative risk calculation for each receptor. An unacceptable cumulative risk for the construction worker exists and is driven by the noncarcinogenic effects of PCE and TCE in the soil vapor inhalation pathway. However, the soil vapor pathway and cumulative risks are not unacceptable for the utility worker as the exposure frequency assumption for the utility worker is less than the construction worker. Soil vapor was collected as part of the SVE pilot test study from August 2015 through September 2017. The most recent samples collected at the combined SVE effluent location resulted in concentrations of PCE at 630 µg/m^3 and TCE at 94 µg/m^3, which are above the cleanup levels identified in **Table 1**.

  – Combined SVE effluent data were compared to SSCLs. No potential unacceptable risk to utility workers is noted based on a typical excavation scenario (30 days exposure frequency in an excavation or trench). Use of SVE effluent concentrations for comparison is conservative as these are not representative of passive soil vapor conditions, but rather characterize conditions under vacuum and are likely to overestimate potential exposure concentrations. However, potential risk is present for the construction worker when using SVE effluent results assuming the MDEQ default construction exposure frequency (124 days). This exposure scenario assumes all work is conducted in an excavation for the duration of a construction project. This scenario is conservative,but is acknowledged to aid decision making at Mission Wye.

2.3 Current Groundwater Monitoring Program

BNSF has conducted routine groundwater monitoring and reporting at Mission Wye on a semiannual or annual basis beginning in 1991. The *Groundwater Sampling Plan* (RETEC 2007) is the current groundwater monitoring plan for Mission Wye and requires annual groundwater sampling be conducted during July when the groundwater levels are at their highest. The groundwater well sampling network is shown on **Figure 4**, including locations where depth to water measurements are collected. Groundwater samples are collected from 11 monitoring wells (MW-1 [background well], MW-3, MW-4, MW-5, MW-9, MW-12, MW-14, MW-18, MW-19, MW-21, and MW-22). The Harris Stock Well, Gravel Pit Well, and surface water from the Gravel Pit Pond also are sampled as part of the annual sampling event.

Evidence of natural attenuation exists at Mission Wye based on groundwater concentrations of PCE and TCE decreasing between 1993 and 2017. By USEPA definition, Monitored Natural Attenuation (MNA) includes a variety of naturally occurring physical, chemical, and biological processes that, under favorable conditions, act without human intervention to reduce the mass, mobility, volume, or concentration of contaminants in soil or groundwater (USEPA 1999). These in-situ processes include biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization, transformation, or destruction of contaminants (USEPA 1999). The greatest decreases in concentrations occurred following removal of impacted material during interim remedial actions (completed in 2000). In monitoring, well MW-3, concentrations decreased by over 50 times for PCE and by over 500 times for TCE. Most of the other monitoring wells with historical detects of chlorinated VOCs showed decreases to below the MDEQ groundwater standards of PCE and TCE. **Figure 5** details the current extent of COCs in groundwater and **Figures 7** and **8** illustrate PCE and TCE concentrations reported between 2000 and 2017 in samples collected from monitoring wells MW-1, MW-3, MW-4, MW-5, MW-9, MW-12, MW-18, and MW-19.

3.0 Modifications from the Approved FS Work Plan

3.1 Change of Site Conditions

The 2013 FS Work Plan (AECOM 2013a) was submitted in April 2013 and was approved by MDEQ on April 11, 2013 (MDEQ 2013). The FS Work Plan presented potential environmental remedies for Mission Wye. Changes in site conditions have occurred since the FS Work Plan was approved, including implementation of a pilot test (soil tilling and SVE) and the natural attenuation of COCs in groundwater and soil. These changes included surface and subsurface soils meeting the SSCLs for PCE and TCE (**Table 3**) and groundwater (June and July 2017) meeting DEQ-7 standards for PCE and TCE at all sampled locations (**Table 4**).

3.2 Screening and Evaluation of Remedial Technologies

The table below summarizes the remedial technologies proposed and screened for further evaluation in the 2013 FS Work Plan, 2014 Draft FS Report, and the 2015 FS Pilot Test Work Plan when soil and groundwater exceedances were still present at Mission Wye. The table also includes an update of the screened remedial activities from the 2017 Revision 1 to the FS Report, and in this 2018 FS Report Revision 2, which is based on existing site conditions. The table also summarizes the remedial technologies proposed and screened in this revised FS Report. Per MDEQ's request, **Table B-1** in **Appendix B** is provided for reference and includes the initial alternative screening table provided in the FS Pilot Test Work Plan (AECOM 2015a) and presents a list of remedial alternatives screened when the 2013 FS Work Plan was developed.

Remedial Technology	2013 FS Work Plan	2014 Draft FS Report (Rev 0)	2015 FS Pilot Test Work Plan	2017 Revised FS Report Revision 1	2018 Revised FS Report Revision 2
No Action	Initially Proposed	Retained	Retained	Retained	Retained
Institutional Controls (ICs)	Initially Proposed	Retained	Retained	Retained	Retained
MNA	Initially Proposed	Retained	Retained	Excluded	Retained
Soil Excavation	Initially Proposed	Retained	Retained	Excluded	Excluded
In-situ aeration/soil tilling	---	Initially Proposed	Pilot Tested	Retained	Retained
Chemical Oxidation	Initially Proposed	Excluded	---	---	---
SVE Passive	Initially Proposed	Retained	Retained	Excluded	Excluded
SVE Active	Initially Proposed	Retained	Pilot Tested	Retained	Retained
Enhanced Reductive Dechlorination	Initially Proposed	Excluded	---	---	---
Air Sparging	---	Initially Proposed	Retained	Excluded	Excluded
Reactive Barrier Wall	Initially Proposed	Retained	Retained	Excluded	Excluded

Remedial technologies were excluded from further evaluation based on the following:

- <u>2014 Draft FS Report</u>
  - Chemical oxidation was excluded in the 2014 Draft FS Report due to the likely limitations of oxidant placement in heterogeneous soils and high groundwater flow rates at Mission Wye.

Chemical oxidation is typically applied to high-level concentrations of PCE/TCE and dense non-aqueous phase liquid in soil and groundwater, neither of which occur at Mission Wye.

  - Enhanced reductive dechlorination was excluded in the 2014 Draft FS Report because high groundwater flow rates and high dissolved oxygen content in the groundwater are impediments to establishing the anaerobic conditions (which are required for remediation of PCE/TCE) in the heterogeneous soils present at Mission Wye. In addition, the potential generation of daughter products (e.g., vinyl chloride) made this technology less favorable.

- 2015 FS Pilot Test Work Plan
  - The 2015 FS Pilot Test Work Plan screened several remedial alternatives (AECOM 2015a). Retained technologies are included in the above table. In-situ aeration/soil tilling and SVE was pilot tested from 2015 to 2016 per the approved FS Pilot Test Work Plan.
- 2017 FS Report, Revision 1
  - MNA was excluded in this revised FS Report because the long-term groundwater data that has been collected at wells during groundwater monitoring has demonstrated decreases in COC concentrations over time via natural processes.
  - Soil excavation is excluded in this revised FS Report because direct contact risks are not present at Mission Wye following the soil tilling pilot test conducted in 2015. There is still evidence of potential contamination in the subsurface that is leaching to groundwater based on the July 2018 groundwater monitoring results, where the DEQ-7 Standard was not met for PCE at MW-3. The exact location(s) and the vertical and horizontal extent of the contamination within the subsurface is unknown, which would make soil excavation less effective and potentially less implementable than other remedies. Other remedies will be more effective at mitigating the risks associated with this pathway. Therefore, soil excavation was excluded from the 2017 and 2018 versions of the FS Report.
  - Passive SVE is excluded in this revised FS Report because an active SVE system is currently installed and was operated at Mission Wye from 2015 through 2017. The active SVE demonstrated effectiveness and is preferred over passive SVE.
  - Air sparging is excluded in this revised FS Report because it would have to be conducted with an active SVE system to prevent vapor phase migration to the subsurface and the active SVE system, which was pilot tested from 2015 through 2017, has proven to be effective by itself.
  - Reactive barrier walls were proposed in the 2014 Draft FS Report for protection of downgradient groundwater receptors; however, they are excluded in this revised FS Report because the only impacts are on BNSF and MRL property.
- 2018 FS Report, Revision 2
  - MNA was added back into Revision 2 of the FS because site hydrogeological characteristics support continuing decreases in groundwater concentrations through natural attenuation processes.

3.3 Pilot Test Progress and Success

The pilot test, conducted per the FS Pilot Test Work Plan (AECOM 2015a) and approved by MDEQ (MDEQ 2015b, 2014b), was started in late 2015. MDEQ approved completion of the SVE pilot test in September 2016 (MDEQ 2016a). Although the pilot test was determined to be complete, the SVE system continued to operate. The SVE system was shut down on September 11, 2017, after groundwater PCE and TCE concentrations were found to be below DEQ-7 Standards. The pilot test performance monitoring results, as well as SVE system and groundwater monitoring results collected since then, has been included in this FS Report to evaluate the effectiveness of the technologies for Mission Wye. Based on soil results collected during the soil tilling pilot test in 2015, soil tilling was effective at meeting the site-specific surface soil/direct contact cleanup levels. Based on groundwater monitoring results collected in June and July 2017, SVE treatment was shown to be effective in

reducing groundwater PCE and TCE concentrations to below DEQ-7 Standards. Both pilot tests were considered to be a success as further discussed in Chapters 4.0 and 5.0.

4.0 Soil Tilling Pilot Test

A soil tilling pilot test was conducted at Mission Wye per the FS Pilot Test Work Plan. The pilot test occurred after the interim remedial activities discussed in Chapter 2.0. This section presents a summary of the activities conducted and data collected during the soil tilling pilot test. **Appendix C** includes associated field notes, analytical data, and data validation reports.

4.1 Soil Tilling Pilot Test Objective

In-situ aeration/soil tilling is a remediation technology where contaminants in soil are degraded by volatilization, photolysis, and natural degradation via aerobic microorganisms to produce innocuous or stabilized byproducts. During in-situ aeration, contaminated soils are excavated, churned, and/or tilled to stimulate attenuation. For COCs at Mission Wye, consisting of TCE and PCE, the degradation processes also are enhanced by sunlight (i.e., photolysis) and oxygen in ambient air (i.e., aerobic degradation).

The objective of the soil tilling pilot test was to provide data on the ability of soil tilling to mitigate the COCs in surface soils.

4.2 Summary of Soil Impacts

The HHRA Amendment indicated 11 soil locations out of the 20 locations sampled had concentrations of leaching COCs above SSCLs considered protective of groundwater. The soil locations exceeding leaching to groundwater SSLs are illustrated on **Figure 6** and results are provided in **Table 3**. The HHRA Amendment concluded that PCE and TCE in soil were not highly elevated with the exception of locations SS-88d and SBS-7D . The PCE and TCE concentrations at the remaining locations were less than 10 times the leaching to groundwater SSLs.

Three of the sample locations (SS-146, ALSAB-2, and SAB-2) that exceeded the leaching to groundwater SSLs in the confirmation samples taken from excavations where the former north cell, seep area, and north parking lot areas were located. These areas were excavated in 2000. The closest wells that are downgradient from these areas are MW-2 and MW-4. Samples were collected from MW-2 from 1998 through 2003, and PCE and TCE have never been detected in any samples collected from the well. Samples were collected from MW-4 from 1991 and 1998 through 2018. Concentrations detected in samples collected from MW-4 have been decreasing over time with the last exceedances of the DEQ-7 occurring in 2012 (PCE) and 2002 (TCE); Tables 1 and 2 in Attachment 4 of Appendix E). This indicates that PCE and TCE are no longer leaching upgradient from MW-2 and MW-4 at concentrations that cause exceedances of the DEQ-7 standards.

Based on the outcome of the leaching evaluation conducted in the HHRA Amendment, leaching of PCE and TCE from soil potentially posed a threat to underlying groundwater at seven locations (SS-88d/SS-88, SS-83, SS-157, SBS-7D, CC-B, EC-A, and EC-C) due to the soil concentrations and historical groundwater concentrations in samples collected from monitoring well MW-3 located downgradient from the soil sample locations. Additionally, based on a review of the groundwater and soil sampling locations, the HHRA Amendment indicated a potential data gap in the area between SS-88d and MW-10, where groundwater or soil samples had not been collected. Based on decreasing concentrations observed in groundwater, individual SVE wells, and combined pre-treatment SVE samples, the magnitude of the leaching potential that would cause exceedances in SSCLs may have subsequently been reduced. However, it is assumed the area that poses potential leaching-to-groundwater soil impacts is located between SS-88d and MW-3, since MW-3 is the next well that is downgradient from MW-10. This is the area shown on multiple figures as the “area potentially posing a leaching to groundwater risk” area. The area around MW-3 was part of the SVE pilot test and is discussed in Chapter 5.0 of this report.

4.3 Soil Tilling Pilot Test Key Components

The areas where soil samples SS-88-d and SBS-7D were collected in 2007 were selected for the pilot test because results exceeded the direct contact SSL (SS-88-d) and/or were more than 10 times greater than the leaching to groundwater SSL (SS-88-D and SBS-7D) (**Table 3**).

The key components of the soil tilling pilot test design included the following:

- Collection of composite soil samples from each of the two designated pilot testing areas prior to tilling.
- Tilling or cultivation of soils to a depth of approximately two feet bgs using mechanical means.
- Collection of post-tilling composite soil samples from each of the two designated pilot testing areas.
- Data analysis and interpretation.

4.4 Soil Tilling Pilot Test Implementation

Soil tilling was performed on August 11, 2015, using a mini-excavator fitted with an articulating bucket. The equipment was effective at turning over the soils to an approximate depth of two feet bgs, as measured in the field. This depth is considered surface soil and, thus, the effectiveness of the pilot test may be evaluated for surface soil only. The bucket was used to lift and turn the soil in layers and break up the soil clods, while the bucket teeth were used to rake out the soil. Each tilling area was approximately 10 feet by 10 feet and was centered on a historical sampling point that was located through the use of a hand-held Global Positioning System (GPS) unit. The tilled areas also were demarcated using the GPS unit.

4.5 Soil Tilling Data Collection and Analysis

Baseline soil samples were collected on August 11, 2015, prior to tilling activities. Post-tilling soil samples were collected on August 13, 2015 following two days of volatilization and photo-degradation. Soil sample collection was consistent with the procedure followed in the 2007 Surface Soil Sampling Plan (ENSR 2007).

A total of five sample aliquots were collected from each area by dividing the area into four quadrants of approximately equal size; one aliquot was collected from the approximate center of each quadrant and from the center of the overall disturbed area. The sample aliquots were submitted to Pace Analytical Laboratory in Minneapolis, Minnesota, and the laboratory composited the sample in-house to minimize volatilization. The samples were analyzed for COCs by USEPA Method 8260.

Soil tilling analytical data collected pre-tilling and post-tilling are presented in **Table 3** and **Figure 9**, with comparison to SSCLs established in the HHRA Amendment (AECOM 2014b). None of the soil samples, pre- or post-tilling, exhibited COC concentrations exceeding site-specific, leaching-to-groundwater SSLs; 0.13 milligrams per kilogram [mg/kg] for PCE and 0.10 mg/kg for TCE. Soil tilling results and the associated validation report were provided to MDEQ on September 16, 2015, with a revised data validation report provided on January 20, 2016 (AECOM 2016b).

MDEQ replied to an e-mail data submittal from AECOM (AECOM 2016b), on March 3, 2016 with a determination that the soil tilling objective of the FS Pilot Test Work Plan was met and no additional soil tilling will be required for the remainder of the pilot test (MDEQ 2016b). Therefore, the soil tilling pilot test was considered complete and no additional tilling or sampling was conducted.

4.6 Soil Tilling Pilot Test Conclusions

The following conclusions are based on the soil tilling pilot test results:

- The soil tilling pilot test was effective in meeting the site-specific surface soil/direct contact cleanup levels (see **Table 3** and **Figure 9**).
- Surface soils have been removed from further evaluation in the FS for direct contact because the COC concentrations in the 2007 sample collected from sample location SS-88d (the sole driver of the soil direct contact risk for surface soils) were below SSCLs after tilling.
- Surface soils have been removed from further evaluation in the FS for soil leaching to groundwater risk based on the following:

- The soil tilling locations targeted the areas where the two highest COC concentrations were detected in soil (**Figure 6**) and the leaching to groundwater SSLs were met in both pre- and post-soil tilling sample results.
- Groundwater and surface soil results, when evaluated together, demonstrate remaining concentrations in surface soils that exceed the leaching to groundwater SSL are no longer contributing to groundwater exceedances.

5.0 Soil Vapor Extraction Pilot Test

This section presents a summary of the activities conducted and data collected during implementation of the SVE Pilot Test per the FS Pilot Test Work Plan. A detailed discussion of the pilot test implementation, data collection, and data analysis, including associated data, tables, and figures, is provided in **Appendix D**. The timeline of pilot test activities is summarized below in the following bullets:

- October 2014 – installed SVE wells and additional VMPs;
- August and September 2015 – conducted baseline monitoring, completed pilot system installation, performed SVE system startup;
- September 2015 through September 2016 – performed operation, maintenance, and monitoring (OM&M) activities associated with the SVE pilot test;
- September 2016 – MDEQ approved completion of the pilot test;
- September 2016 to September 2017 – continued operation of the SVE system; and
- September 2017 - Shut down SVE system.

5.1 SVE Pilot Test Objective

SVE is the process of applying a vacuum to unsaturated soils to increase the rate of volatilization of VOCs. A vacuum is applied to an extraction well(s) resulting in the enhanced flow of subsurface air to the well. Volatilization rates of hydrocarbons in subsurface soils are increased in response to the enhanced flow of air and the lowered vapor pressure. The hydrocarbon vapors in the soil gas are recovered by the extraction well(s) and are removed by an off-gas treatment system before they are discharged. Higher flow rates can result in a more rapid removal of VOCs from subsurface soils. The objective of the SVE pilot test was to provide data on the ability of SVE to mitigate the source of the COCs (PCE and TCE) in groundwater through SVE. Tasks associated with the SVE pilot test objectives included the following:

- Evaluate the effectiveness of improving groundwater conditions through utilization of SVE to mitigate groundwater smear zone impacts.
- Establish vacuum propagation and radius of influence (ROI) of vapor extraction wells, and measure the ROI and vapor extraction flow rate for each SVE well location.
- Evaluate the effect of changes of groundwater elevations on the ROI, vapor extraction rates, and mass removal of COCs by SVE.

5.2 SVE Pilot Test Key Components

The key components of the SVE pilot test design included the following.

- Installation of three VMPs (VMP-3 through VMP-5) in 2014 (**Figure 10**). These were installed in addition to the four VMPs that were installed in 2013 as two “nested” sets with a “deep” and a “shallow” point each (VMP-1S/VMP-1D and VMP-2S/VMP-2D). **Figure D-1** shows the construction detail for these VMPs.
    i. VMP-3 through VMP-5 was located within the expected ROI of SVE-4, SVE-6, and SVE-7 to evaluate vacuum propagation.
    ii. VMP-1S and VMP-1D installed in 2013, were used to measure vacuum propagation with depth in the central portion of the SVE pilot test area.
    iii. VMP-2S and VMP-2D, installed in 2013, were used to measure vacuum propagation with depth in the eastern portion of the SVE pilot test area.

- Installation of eight SVE extraction wells (SVE-1 through SVE-8), shown on **Figure 10**. **Figure D-1** shows the construction detail for these SVE wells. The expected footprint (i.e., area of influence) covered by the eight-well SVE system with a designed 50-foot ROI is approximately 63,000 square feet (1.44 acres).
- Setup and start-up of SVE pilot test equipment.
- Collection of baseline groundwater and soil vapor data (in the SVE pilot test area).
- Collection of groundwater and soil vapor data during operation of the SVE pilot test system.

5.3 SVE Implementation and Data Collection

Operation of the SVE pilot test system began on September 29, 2015, and performance optimization modifications (including reconfiguring the manifold) were made to the system during the first week of operation. The system was operated nearly continuously through September 2016, with full vacuum and flow from the eight SVE wells (i.e., each well is running 100 percent open). As discussed in Chapter 5.0, the SVE system continued to operate until September 2017 following MDEQ approval of the end of the pilot test in September 2016.

SVE system performance monitoring, summarized in **Table D-1,** was performed according to the schedule outlined in the FS Pilot Test Work Plan (AECOM 2015a) and the SVE System OM&M Plan (AECOM 2017b). Baseline and start-up groundwater, soil vapor, and SVE effluent vapor sampling was conducted to evaluate initial conditions, allowing the effects of the SVE system to be properly assessed. Performance monitoring for the SVE effluent was conducted twice-monthly for the first two months of pilot test operation and then monthly through August 2016. SVE effluent vapors were field-screened for VOC concentrations utilizing a photoionization detector (PID) and/or PCE-specific sorbent tubes. System readings, including SVE flow rates, vacuums, and temperatures, were recorded during routine OM&M visits in accordance with the procedures established in the FS Pilot Test Work Plan and the SVE System OM&M Plan.

5.3.1 Soil Vapor and SVE Effluent Vapor Summary

Soil vapor and SVE effluent vapor samples were analyzed at ALS Environmental Laboratory in Simi Valley, California; for VOCs by USEPA Method TO-15; and for fixed gases (oxygen, carbon dioxide, methane, hydrogen, and nitrogen) by American Society of Testing Materials (ASTM) Method D1946. Vapor samples collected from the exhaust of the treatment vessels were analyzed only for VOCs by USEPA Method TO-15. Soil vapor sample locations and results from VMPs are represented on **Figure 11** for both the July and October 2015 sampling events (both conducted prior to the SVE pilot testing) and included VMP-1S, VMP-1D, VMP-2S, and VMP-2D. VMP-3, VMP-4, and VMP-5 were only sampled in October 2015.

SVE vapor sample locations are illustrated on **Figure 12**. A summary of SVE effluent samples collected during the pilot test period from startup in September 2015 through July 2017 are presented in **Table D-2**. As shown on **Figure D-2**, the combined effluent vapor samples indicate that both PCE and TCE concentrations during SVE pilot test operation initially exhibited an increase, followed by an overall decline in concentrations, which is typical and expected. In general, the highest PCE and TCE concentrations were observed in the effluent from SVE-2, SVE-3, and SVE-8.

The estimated mass of PCE and TCE removed during the SVE pilot test was calculated using the following equation and the results are presented in **Table D-7**.:

Mass Removal Formula:

$M = T * Q * C$

M = incremental mass removed (pound)

T = time (minute)

Q = flow rate (ft^3/minute)

C = concentration (µg/m^3)

Conversion = (1,440 minute/day)*(1 pound/453,592,000 µg)*(1 m^3/35.31 ft^3)

The timeframes are based on SVE samples collected for performance monitoring of the SVE system. After an initial startup and shakedown period (September 29-October 20, 2015; October 21-30, 2015), SVE samples were collected on a monthly basis until September 2016 when the sampling frequency was reduced to a quarterly basis. The ability of the SVE system to remove PCE and TCE source mass is quantified using the mass removal calculations. The overall mass of PCE removed (30.48 pounds) and TCE (3.94 pounds) by the SVE pilot test demonstrates that the quantity of residual PCE and TCE source mass in the subsurface at Mission Wye is low.

5.3.2 Groundwater Summary

Sampling for performance monitoring of groundwater (MW-1, MW-3, MW-4, MW9, and MW-22) was conducted on December 2, 2015; March 15, 2016; June 30, 2016; and June 19, 2017. Additionally, the site-wide routine annual groundwater sampling events continued to occur. Eleven monitoring wells (MW-1, MW-3, MW-4, MW-5, MW-9, MW-12, MW-14, MW-18, MW-19, MW-21, and MW-22) were sampled during the annual event, as shown on **Figure 4**. Per the Groundwater Sampling Plan (RETEC 2007), monitoring well MW-1 was sampled to observe the background groundwater quality; monitoring wells MW-3, MW-4, and MW-5 represent former source area wells; and monitoring wells MW-9, MW-12, MW-14, MW-18, MW-19, MW-21, and MW-22 represent downgradient groundwater quality wells. The Harris Stock Well, the Gravel Pit Well, and surface water from the Gravel Pit Pond also were sampled as part of the downgradient sampling network.

Groundwater samples were analyzed at Pace Analytical Laboratory in Minneapolis, Minnesota, for VOCs by USEPA Method 8260. Groundwater analytical results from samples collected during the SVE operational period are summarized in **Table 4**. **Appendix E** presents a summary of the groundwater monitoring activities and the results from the annual groundwater monitoring event conducted in July 2017 and, at MDEQ's request (MDEQ 2017b), serves as the annual report.

Annual groundwater monitoring has been conducted when groundwater levels are highest during the year, typically during July, since 2001 (following completion of interim source removal activities). More frequent groundwater monitoring conducted between February 1991 and July 2000 indicated the highest groundwater concentrations occurred during this high groundwater period. One of the tasks identified in the FS Pilot Test Work Plan was to collect quarterly groundwater data over several seasons to evaluate the effect that changes in groundwater elevations has on COC concentrations. As shown in **Table 4**, groundwater samples were collected in July 2015, December 2015, March 2016, June 2016, and July 2016. Of these, the COC exceedances were observed only during the events conducted during high groundwater conditions in June and July 2016. **Figure 13** shows the comparison of the PCE plumes during high groundwater conditions from 2015 through 2017; PCE did not exceed the DEQ-7 standard during 2017 and TCE did not exceed the DEQ-7 Standard during 2015, 2016, or 2017. **Figure 14** shows the groundwater elevation hydrograph for monitoring well MW-3; the well is within the SVE treatment area and was selected as being representative of the overall groundwater elevation fluctuations at Mission Wye over time.

PCE and TCE concentrations were lower in samples collected during the performance monitoring events than in samples collected during the baseline monitoring event on July 23, 2015. Following the baseline monitoring event conducted in July 2015, PCE and TCE concentrations in the groundwater samples collected in December 2015; March, June, and July 2016; and June and July 2017 were less than the DEQ-7 standards with the sole exception of the PCE concentration in the sample collected from MW-3 during the June 2016 and July 2016 events. The reported PCE concentration of 5.2 µg/L and 6.4 µg/L, respectively, slightly exceeded the DEQ-7 Standard of 5 µg/L (MDEQ 2017a). As mentioned above, all COC concentrations in the groundwater samples collected in June and July 2017 were below the DEQ-7 Standard for PCE and TCE (**Table 4**). **Figure 13** shows the decreasing PCE plume between the baseline sampling in 2015 and the July 2017 events.

The decrease in PCE and TCE concentrations in groundwater between the baseline events conducted in July 2015 and the events conducted in June and July 2017 events provide the strongest line of evidence that SVE operation has been effective at reducing COCs in groundwater at Mission Wye.

5.3.3 ROI and System Performance Data

SVE system operational data collected during scheduled OM&M visits included measured vacuum applied to the SVE wells by the system, measured vacuum in the SVE effluent (individual lines at the manifold and in the combined lines), and flow rates (individual lines and combined lines). This data is presented in **Table D-4**.

Vacuum was measured at SVE wells and in VMPs to evaluate ROI and system performance in accordance with the FS Pilot Test Work Plan (AECOM 2015a). The October 2015 ROI data collection event was to establish the initial ROIs for each well during approximate low groundwater conditions. The August 2016 ROI data collection event was to calculate the ROIs for each well at approximate high groundwater. The March 2017 ROI data collection event was to evaluate ROI at varying applied vacuums. The June 2017 ROI data collection event was conducted to evaluate continued ROI of the SVE system. The USACE Soil Vapor Extraction and Bioventing Engineering Design Guide (2002) states that: “Vacuum (or pressure) measurements can be recorded at existing monitoring wells, or additional soil probes can be installed at various distances and directions from the extraction well, and at varying depths.” Based on the number of monitoring locations, the various distances the monitoring locations are located away from the extraction wells, and the number of vacuum measurements collected during the pilot test period, the vacuum measurements is sufficient to accurately measure ROI at Mission Wye.

A summary of each vacuum measuring event and subsequent ROI are summarized below:

- October 2015 – SVE wells individually exhibited an ROI nearly equal to or exceeding the 50-foot ROI estimated in the FS Pilot Test Work Plan (AECOM 2015b), with an average ROI of62.56 feet across the pilot test area. **Figures D-3** and **D-7** display the estimated ROI of each SVE well based on data collected on October 2, 2015.
- August 2016 – SVE wells individually exhibited an ROI nearly equal to or exceeding the 50-foot ROI estimated in the FS Pilot Test Work Plan (AECOM 2015b), with an average ROI of 56.49 feet across the pilot test area. **Figures D-4** and **D-8** display the estimated ROI of each SVE well based on data collected on August 17, 2016.
- March 2017 – SVE wells individually exhibited an ROI more than twice the 50-foot ROI estimated in the FS Pilot Test Work Plan (AECOM 2015b), with an average ROI of129.59 feet across the pilot test area. **Figures D-5** and **D-9** display the estimated ROI of each SVE well based on data collected on March 21, 2017. In addition, greater induced vacuum measurements correlated with greater applied vacuum. Data from this step testing is presented in **Table D-5**.
- June 2017 – SVE wells individually exhibited an ROI more than twice the 50-foot ROI estimated in the FS Pilot Test Work Plan (AECOM 2015b), with an average ROI of 108.16 feet across the pilot test area. **Figures D-6** and **D-10** display the estimated ROI of each SVE well based on data collected on June 19, 2017.

Based on the consistency of ROI tests over three events at eight SVE wells and the high permeability, porous nature of the coarse-grained, fluvially deposited, unconsolidated cobble and gravel, preferential flow channels and short circuiting are unlikely to be occurring at Mission Wye. In addition, the measured ROI during the SVE system operation exceeded the 50-foot design basis in the FS Pilot Test Work Plan for spacing of the SVE wells. The current SVE system provides adequate coverage of the subsurface soils potentially leaching to groundwater. In addition, ROI events were conducted at approximate low and high groundwater levels to determine what effect, if any, the changes in the groundwater elevation have on the effectiveness of the SVE system, including ROIs, vapor extraction rates, and mass removal rate of COCs. The ROI between the October 2015 and August 2016 events were similar, with the overall calculated ROIs within 20 percent of one another on average; however, the average ROI was significantly higher during the March and June 2017 events. This may be due to weather conditions and/or drying of the subsurface through continued SVE operation.

5.4 SVE Pilot Test Conclusions

As discussed in Section 5.1, the tasks associated with the SVE pilot test included the following.

- Evaluate the effectiveness of improving groundwater conditions through utilization of SVE to mitigate groundwater smear zone impacts.
- Establish vacuum propagation and ROI of vapor extraction wells and measure the ROI and vapor extraction flow rate for each SVE well location.
- Evaluate the effect of changes of groundwater elevations on the ROI, vapor extraction rates, and mass removal of COCs by SVE.

PCE and TCE mass removal was monitored throughout the duration of the SVE pilot test. Mass removal rates were higher during the first three months of the SVE pilot test operation. Mass removal rates were highest based on vapor concentrations of up to 3.29 µg/m^3 for PCE and 0.45 µg/m^3 TCE which were recorded for the two-week period from October 17-30, 2015, compared to the last two-week period of operation with vapor concentrations down to 0.21 µg/m3 for PCE and 0.00 µg/m3 TCE, June 6-19, 2016 (**Table D-7**). The mass removal data show a decline in mass reduction throughout the duration of the SVE pilot test with rates reaching near asymptotic levels near the shutdown. This is due to a decrease in actual mass of TCE and PCE available to remove and not because the SVE system performance is becoming less effective or reaching its technical limitations.

The SVE pilot test was shown to be effective in reducing groundwater PCE and TCE concentrations at Mission Wye as discussed in Section 5.3.2 and as shown in **Table 4**. Specifically, the highest PCE concentration in groundwater measured in the baseline July 2015 monitoring event was a concentration of 67.4 µg/L in well MW-3. The PCE concentration measured in MW-3 during the June 2016 quarterly SVE event was 5.2 µg/L (approximately an order of magnitude less than the PCE concentration during the baseline event) and was 1.2 µg/L during the June 2017 quarterly SVE event (a reduction to below the DEQ-7 Standard). Results from the annual groundwater event conducted in July 2017 confirmed that groundwater concentrations continued to be below the DEQ-7 Standard.

Vacuum was measured at SVE wells and in VMPs in October 2015, August 2016, March 2017, and June 2017. Overall, the measured ROI during the SVE Pilot Test exceeded the 50-foot design basis in the FS Pilot Test Work Plan for spacing of the SVE wells. The ROI events conducted at approximate low and high groundwater levels indicated that the changes in the groundwater elevation had little effect on the ROI (less than 20 percent difference in ROI on average between events). However, the observed system flow rate was less during the months with higher groundwater (approximately 200 cubic feet per meter [cfm] versus greater than 300 cfm. In general, due to the reduced flow rate, the mass removal rate calculated during the time period with higher groundwater also was lower than that during periods with lower groundwater. The average PCE removal rate during June and July 2016 (representing high groundwater) was approximately 0.03 pound per day, while the average PCE removal rate from September 2015 through May 2016 was approximately 0.10 pound per day. However, based on the removal rates from September 2016 through May 2017 (0.013 pound per day) versus June 2017 through July 2017 (0.015 pound per day), the reduced removal rate is likely more of a function of a reduced residual mass in the subsurface in addition to groundwater fluctuations.

6.0 Detailed Evaluation of Technologies

The following subsections describe the conceptual site model, the current conditions and risk characterization at Mission Wye (following the FS Pilot Study implementation and the June and July 2017 groundwater monitoring events), and a detailed evaluation and analyses of remedial technologies to address COCs at Mission Wye. Results from surface soil samples collected during the soil tilling pilot test indicate soil no longer presents a direct contact or soil leaching to groundwater risk at Mission Wye (see Chapter 4.0). Results from June and July 2017 groundwater sampling events indicate subsurface soils are no longer leaching COCs to groundwater at levels that would cause exceedances of DEQ-7 Standards. Residual COCs in soil vapor may pose a potential risk to construction workers or to workers or residents in the event future buildings are constructed.

6.1 Conceptual Site Model

The following bullets summarize the conceptual site model for Mission Wye:

- Subsurface soil beneath Mission Wye (below the fill) is comprised of about 40 feet of coarse-grained, fluvially deposited, unconsolidated cobble and gravel with a silt/sand matrix, and occasional sand lenses.
- The aquifer underlying Mission Wye has been identified as the Yellowstone Alluvium Aquifer. The following bullets provide additional hydrology information.
  - The saturated thickness of the Yellowstone Alluvium Aquifer varies from approximately 20 feet during periods of low flow (generally mid-August to mid-May) to 30 feet during periods of high flow (generally mid-May to mid-August). Observed depth to groundwater fluctuates approximately 10 feet (**Figure 14** presents a hydrograph of well MW-3 dating back to 1991 showing both seasonal fluctuations and historical high and low elevations of groundwater). The groundwater elevation for MW-3 in July 2018 was at 4398.21feet above mean sea level (amsl). That is the highest elevation recorded for MW-3 since July 2013 (4398.31 feet amsl). In July 1993 and July 2013, groundwater elevations also were higher than average for MW-3 at 4,400.46 feet amsl and 4,398.31 feet amsl, respectively. The results of the July 2018 groundwater monitoring results are presented in the 2018 Annual Groundwater Monitoring Report (AECOM 2019). Based on previous groundwater monitoring, there is a correlation between higher groundwater elevations and higher contaminant concentrations. Therefore, the July 2018 results likely represent the worst-case scenario for contaminant concentrations in groundwater.
  - There is no site-specific hydraulic conductivity data; based on the cobbles, gravels, silts, and sands noted in the site-specific well logs, hydraulic conductivity is estimated to range between 30-300 feet per day based upon literature values for unconsolidated sand and gravel mixes (Halford and Kuniansky 2002). This is further supported when literature values are compared to the hydraulic conductivity values measured at the Livingston Shop Complex and the Yellowstone Alluvium Aquifer (average is 211 feet per day), which is located 5 miles from Mission Wye and has a similar lithology (both locations are within the Yellowstone Alluvium Aquifer). Effective porosity also is expected to be similar to the range (0.15 to 0.25) identified at the Livingston Shop Complex.
  - Based on the potentiometric surface from July 2017 (**Figure 4**), the measured average hydraulic gradient of the aquifer at Mission Wye is 0.004; therefore, groundwater velocities in the Yellowstone Alluvium Aquifer ranged from three to ten feet per day.
  - Groundwater flow is generally to the northeast as shown on **Figure 4**.
- The history and background of operations that occurred at Mission Wye were summarized in Sections 1.2 and 2.1. The following bullets present a summary of interim remedial actions.
  - Perched water was removed, treated, and discharged in 1995.
  - Clay source material, ALS, and impacted soil were excavated from the North, South, Center, and East Cells, and from the ALS parking lot and Seep Areas prior to 2000 (**Figure 2**).

  - Additional surface and subsurface soil sampling was completed in 2007 to confirm results of previous removal activities.

- PCE and TCE concentrations in groundwater above DEQ-7 Standards have been limited to a few wells following completion of soil excavation activities in 2000 and exceedances were observed only during seasonally high groundwater. While the interim remedial actions removed the majority of soil impacts influencing groundwater, this suggests a residual VOC mass remained and was located in soil that was generally unsaturated (smear zone soils) as leaching to groundwater only occurred when the groundwater elevations were high. The DEQ-7 Standards were met during high groundwater elevations in June and July 2017; however, these samples were collected as the SVE system was concurrently operating. Annual groundwater monitoring occurred in July 2018, approximately one year after the SVE system was turned off, and exceedances of the DEQ-7 Standard occurred in the DEQ split sample (14 µg/L) and the primary sample (16.6 µg/L). A Park County zoning restriction review documented that the property owned by BNSF and MRL, in addition to the property owned by Heart K Land & Cattle Company that is located downgradient of the former source areas and west of Highway 89, is currently unzoned. The property located to the east of Highway 89 is part of the East Yellowstone Zoning District and is zoned for residential and agriculture development. The area of COC detections in groundwater consists of vacant rural land, an inactive gravel pit, and grazing land. The BNSF and MRL property does not have any existing permanent structures and no future development is planned. The SVE system shed is the only temporary structure on BNSF's property. BNSF will obtain MDEQ's approval prior to decommissioning and removing the SVE system.

6.2 Summary of Risk Characterization

Conditions at Mission Wye have changed since the development of the HHRA Amendment due to the implementation of the FS pilot test. Following is a summary of current conditions and risk characterization per media type.

- **Soil Direct Contact**
  - Surface soil: The surface soil risk in the 2014 HHRA Amendment was driven by elevated concentrations of PCE, and to a lesser extent TCE, at sample location SS-88d. Soil tilling results collected during pilot tests were below the SSCL for Soil Direct Contact for Child Resident in both the baseline and post-tilling samples. Post-tilling PCE and TCE results were below the detection limits (**Table 3** and **Figure 9**). Therefore, a soil direct contact risk is no longer present for all receptors.
  - Subsurface soil. The 2014 HHRA Amendment did not find a direct contact risk associated with subsurface soils. Soil samples collected from depths equal to and greater than two feet during the 1993 risk assessment, confirmation samples collected from the excavation areas in 1997 and 2000, test pit sample results collected in 2007, and soil samples collected from VMP borings in 2013 were evaluated in the HHRA Amendment.
- **Soil Leaching**
  - The two sample locations included in the soil tilling pilot test previously had concentrations exceeding 10 times the SSCL for leaching.. Locations exceeding 10 times the SSCLs for leaching were chosen for the pilot test to determine the effectiveness of the technology at treating the higher contaminant concentrations. Based on the pilot test results, these soils no longer present a leaching to groundwater risk; however, this evaluation only pertains to surface soil leaching to groundwater.
  - Soil tilling results collected during the pilot test were below the SSCLs for leaching (**Table 1**) in both the baseline and post-tilling samples from both areas (**Table 3** and **Figure 9**) where samples exceeded 10 times the soil leaching cleanup level.
  - PCE and TCE were below the detection limits in all but the post-tilling PCE sample collected from SBS-7D (estimated concentration of 46.7 microgram per kilogram (µg/kg) vs. leaching cleanup level of 130 µg/kg).

  - Groundwater concentrations in monitoring wells immediately downgradient of surface soil sample locations that have previously exceeded SSCLs for leaching to groundwater have shown steadily decreasing concentrations post interim actions and pilot testing. More recently, one groundwater sample location exceeded the SSCL during a historic high groundwater elevation event. It is presumed that surface soils no longer present a leaching to groundwater risk, but localized subsurface soil contamination near MW-3 poses a potential leaching to groundwater risk.
  - Three additional sample locations (SS-146, ALSAB-2, and SAB-2 shown on **Figure 6**) are cross and upgradient of monitoring wells MW-2 and MW-4 and have exceeded the SSCL for leaching to groundwater. Groundwater concentrations of PCE and TCE in MW-4 have been below the DEQ-7 Standard since 2013 and 2003, respectively. Therefore, while a VOC mass may remain within those soil locations, the concentrations are not resulting in exceedances of the DEQ-7 Standards.
  - The seven remaining surface and subsurface locations (SS-83, CC-B, SS-157, EC-A, EC-C, SS-88d, and SBS-7D shown on **Figure 6**) are upgradient of monitoring wells MW-3 and MW-5.Groundwater concentrations of PCE and TCE in MW-5 have been below the DEQ-7 Standard since 2005 and 2003, respectively. Groundwater concentrations of PCE in MW-3 have decreased following operation of the SVE pilot system and were less than the DEQ-7 Standard in the quarterly pilot test samples and annual groundwater samples collected during high groundwater in June and July 2017. TCE concentrations have been below the DEQ-7 Standard since 2009. An exceedance of the DEQ-7 Standard for PCE occurred in July 2018 when the groundwater elevation for MW-3 was the highest ever reported.

- **Groundwater**
  - The 2014 HHRA Amendment reported that DEQ-7 Standard for PCE and/or TCE was exceeded in samples collected between July 2010 and July 2013 from four wells (MW-3, MW-4, MW-9, and MW-22). Concentrations of PCE at MW-3 were consistently elevated above DEQ-7 Standards during high groundwater conditions (during the summer months); however, PCE and TCE concentrations have continued to decrease over time, particularly following implementation of the SVE pilot test in 2015. See **Figures 7** and **8** for historical groundwater concentrations and associated groundwater elevations between 2000 and 2017 in select monitoring wells. All groundwater sample results were below the DEQ-7 Standards of five µg/L for PCE and TCE in the June and July 2017 monitoring events, but an exceedance of PCE occurred in samples collected from MW-3 in July 2018. Therefore, while the 2014 HHRA Amendment indicated that future use of groundwater for domestic purposes may pose unacceptable risk to receptors due to the exceedance of the DEQ-7 PCE and TCE Standards, recent groundwater sampling results show decreases compared to historical concentrations, and DEQ-7 Standards have been met in all wells except for MW-3. This may indicate that interim actions have eliminated potential risks from groundwater exposure; however, subsequent monitoring would be needed to confirm that DEQ-7 Standards have been achieved.
  - High water annual monitoring will continue until two consecutive years demonstrate groundwater concentrations confirm that DEQ-7 Standards have been achieved. Since 2000 (post-excavation activities), groundwater DEQ-7 Standards have generally been exceeded in groundwater samples collected only during high groundwater conditions. Based on historical exceedances, COCs are most likely present at a depth between the seasonal high and low groundwater elevations and the capillary fringe, which is expected to extend from approximately 13 to 18 feet bgs at Mission Wye.

- **Soil Vapor**
  - Individual SVE wells were monitored quarterly for PCE and TCE between September 2015 and June 2016. Concentrations in samples collected from four individual wells (SVE-4, SVE-5, SVE-6, SVE-7) decreased with some PCE concentrations meeting the indoor air SSCL and the construction and trench worker screening levels. Decreases also were observed at the combined effluent (pre-treatment) sample location. When the SVE pilot test ended, samples were not collected at the individual SVE wells and, instead, monitoring occurred at the combined effluent sample location, mid-treatment location, and an exhaust location. Decreases in PCE and TCE continued at the combined effluent location; however, the combined concentrations do not meet

the indoor air SSCL or construction and utility worker cleanup levels. The concentrations represented by the individual SVE wells are more realistic of soil vapor risk exposure to a construction worker or utility worker in an excavation/trench, or a person in a hypothetical building potentially exposed via vapor intrusion of subsurface vapors to indoor air. The continued decreases in PCE and TCE at the combined effluent sample location could be reflective of continued decreases in PCE and TCE at the individual wells. However, additional sampling at the individual vapor wells would be needed to confirm soil gas meets SSCLs.

  - Based on soil results from the year 2000 confirmation sampling at the North Parking Lot and Seep areas (ALSAB-2 and SAB-2), there could be a potential soil vapor risk present at Mission Wye. No soil vapor data has been collected in those areas.

- **Vapor Intrusion.** The results of the vapor intrusion evaluation indicated that concentrations of trans-1,2-DCE, TCE, and PCE in soil and/or groundwater have the potential to migrate, as vapors, into the indoor air of hypothetical future buildings overlying the Mission Wye property, in the event that this area is developed. Currently, there is no vapor intrusion pathway since there are no buildings present. It is important to note that the soil vapor results to indoor air screening levels is conservative as attenuation between the subsurface and indoor air is not accounted for.
- **Ecological.** The HHRA Amendment determined there was no potential risk to ecological receptors and no further evaluation is warranted.

6.3 Screening Criteria

6.3.1 Initial Alternatives Screening Criteria

In the FS Pilot Study Work Plan Revision 2 (AECOM 2013c), remedial alternatives were screened for treating the compounds of potential concern identified in the HHRA Amendment (RETEC 1993), which included PCE and TCE in soil and groundwater at Mission Wye. This FS Report also includes remedial alternatives to address soil vapor in the subsurface soils based on the findings in the MDEQ Memo (MDEQ 2018). The list of available technologies was developed from the Federal Remediation Technologies Roundtable (FRTR 2014), Remediation Technologies Reference Guide, Version 4.0. The alternatives were screened against the criteria of applicability, implementability, effectiveness, reliability, and cost and are further discussed in Chapter 3.0.

6.3.2 Evaluation/Cleanup Criteria

Based on the comments received from MDEQ (MDEQ 2015a) on the 2014 Draft FS Report, the evaluation of alternatives was conducted using the 1993 version of Section 75-10-721 of CECRA, as provided in a 1995 legislative savings clause. The remedial alternatives were screened against these criteria in this revised FS Report:

- Protection of human health and the environment – addresses whether an alternative attains a degree of cleanup of the hazardous or deleterious substance and control of a threatened release or further release of that substance to assure present and future protection of public health, safety, and welfare, and the environment. (Threshold Criteria).
- Compliance with ERCLs – addresses whether an alternative will comply with applicable and well-suited federal and state ERCLs. (Threshold Criteria).
- Permanent solutions – evaluates whether the remedy provides long-term effectiveness and permanently and significantly reduces the threat posed by the hazardous and deleterious substances at Mission Wye.
- Treatment or resource recovery technologies reduce toxicity, mobility, and volume – addresses the degree that alternatives reduce toxicity, mobility, and volume. Treatment technologies are generally preferred to simple disposal options.
- Cost-effective – This criterion takes into account the total short- and long-term costs of the actions, including operations and maintenance activities for the entire period during which the activities will be

required. Cost-effectiveness evaluates the direct capital, indirect capital, and OM&M costs and, for this evaluation, a 3 percent discount for net present value was used.

- Short-term effectiveness – addresses the period of time needed to complete the alternative and any adverse impact on the community, workers, or the environment during the construction and implementation period.
- Implementability - refers to the technical and administrative feasibility of an alternative including the availability of materials and services needed to carry out a particular option.

6.4 Remedial Technologies

Based on discussions with MDEQ and subsequent submittal of a list of potential remedial technologies in the FS Pilot Test Work Plan (AECOM 2015a) and the conditions after pilot testing, the list of appropriate technologies evaluated in this revised FS Report include the following:

- No Action;
- ICs;
- Soil Tilling;
- SVE; and
- MNA

For calculating costs of all remedies, except No Action, it was assumed that two years of groundwater monitoring would be needed to confirm groundwater standards are met. However, MDEQ will establish the required groundwater monitoring schedule after it issues the ROD.

6.4.1 Soil Alternatives

Under the current conditions, as discussed in Chapter 4.0, direct contact to soil no longer presents an unacceptable risk at Mission Wye. However, localized subsurface soil contamination is a source of contamination for soil vapor and groundwater. Therefore, technologies discussed below are No Action, Soil Tilling, and SVE at Mission Wye.

6.4.1.1 No Action

No Action provides the baseline by which other options are compared. Under this approach no additional activities would be implemented at Mission Wye. Although intrinsic natural attenuation would still be occurring, no remedial action or monitoring would be performed.

No Action is protective of human health and the environment in the short term and long term for surface soils since no unacceptable risk exists, but risks from subsurface soils would remain. No Action does not meet ERCLs on its own because groundwater contamination exceeds DEQ-7 Standards at MW-3. No Action is not effective or reliable in the short-term because unacceptable risks would remain. No Action would not permanently reduce the risk and would not utilize resource recovery technologies. The total net present value for implementing No Action is $0.00.

6.4.1.2 Soil Tilling

In-situ aeration/soil tilling was pilot tested successfully at Mission Wye and is a remediation technology where contaminants in soil are degraded by volatilization, photolysis, and natural degradation via aerobic microorganisms to produce innocuous or stabilized byproducts. During in-situ aeration, contaminated soils are excavated, churned and/or tilled to stimulate attenuation. Soil tilling is only viable for surface soils and dependent on how deep the equipment can dig.

Soil tilling is protective of human health and the environment in the short term and long term in surface soils since no unacceptable risk exists, but risks from subsurface soils would remain. Soil tilling would permanently reduce

the risk in surface soils,but does not utilize treatment or resource recovery technologies since PCE and TCE are not biodegraded aerobically. Soil tilling is implementable and cost-effective as the implementation of the soil tilling pilot study was approximately $8,000. Although no unacceptable risk exists from surface soils leaching to groundwater, a cost estimate is provided for comparison purposes. For cost estimate purposes, BNSF assumed two 10 foot by 10 foot areas, which are tilled down to a depth of two feet bgs. Tilling would occur once per month over non-winter months (April through October), and soil sampling will occur semi-annually for a period of one year. The total value for implementing Soil Tilling is $36,900.

6.4.1.3 SVE

SVE, which was pilot tested at Mission Wye, is the process of applying a vacuum to unsaturated subsurface soils to increase the rate of volatilization of VOCs for remediation. SVE also can facilitate the removal of COCs in the capillary fringe and smear zone when applied during low groundwater levels. At well MW-3, groundwater has fluctuated from a historical high of 4,400.46 feet amsl on July 13, 1993 to a historical low of 4,386.38 feet amsl on March 15, 2016, a difference of 14.08 feet. Therefore, SVE is able to address the smear zone during periods of low groundwater elevation. A vacuum is applied to an extraction well screened in the subsurface resulting in the enhanced flow of subsurface air radially to the well. Volatilization rates of VOCs in subsurface soils are increased in response to the enhanced flow of air and the lowered vapor pressure. The VOCs in the soil gas are recovered by an extraction well and can be directly discharged to the atmosphere through a diffuser stack but are often removed by an off-gas treatment system before they are discharged.

SVE can be effective on VOCs (including TCE and PCE) based on their ability to be removed through volatilization. Both TCE, with a vapor pressure of 69 millimeter mercury (mm Hg) at 25 degrees Celsius (°C), and PCE, with a vapor pressure of 18.5 mm Hg at 25°C, are volatile compounds (Hazardous Substances Databank 2017). SVE also is more effective with soils with higher permeability (e.g., sands and gravels). Other advantages of SVE include: it has a reasonably short implementation time to reach remedial goals, is readily implemented as a remediation technology and is still in place from the pilot test, has a larger ROI compared to other technologies, and is relatively cost-effective on a per pound of COC removed basis. Disadvantages include the limited effectiveness in saturated conditions and the requirement for vapor treatment equipment. In addition, heterogeneous and low-permeability soils can limit the effectiveness of SVE at source removal. SVE also can be problematic in cold climates due to potential freezing of condensate and extracted vapor within piping, manifold, and valves. Above grade piping, manifolds, and associated equipment may require heat tracing and/or insulation to prevent ice build-up during low temperature conditions.

SVE is implemented through application of a vacuum to subsurface extraction wells with a blower. There are several types of vacuum blowers or pumps used for SVE, but the most common types include Regenerative Blowers, Rotary Lobe Blowers, Rotary Claw Blowers, Centrifugal Fan Blowers, and Liquid Ring Pumps. Different types of vacuum blowers or pumps generate different levels of air flow and vacuum; the SVE system currently in place uses a Gast Manufacturing, Inc. R7100R-50 regenerative blower.

The effectiveness of SVE for treating the COC mass in subsurface soils at Mission Wye was pilot tested as discussed in Chapter 5.0. The SVE system layout is shown on **Figure 16**. The system has been effective at removing PCE and TCE source mass from the subsurface as evidenced by decreased combined vapor concentrations over time (**Figure D-2**). As of July 31, 2017, the SVE system removed an estimated total of 30 pounds of PCE and 4 pounds of TCE from the subsurface through vapor extraction (**Table D-7**). In addition, groundwater monitoring results have shown a reduction in PCE and TCE groundwater concentrations based on groundwater concentrations following the pilot test (**Table 4**). The ROI for each SVE well ranged from approximately 40 to 130 feet (**Figures D-3** through **D-6**).

SVE also can reduce the concentrations of COCs in groundwater by treating the source of groundwater COCs. Since 2016, MW-3 has fluctuated from a high of 4398.21 feet amsl (July 2018) to a low of 4,386.38 feet amsl (March 2016), a total of almost 12 feet (**Figure 14**). Therefore, by itself, this technology is protective of human health and the environment in the short-term and long-term. This technology does not meet ERCLs on its own. This alternative would provide a permanent solution for and permanently reduce the risk posed by treating residually impacted soils. This alternative would not utilize resource recovery technologies. However, it does reduce the mobility and volume of the contaminants because it treats the contaminated vapors. It is

implementable since materials and personnel needed to construct an SVE system are commonly available, and an SVE system currently exists and could be used with minimal revamping.

The costs for implementation of the SVE pilot study and subsequent system operation were approximately $557,000. The total net present value for implementing SVE in the future assumes two years of additional operation is $167,100. Based on a first order decay of curve-fit of PCE groundwater concentrations between 2011 and 2018, the DEQ-7 groundwater standard of 5 µg/L is predicted to be achieved within 1.5 years.

6.4.2 Groundwater Technologies

Under the current conditions, as discussed in Chapter 4.0, groundwater concentrations are decreasing, but SSCLs are not met in the area of MW-3. Technologies discussed below are No Action, ICs, and MNA.

6.4.2.1 No Action

No Action provides the baseline by which other options are compared. Under this approach no additional activities would be implemented at Mission Wye. Although intrinsic natural attenuation would still be occurring, no remedial action or monitoring would be performed.

No Action is not protective of human health and the environment in the short term and long term since groundwater exceeds SSCLs near MW-3. This alternative does not meet ERCLs. No Action would not permanently reduce the risk, nor does it utilize resource recovery technologies. This alternative is easily implementable and cost-effective. The total net present value for implementing No Action is $0.00.

6.4.2.2 ICs

ICs are restrictions on the use of real property to mitigate risk to human health or the environment. They may include recorded restrictions placed in the chain-of-title of the property, such as restrictive covenants, or other mechanisms such as a controlled groundwater area. Section 75-10-727, Montana Code Annotated (MCA), allows “a landowner to restrict the use of the landowner's real property to mitigate the risk posed to the public health, safety, and welfare and the environment without conveying the property or creating a dominant and servient estate.” The benefit of these types of controls is that they are binding on subsequent purchasers of the property. The use of restrictive covenants and deed restrictions are forms of ICs that are available in Montana Property owners may petition MDEQ to revise or remove the ICs when no longer needed and “an institutional control must be removed if there is not an unacceptable risk posed to the public health, safety, and welfare and the environment”.

ICs do not remediate the contamination; however, they can be effective for managing potential for human exposure to contaminants. The effectiveness of ICs depends on the mechanisms used and the durability of the control. ICs may be layered to improve effectiveness. They are considered easy to implement and inexpensive to implement and maintain, although long-term enforcement may increase costs.

ICs could be applied to prevent contact with contaminated groundwater. The evaluation of the ICs is discussed in more detail in Section 6.4.3.2 and that discussion also is applicable to implementing ICs to restrict groundwater exposure.

ICs can be protective of human health in the short term and long term. The IC would restrict property use for potential exposure pathways to contaminated groundwater. An IC would not meet ERCLs on its own. The implementation of ICs would not offer a permanent solution, but could be effective, when combined with other alternatives. This alternative would not utilize resource recovery technologies. The total net present value for implementing ICs is $67,500, including 30 years of annual inspections and IC review every five years. This estimate does not include the cost of enforcing a violation of an IC.

6.4.2.3 MNA

MNA is an in-situ groundwater treatment remedy that uses naturally-occurring processes to reduce concentrations and achieve cleanup levels. In addition to biodegradation and chemical transformation, other attenuation

processes that reduce contaminant concentrations over time include sorption, dispersion, dilution, dissolution, and volatilization. Monitoring is essential to evaluate the effectiveness of MNA.

Groundwater monitoring at Mission Wye provided evidence that natural attenuation is occurring as concentrations of PCE and TCE have decreased from 1993 to 2018. Based on the current data, and as more fully explained in the Technical Protocol for Evaluation of Natural Attenuation of Chlorinated Solvents in Ground Water (USEPA 1999), MDEQ has determined that significant biodegradation is not occurring at Mission Wye; however, COC concentrations are decreasing due to the other processes. Overall, groundwater monitoring results indicate the dissolved-phase plume is stable or decreasing over time. Based on the results of monitoring at Mission Wye (**Figures 7**, **8**, and **13**), this technology is feasible for cleanup of groundwater at Mission Wye and will be considered for further evaluation in the FS Report.

MNA by itself is not protective of human health and the environment in the short term, but could be combined with other technologies to meet the protectiveness criteria. This technology does not meet ERCLs on its own, but could be combined with other technologies to meet ERCLs. This technology would provide a permanent solution for groundwater, but only in the long term once DEQ-7 Standards are met. MNA would not utilize a resource recovery technology. This alternative is implementable and cost-effective, provided DEQ-7 Standards are met within a reasonable timeframe. For purposes of estimating costs, four years of monitoring was assumed. The total net present worth for implementing MNA is $143,300 for four years of monitoring.

6.4.3 Soil Vapor Technologies

Under the current conditions, as discussed in Section 6.2, there is currently an incomplete pathway for indoor air risk via soil vapor due to the absence of buildings at Mission Wye. Also, as discussed in Section 6.2, in absence of other data, the comparison of SVE effluent data to SSCLs for future construction workers in a trench or excavation, presents a potential risk when compared to the MDEQ default for construction project duration. MDEQ has requested an evaluation of alternatives for these situations. Technologies discussed below are No Action, ICs, and SVE.

6.4.3.1 No Action

No Action provides the baseline by which other options are compared. Under this approach no additional activities would be implemented to address the potential pathway for indoor air soil vapors if the property was developed and buildings were built at Mission Wye. Although intrinsic natural attenuation would still be occurring, no monitoring or reporting would be performed and remedies would not be implemented.

The No Action would not address the potential for soil vapors to impact hypothetical future buildings. Therefore, by itself, No Action is not protective of human health and the environment in the short term and long term, and does not meet ERCLs. No Action would not permanently reduce the risk and would not utilize resource recovery technologies. It is implementable and cost effective. The total net present value for implementing No Action is $0.00.

6.4.3.2 ICs

Section 6.4.2.2 describes ICs. The most appropriate IC for Mission Wye to address soil vapor is a restrictive covenant limiting use of the property in one or more of the following ways: 1) prohibit the construction of buildings; or 2) require vapor intrusion monitoring and/or vapor mitigation measures be implemented if buildings (that are intended to be occupied by either residents or commercial/industrial workers) are constructed in the future; 3) prohibit excavations beyond a specified depth; or 4) require engineering controls during such excavations to minimize vapors. ICs do not remediate the sources of contamination.

If selected as part of the final remedy in the ROD, restrictive covenants could be recorded in the County property records and would be part of the publicly available property chain of title. Additionally, as part of its internal system and process for tracking restrictions on real property, BNSF maintains an internal geographic information system (GIS) mapping program for its real property. The GIS system includes an environmental layer that identifies property use restrictions (whether via internal controls or use restrictions through recorded instruments). The Mission Wye Facility is mapped onto an environmental layer in that GIS identifying it as an active environmental

investigation and remediation site. Internal BNSF departments including Engineering, Real Estate, and Environmental, consult the GIS as part of any construction project planning and land use decisions (including acquisitions, dispositions, and permitting). The recorded restrictive covenant footprint will be mapped in the GIS and the IC will be available for download / review. Restrictive covenants also would be recorded on the property owned by MRL.

ICs would restrict the future use of the property and although ICs do not remediate the contamination, they can be effective for managing potential for human exposure to contaminants. Therefore, by itself, an IC is protective of human health in the short term and long term. The ICs will restrict property use for the vapor intrusion pathway, which is currently incomplete, and will prevent exposure via an indoor air hypothetical pathway. They also will prevent potential for exposure to soil vapor that may accumulate in an excavation. An IC would not meet ERCLs on its own. The implementation of ICs would permanently reduce the risk posed by soil vapor intrusion. in the short-term and long-term. This alternative would not utilize resource recovery technologies. The area with soil vapor, along with property ownership (BNSF and MRL), is shown on **Figure 15**. The total net present value for implementing ICs is $67,500, including 30 years of annual inspections and IC review every five years. This estimate does not include the cost of enforcing a violation of an IC.

6.4.3.3 Soil Vapor Extraction

SVE was described as a remedial technology for soil in Section 6.4.1.3. SVE also is effective on VOCs (including TCE and PCE) in soil vapor based on their ability to be removed through volatilization. The effectiveness of SVE for treating the remaining COC mass through SVE at Mission Wye was pilot tested as discussed in Chapter 5.0. The SVE system layout is shown on **Figure 16**. The system has been effective at removing PCE and TCE source mass through extraction of soil vapor from the subsurface as evidenced by decreased combined vapor concentrations over time (**Figure D-2**).

SVE would address soil vapor from subsurface soil sources that may exceed indoor air screening levels or construction worker inhalation screening levels. Therefore, by itself this technology is protective of human health and the environment in the short term and long term. This technology does not meet ERCLs on its own because groundwater exceeds cleanup levels. This alternative would provide a permanent solution for soil vapor and permanently reduce the potential risk posed by treating contaminated soil vapor to below indoor air screening levels and construction work inhalation screening levels for the currently incomplete pathway. This alternative does not use resource recovery technologies. However, it does remove and treat contaminated vapors; therefore, it reduces the mobility and volume of the contaminants. It is implementable since materials and personnel needed to construct an SVE system are commonly available, and an SVE system is currently in place and could be used with minimal revamping. The total net present value for implementing the SVE technology is $167,100 for two years of operation, including the preparation of a Remedial Action Work Plan.

6.5 Comparative Evaluation of Alternatives

Remedial alternatives were developed through initial screening as discussed in Section 6.3.1 and the evaluation criteria screening in Section 6.3.2. Retained technologies for Mission Wye were evaluated to ensure that they met PRAOs and the requirements of CECRA, including mitigation of risks to human health and the environment. The objective of the comparative technology evaluation process is to aid in determining the most appropriate remedial measure for Mission Wye. To accomplish this, the technologies discussed above were sorted into alternatives for each impacted media and numbered. This resulted in three soil alternatives, three groundwater alternatives, and three soil vapor alternatives for Mission Wye as listed below.

Soil Alternatives:

1. No Action
2. Soil Tilling
3. SVE

Groundwater Alternatives:

1. No Action
2. MNA
3. ICs

Soil Vapor Alternatives:

1. No Action
2. ICs
3. SVE

Each remedial alternative was evaluated for protection of human health and the environment, compliance with ERCLs, permanent solutions, treatment or resource recovery technologies, and cost-effectiveness. These criteria are from the 1993 version of Section 75-10-721 of CECRA, as provided in a 1995 legislative savings clause. Following is an evaluation of each alternative for each criterion. Evaluation results are provided in **Table 5**.

6.5.1 Protection of Human Health and the Environment

No Action is not protective of human health or the environment because people could potentially be exposed to contamination in soil vapor and groundwater. Soil tilling, SVE, and MNA for soil and groundwater are not protective of human health and the environment on their own, but would be if combined with other alternatives. ICs are protective of human health in the short term by reducing potential exposure to contaminated vapors and groundwater; ICs can be protective in the long term with adequate inspections and any necessary enforcement to ensure compliance with the restrictions..

6.5.2 Compliance with ERCLs

No Action would not comply with ERCLs. ICs, soil tilling, and SVE would not comply with ERCLs on their own and would have to be combined with other alternatives. MNA would comply with ERCLs after groundwater cleanup levels are met. .

6.5.3 Permanent Solutions

No Action is not permanent because contaminated soil vapor and groundwater would remain at levels that would continue to pose potential risks to construction workers and receptors that may be exposed in future buildings. For ICs to provide long-term effectiveness and be permanent, the ICs would need to require that construction workers take appropriate measures to mitigate exposure to vapors in trenches. ICs also would need to require assessment, mitigation measures, and confirmation sampling for any future buildings. All risks are mitigated and ICs are adequately monitored to ensure compliance with their terms. The ICs would need to include regular inspections and enforcement if the ICs are not followed. Soil tilling and SVE are permanent because contaminant mass is removed and treated. MNA requires time to demonstrate effectiveness and permanence.

6.5.4 Treatment or Resource Recovery Techniques

No Action and ICs would not by themselves reduce the toxicity, mobility, or volume of contamination. However, No Action and ICs would not preclude natural attenuation from occurring. Through the in-situ processes including dispersion, dilution, sorption, and volatilization, natural attenuation would eventually reduce mobility given enough time. Soil tilling and SVE incorporate some form of treatment that results in reduced mobility or volume of contamination. MNA would reduce the mobility of COCs.

6.5.5 Cost Effectiveness

An evaluation of capital and OM&M costs is provided for each alternative based on estimated cleanup timeframes. During the detailed analysis, capital and OM&M cost estimates were assembled for each alternative with a contingency range of at least +50 to -30 percent, and include the following:

- Direct capital costs – including cost for construction; equipment, labor, and materials; site development and building; and disposal costs;
- Indirect capital costs – including cost for engineering, construction oversight, start up and shakedown, and contingency allowances; and
- OM&M costs – including costs for post-construction labor, maintenance, administration, long-term monitoring, equipment replacement, and periodic reviews.

As shown in **Appendix F**, **Tables F-**1 to F**-6**, costs to implement the alternatives range from $0.00 for the No Action alternative to $167,100 for SVE. Costs for MNA ($143,300) and ICs ($67,500) are less than the costlier alternative of SVE ($167,100). Although additional treatment of soil vapor through SVE will remove additional COC mass, the same level of protection of human health can be achieved through the lower cost ICs alternative. Soil tilling is not as costly as SVE, ICs, or MNA, but would not provide any greater level of protection because its effectiveness is limited to surface soils and confirmation sampling indicates that PRAOs are currently met in surface soil.

6.5.6 Short-term Effectiveness

No Action and MNA do not provide short-term effectiveness because SSCLs in soil vapor and groundwater would not be met in the short-term. Soil tilling presents a limited risk to workers during operation of heavy equipment used for tilling. SVE presents a limited risk to workers because the system is already installed. These risks could be minimized by following proper safety procedures. ICs could minimize short-term risk to construction workers and future receptors that could potentially be exposed to soil vapor if steps are taken to adequately ventilate trenches. ICs also would be effective at addressing potential risks to future receptors that could potentially be exposed to indoor air contamination in future buildings. All alternatives are expected to achieve PRAOs in 2-4 years.

6.5.7 Implementability

No Action is easily implemented. ICs are easy to implement but require periodic review and enforcement to ensure compliance. MNA would require time for subsequent monitoring and to ensure SSCLs are met, and environmental contractors are locally available to perform the work. Equipment and environmental contractors are locally available for soil tilling. SVE equipment and power is already in place, and environmental contractors are locally available to operate the system.

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Tables

Table 1 Summary of Site-Specific Cleanup Levels for Soil, Groundwater, and Soil Vapor
BNSF Mission Wye, Livingston, Montana

COC	Soil Direct Contact Cleanup Levels[1] (mg/kg)					Soil Vapor Cleanup Levels[1,2] (µg/m^3)			Groundwater Cleanup Levels[3] (µg/L)	Site-Specific Leaching Cleanup Levels[1] (µg/kg)
	Commercial/ Industrial Worker	Construction/ Excavation Worker	Visitor/ Trespasser (Adolescent)	Adult Resident	Child Resident	Site-Specific Industrial Indoor Air Screening Levels	Construction Worker	Utility Worker	DEQ-7 Standard	
Tetrachloroethene (PCE)	557	739	4,077	134	112	235	353	1,460	5	130
Trichloroethene (TCE)	27	38	222	6.4	5.7	15	17	73	5	100

Notes:

[1] = Cleanup levels are based on a noncancer hazard index (HI) of 1 and cancer target risk level (TRL) of 1x10-5. The lower of the noncancer and cancer value was selected.

[2] = Soil vapor cleanup levels are protective of construction and utility workers involved in potential future excavation and trenching activities at Mission Wye. The values for the utility worker assume a maximum 30-day exposure frequency per year, while values for the construction worker conservatively assume 124 days per year (DEQ default for construction project duration). However, construction worker exposure to soil vapor within an open excavation for the entire 124-day construction project duration is not reasonably expected to occur under site-specific conditions.

[3] = Groundwater cleanup levels are the DEQ-7 Groundwater Standard (*Circular DEQ-7 Montana's Numeric Water Quality Standards* , Human Health Standards for Groundwater, May 2017.

COC = constituent of concern.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
µg/L = micrograms per liter
µg/m^3 = micrograms per cubic meter

Table 2 Risk Assessment Receptor Summary
BNSF Mission Wye, Livingston, Montana

Contaminated Media (Below)	Exposure Units (Right)	BNSF Property		MRL Property		Heart K Land & Cattle Company	
		Receptor*	Cleanup Criteria	Receptor*	Cleanup Criteria	Receptor*	Cleanup Criteria
Surface Soil[1]		---	---	- Child Resident	- Site Specific Direct Contact for Child Resident	---	---
				- Adult Resident	- Site Specific Direct Contact for Adult Resident		
				- Construction/ Excavation Worker	- Site Specific Direct Contact for Construction Worker		
				- Commercial/ Industrial Worker	- Site Specific Direct Contact for Commercial/ Industrial Worker		
Subsurface Soil[2]		---	---	---	---	---	---
Groundwater[3]		- Groundwater Users	- DEQ-7	- Groundwater Users	DEQ-7	- Groundwater Users	DEQ-7
Soil Vapor[4]		- Child Resident	- USEPA Regional Screening Levels for residential air.	- Child Resident	- USEPA Regional Screening Levels for residential air.	---	---
		- Adult Resident	- USEPA Regional Screening Levels for residential air.	- Adult Resident	- USEPA Regional Screening Levels for residential air.		
		- Commercial/ Industrial Worker	- USEPA Regional Screening Levels for residential air.	- Commercial/ Industrial Worker	- USEPA Regional Screening Levels for residential air.		
		-Construction or Utility Worker in a Trench	- Site Specific Direct Contact for Construction Worker and Utility Worker	-Construction or Utility Worker in a Trench	- Site Specific Direct Contact for Construction Worker and Utility Worker		

Notes:

* = From Human Health Risk Assessment Amendment for BNSF Mission Wye Facility, Livingston, Montana, Revision 1, August 2014, Table 8-1.

--- = no potential unacceptable risk - not applicable.

[1] = No risk under current site conditions. Unacceptable direct-contact and leaching to groundwater risk in surface soil (0 to 2 feet below ground surface) was driven by concentrations of PCE and TCE at sample location SS-88d.
Based on the Soil Tilling pilot test results, this location no longer exceeds the Direct Contact or Leaching to Groundwater cleanup levels, and groundwater sampling indicates that COCs in soil exceeding Leaching to Groundwater cleanup levels has already leached and no longer poses a leaching concern.

[2] = No risk under current site conditions. Subsurface soil (greater than 2 feet below ground surface) risk was mitigated during Feasibility Study Pilot Study - see Feasibility Study Report Section 4.0.
Exceedance of the leaching cleanup level indicates soil, specifically from location SBS-7D where a soil sample was collected, may pose a threat to underlying groundwater. See Note 3 below.

[3] = No risk under current site conditions. Unacceptable risk was driven by PCE and TCE concentrations over DEQ-7 Standards. Results from June and July 2017 monitoring were all below DEQ-7 Standards.

[4] = Currently, no vapor intrusion pathway exists since no buildings are present. However, in the event of future development, a potentially complete vapor intrusion pathway may exist. There is also a potential risk to construction and trench workers from vapor inhalation in an excavation.

DEQ-7 - Circular DEQ-7 Montana's Numeric Water Quality Standards, Human Health Standards for Groundwater, May 2017.

Table 3 Soil Analytical Results
BNSF Mission Wye, Livingston, Montana

Soil Sample Locations Identified in the HHRA Amendment

Sample Location Sample Depth (feet bgs) Sample Date	Soil Direct Contact for Child Resident[1]	Site-Specific Leaching Cleanup Levels	CC Bottom B 6 10/8/1997	EC Bottoms A 6 11/20/1997	EC Bottoms C 6 12/2/1997	ALSAB-2 0-3 4/13/2000	SAB-2 2-3 4/6/2000	SS-146 0-2 9/13/2007	SS-157 0-2 9/13/2007	SS-83 0-2 9/13/2007	SS-88 0-2 9/13/2007	SBS-7D 2 9/14/2007	SS-88d 0-2 9/13/2007
COCs by Method 8260B (µg/kg)													
Tetrachloroethene	112,000	130	**500**	**447**	**416**	<200	<200	**133**	**223**	**527**	**160**	**3,010**	**204,000**
Trichloroethene	5,700	100	<100	**103**	<100	**270**	**210**	26.6 J	<83.8	56.1 J	53.6 J	187	**76,300**

Soil Tilling Pilot Test Analytical Results

Sample Location Sample Depth (feet bgs) Event Sample Date	Soil Direct Contact for Child Resident[1] (µg/kg)	Site-Specific Leaching Cleanup Levels (µg/kg)	SBS-7D 2 2007 Event 9/14/2007	SBS-7D 0-2 Baseline[2] 8/11/2015	SBS-7D 0-2 Post-Tilling[2] 8/13/2015	SS-88d 0-2 2007 Event 9/13/2007	SS-88d 0-2 Baseline[2] 8/11/2015	SS-88d 0-2 Post-Tilling[2] 8/13/2015
COCs by Method 8260B (µg/kg)								
Tetrachloroethene	112,000	130	**3,010**	< 11.0	46.7 J	**204,000**	< 10.6	< 11.4
Trichloroethene	5,700	100	187	< 12.9	< 13.3	**76,300**	< 12.4	< 13.3

Notes:

[1] = The direct contact soil screening level chosen represents the most conservative screening level presented in the 2014 Human Health Risk Assessment Amendment (HHRA Amendment).

[2] = Baseline and Post-Tilling COC results were below the Soil Direct Contact and Site-specific Leach Cleanup Levels indicating that the two soil locations with the highest PCE and TCE concentrations from the HHRA Amendment no longer pose a direct soil contact or leaching to groundwater risk.

< = analyte not detected above the method detection limit.

µg/kg = microgram per kilogram.

bgs = below ground surface.

COC = compound of concern.

J = Estimated value.

Bolded values indicate results greater than the Site-Specific Leaching Cleanup Levels.

Shaded valued indicate results exceeding the direct contact screening level.

Table 4 Groundwater Monitoring Results During SVE Operations
BNSF Mission Wye, Livingston, Montana

Analyte	Tetrachloroethene (PCE)							Trichloroethene (TCE)						
Monitoring Location	Baseline	Performance Events						Baseline	Performance Events					
	07/23/2015	12/02/2015	03/15/2016	06/30/2016	07/06/2016	06/19/2017	7/12/2017	07/23/2015	12/02/2015	03/15/2016	06/30/2016	07/06/2016	06/19/2017	7/12/2017
MW-1	< 0.19	NS	NS	<0.13	< 0.13	< 0.25 UJ	< 0.25	< 0.14	NS	NS	< 0.051	0.40 U	< 0.052 UJ	< 0.052
MW-3	**67.4**	< 0.19	< 0.19	**5.2**	**6.4**	0.96 J [1.3]	4.7 [4.5]	4.6	< 0.14	< 0.14	0.30 J	0.43	< 0.052 [< 0.50]	0.35 J [0.36 J]
MW-3 Duplicate	NA	< 0.19	< 0.19	**5.5**	NA	1.2	4.3	NA	< 0.14	< 0.14	0.33 J	NA	< 0.052	0.35 J
MW-4	1.3	< 0.19	< 0.19	1.3	< 0.13	< 0.25 UJ	1.1	0.59	0.26 J	0.24 J	0.54	0.64	0.48 J	0.48
MW-4 Duplicate (MW-33)	1.4	NA	NA	NA	< 0.13	NA	NA	0.53	NA	NA	NA	0.75	NA	NA
MW-5	NS	NS	NS	NS	< 0.13	NS	0.75 J	NS	NS	NS	NS	0.49	NS	0.64
MW-9	**5.2**	2.4	1.4	0.97 J	0.90 J	< 0.25	1.1 [0.53]	1.5	0.43	0.26 J	0.33 J	0.26 J	0.31 J	0.27 J [0.25 J]
MW-12	NS	NS	NS	NS	< 0.13	NS	0.80 J	NS	NS	NS	NS	< 0.051	NS	0.77
MW-14	NS	NS	NS	NS	1.0	NS	0.85 J	NS	NS	NS	NS	0.40	NS	< 0.052
MW-18	NS	NS	NS	NS	0.40 J	NS	0.83 J	NS	NS	NS	NS	0.50	NS	0.29 J
MW-19	NS	NS	NS	NS	< 0.13	NS	< 0.25	NS	NS	NS	NS	0.62	NS	0.40
MW-21	NS	NS	NS	NS	< 0.13	NS	< 0.25	NS	NS	NS	NS	< 0.051	NS	< 0.052
MW-22	1.4	NS	NS	0.41 J	0.56 J	< 0.25	0.94 J	0.38 J	NS	NS	0.11 J	< 0.051	< 0.052	< 0.052
Field Blank	< 0.19	< 0.19	< 0.19	<0.13	< 0.13	< 0.25 UJ	< 0.25	< 0.14	< 0.14	< 0.14	< 0.051	< 0.051	< 0.052 UJ	< 0.052
Equipment Blank	< 0.19	< 0.19	< 0.19	<0.13	< 0.13	< 0.25	< 0.25	< 0.14	< 0.14	< 0.14	< 0.051	< 0.051	< 0.052	< 0.052
Trip Blank	< 0.19	< 0.19	< 0.19	<0.13	< 0.13	< 0.25 UJ	< 0.25	< 0.14	< 0.14	< 0.14	< 0.051	< 0.051	< 0.052 UJ	< 0.052

Notes:

All results were analyzed by USEPA Method 8260 and are reported in micrograms per liter (µg/L).
< = Non-detect data is shown less than the method detection limit;
with the exception of results qualified in the data validation report as less than the reporting limit or less than the detected value.
[#] = MDEQ Split Sample Result.
J = Estimated value.
NA = Not applicable.
NS = Well not sampled. Insufficient water depth to purge and collect sample.
U = The analyte was not detected above the reported sample MDL. In some cases, the analyte was detected above the reported sampled MDL; however, the result was qualified as not detected at the laboratory reporting limit due to blank contamination.
UJ = The analyte was not detected above the MDL. However, the MDL is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
Bold text indicates that result exceeds DEQ-7 Standard of 5 µg/L for PCE and TCE (*Circular DEQ-7 Montana's Numeric Water Quality Standards*, Human Health Standards for Groundwater, May 2017).
Shaded columns indicate periods of high groundwater, where PCE and TCE concentrations were typically observed

Table 5 Comparative Analysis of Alternatives
BNSF Mission Wye, Livingston, Montana

Alternatives	Alternative Number	Description	Protection of Human Health and the Environment	Compliance with ERCLs*	Permanent Solutions	Treatment or Resource Recovery Techniques	NPV Cost (Cost Effectiveness)
Soil	1	No Action	Yes	Yes	Yes	No	$0
	2	Soil Tilling	Yes	Yes	Yes	Yes	$36,000
Groundwater	1	No Action	Yes	Yes	Yes	No	$0
	2	MNA	Yes	Yes	Yes, with time	Yes	$143,300
Soil Vapor	1	No Action	No	No	No	No	$0
	2	Institutional Controls (ICs)	Yes	Yes	Yes	No	$67,500
	3	Soil Vapor Extraction (SVE)	Yes	Yes	Yes	Yes	$167,100

Notes:

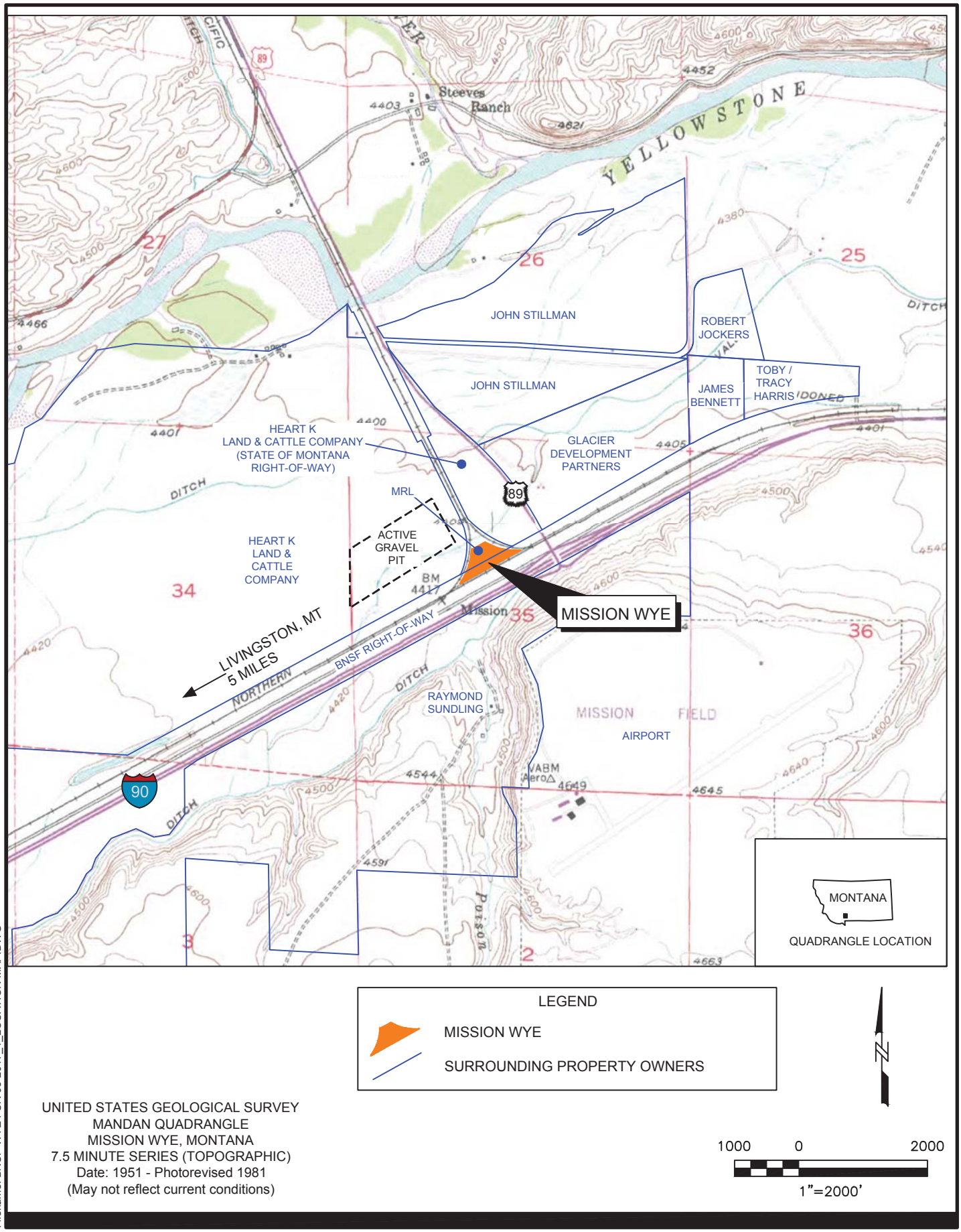
NPV - net present value; 3% discount factor used for NPV calculation used for remedies with time frames greater than one year.

* Further evaluation of ERCLs compliance will occur during the remedial design process.

All technologies assume two years of post-remediation confirmation groundwater sampling (8 wells) and groundwater levels (23 wells) at $45,600.

See Table F-1 in Appendix F for cost estimate details.

Figures



UNITED STATES GEOLOGICAL SURVEY
MANDAN QUADRANGLE
MISSION WYE, MONTANA
7.5 MINUTE SERIES (TOPOGRAPHIC)
Date: 1951 - Photorevised 1981
(May not reflect current conditions)

Project Management Initials: Designer: E.S.S. Checked: J.C. Approved: M.Z. ANSI A 8.5" x 11"

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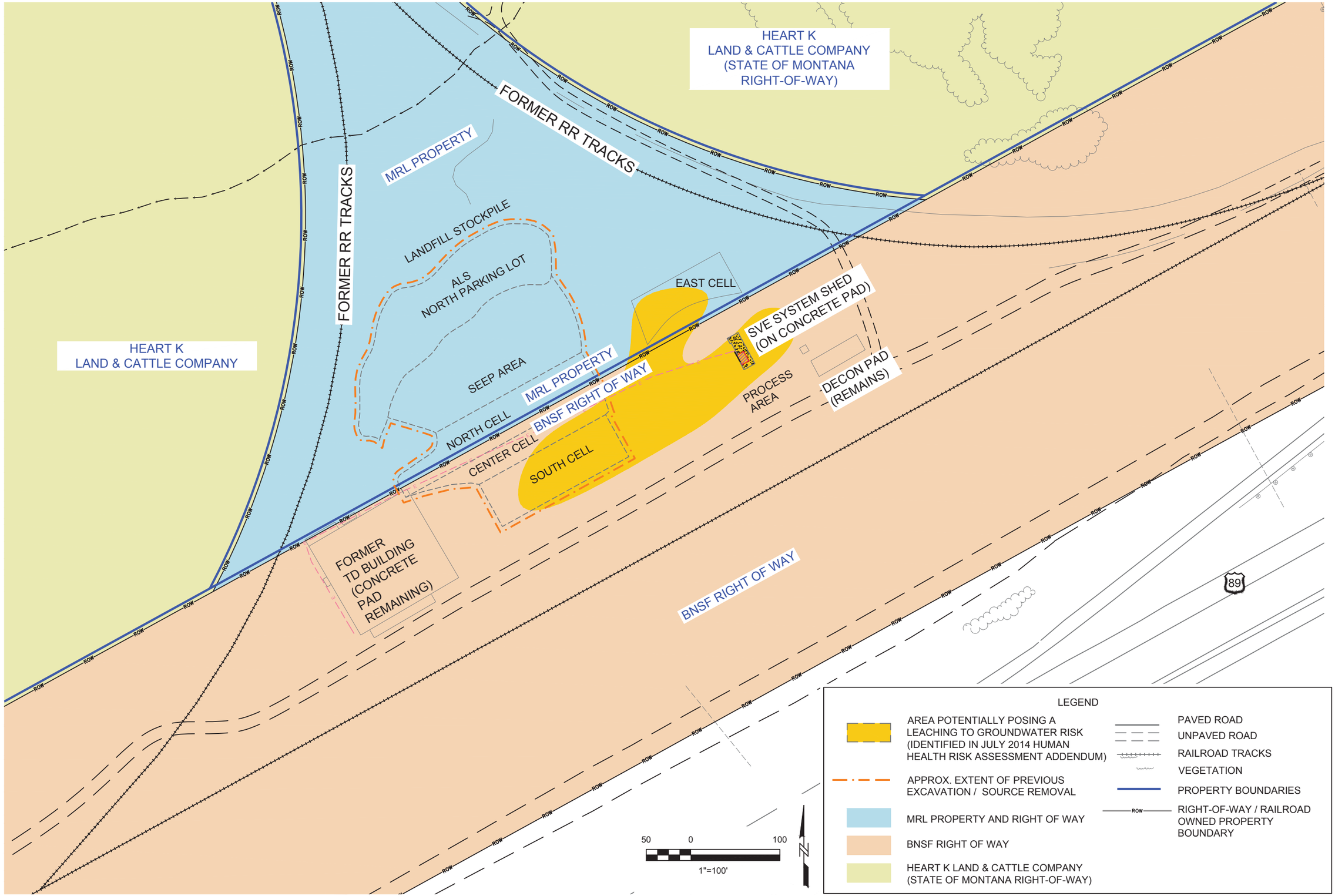
BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018

MISSION WYE LOCATION MAP AND SURROUNDING PROPERTY OWNERSHIP

Figure: 1



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Project Management Initials: Designer: E.S.S. Checked: J.C. Approved:M.Z. ANSI B 11" x 17"

Figure: 2

SITE LAYOUT

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BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018

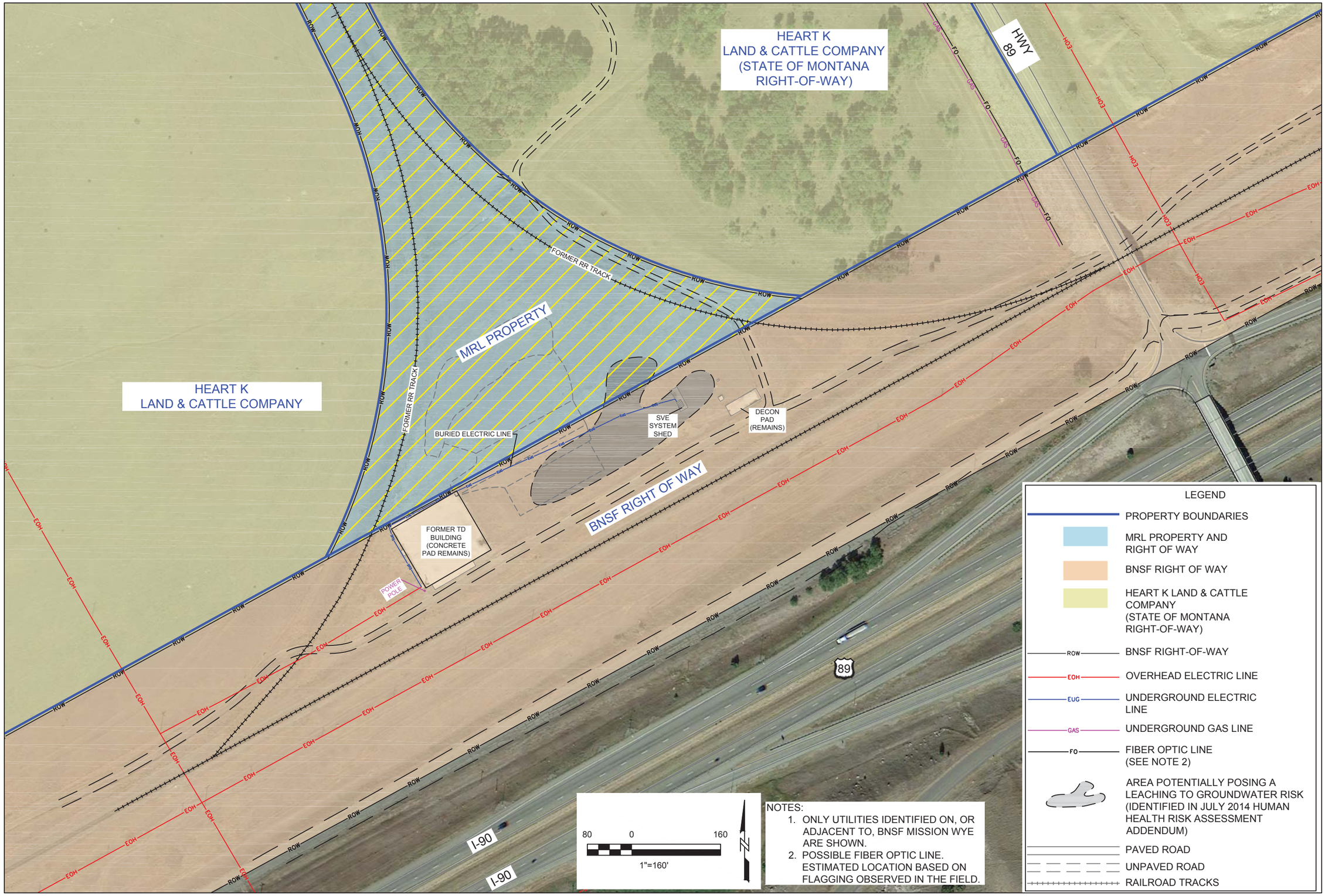

Figure: 3

PROPERTY OWNERSHIP AND UTILITY MAP

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018

Project Management Initials: Designer: E.S.S. Checked: J.C. Approved: M.Z. ANSI B 11" x 17"

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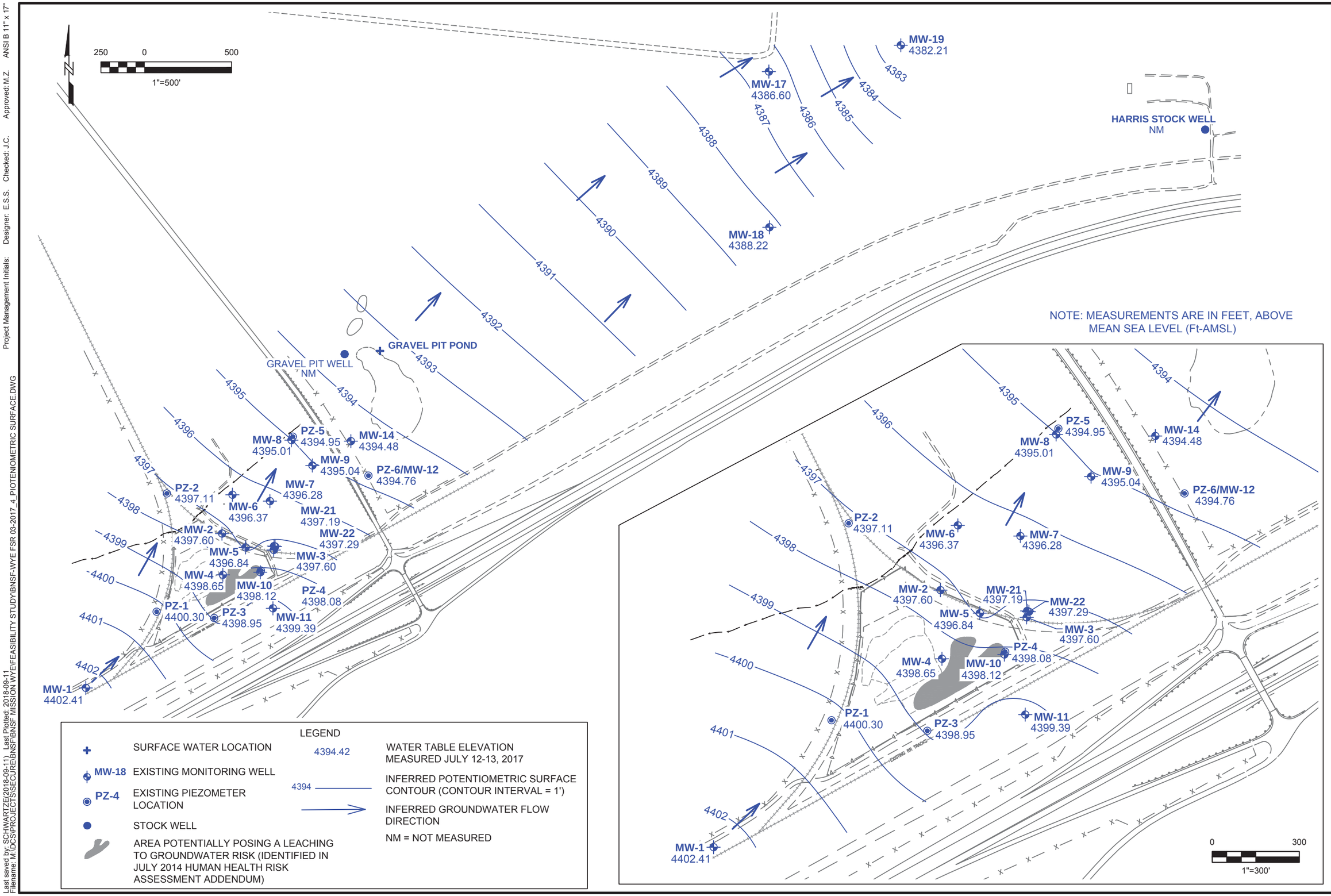

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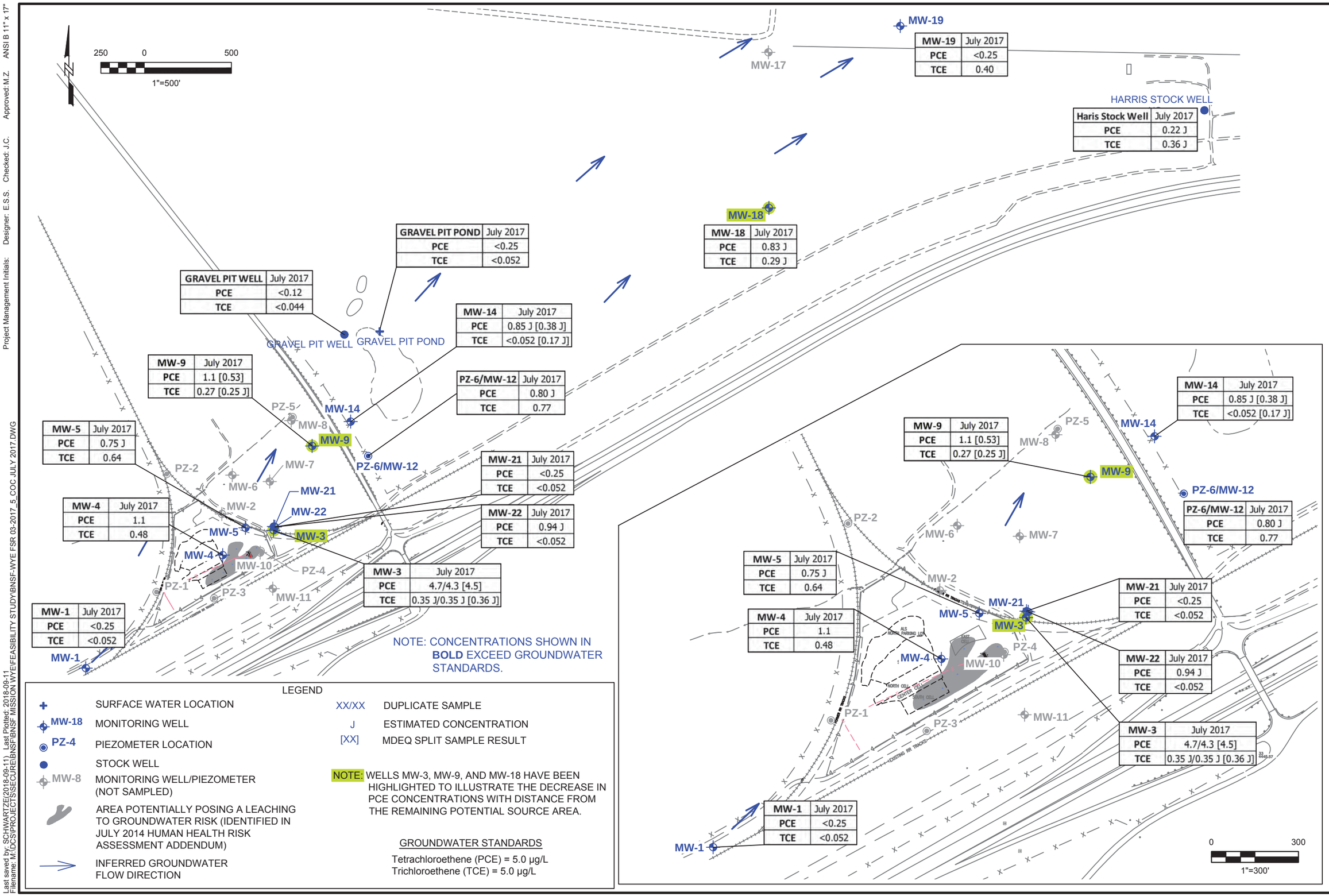
Project Management Initials: Designer: E.S.S. Checked: J.C. Approved: M.Z. ANSI B 11" x 17"

Figure: 4

POTENTIOMETRIC SURFACE MAP
JULY 2017

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018



MW-19	July 2017
PCE	<0.25
TCE	0.40

Haris Stock Well	July 2017
PCE	0.22 J
TCE	0.36 J

MW-18	July 2017
PCE	0.83 J
TCE	0.29 J

GRAVEL PIT POND	July 2017
PCE	<0.25
TCE	<0.052

GRAVEL PIT WELL	July 2017
PCE	<0.12
TCE	<0.044

MW-14	July 2017
PCE	0.85 J [0.38 J]
TCE	<0.052 [0.17 J]

MW-9	July 2017
PCE	1.1 [0.53]
TCE	0.27 [0.25 J]

PZ-6/MW-12	July 2017
PCE	0.80 J
TCE	0.77

MW-5	July 2017
PCE	0.75 J
TCE	0.64

MW-21	July 2017
PCE	<0.25
TCE	<0.052

MW-4	July 2017
PCE	1.1
TCE	0.48

MW-22	July 2017
PCE	0.94 J
TCE	<0.052

MW-3	July 2017
PCE	4.7/4.3 [4.5]
TCE	0.35 J/0.35 J [0.36 J]

MW-1	July 2017
PCE	<0.25
TCE	<0.052

Figure: 5

COC CONCENTRATION IN GROUNDWATER
JULY 2017

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018

Project Management Initials: Designer: E.S.S. Checked: J.C. Approved: M.Z. ANSI B 11" x 17"

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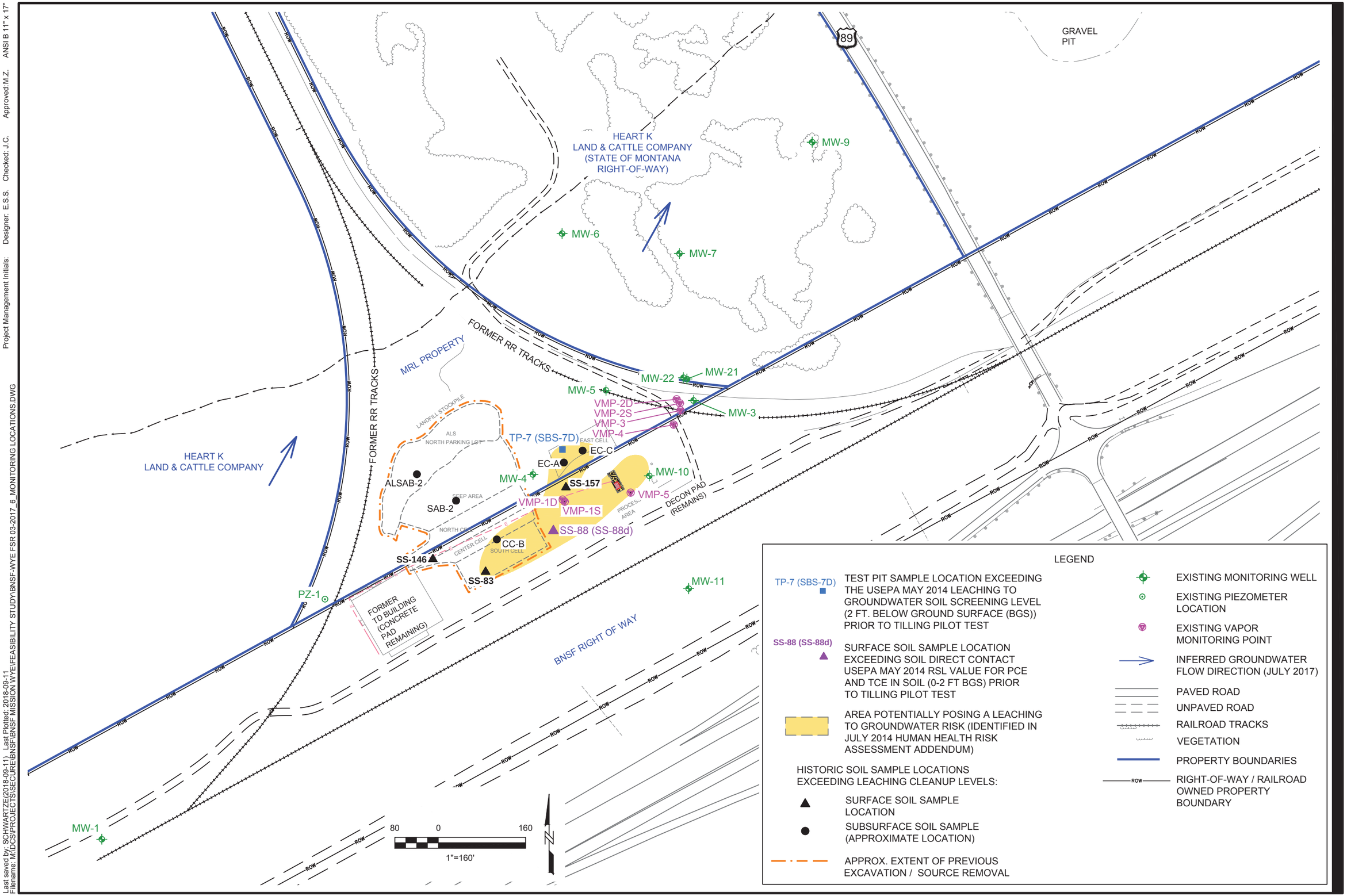

Figure: 6

MONITORING LOCATIONS FOR SOIL LEACHING TO GROUNDWATER

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018

Project Management Initials: Designer: E.S.S. Checked: J.C. Approved: M.Z. ANSI B 11" x 17"

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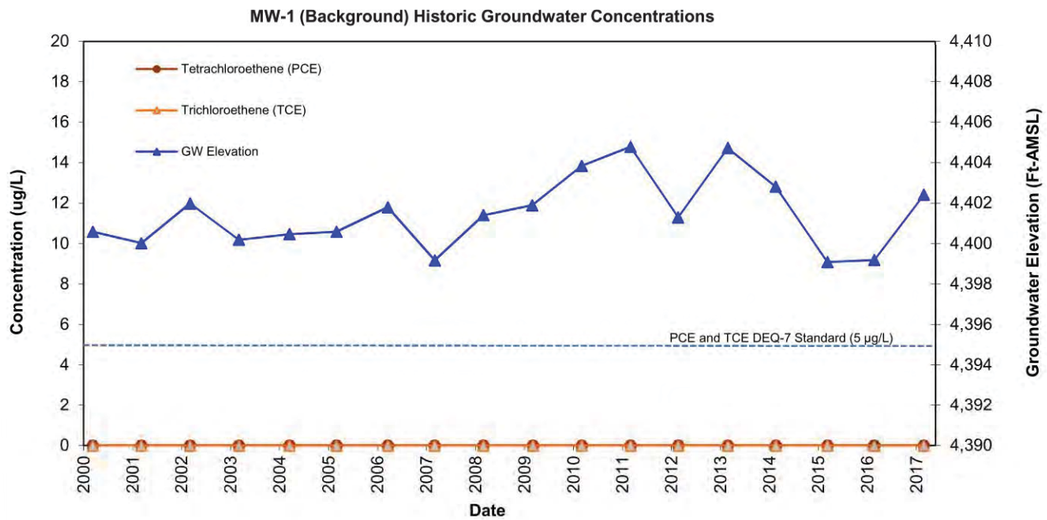

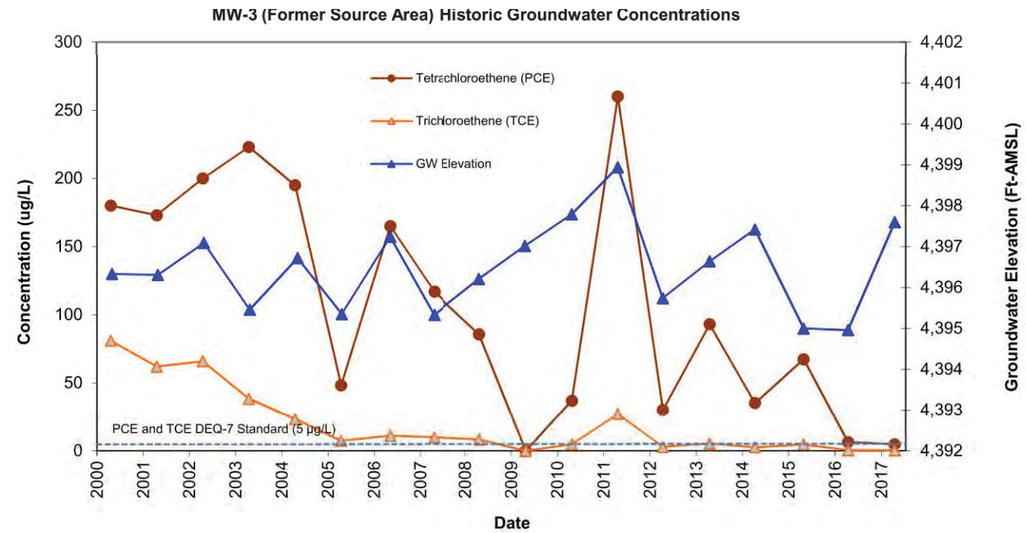

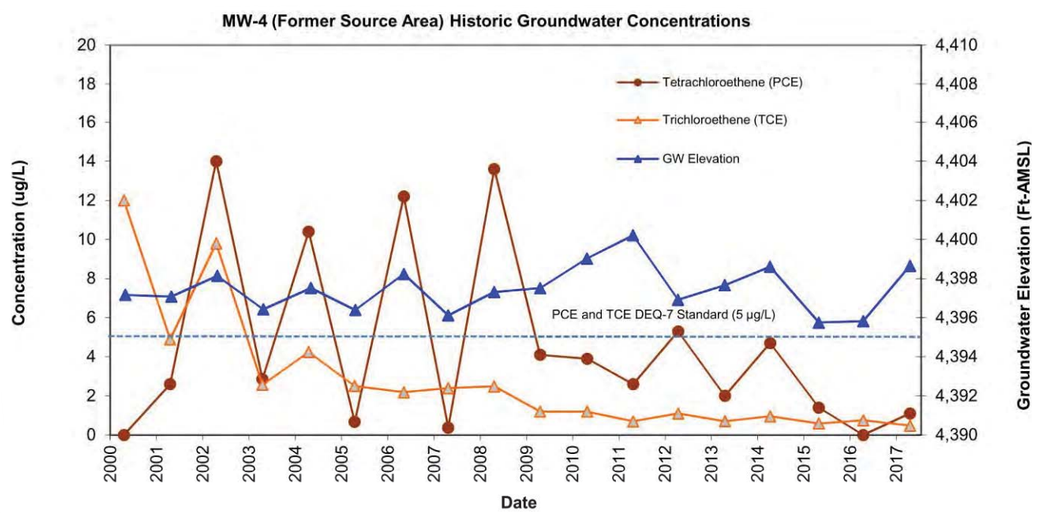

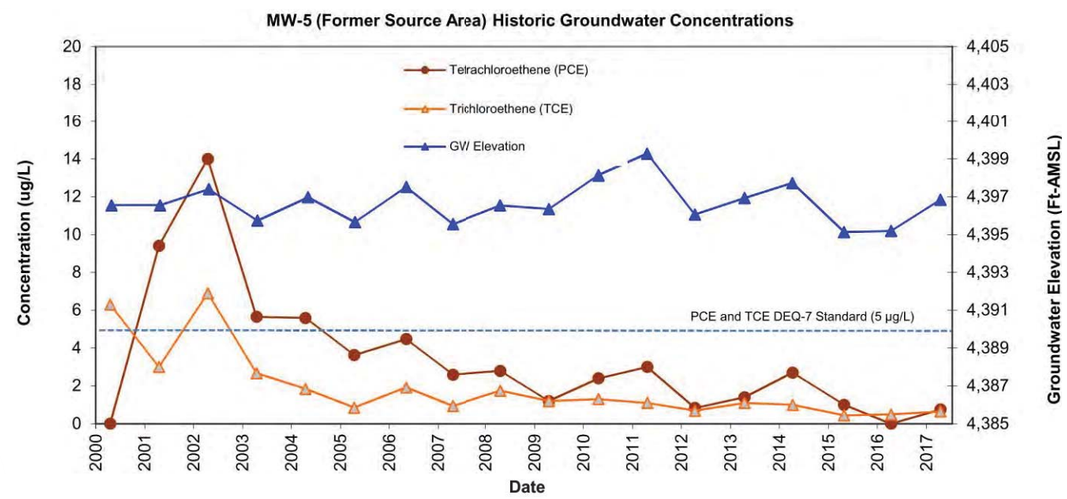

Figure: 7

HISTORIC GROUNDWATER PCE AND TCE CONCENTRATIONS AND ELEVATIONS WELLS MW-1, MW-3, MW-4, AND MW-5

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018

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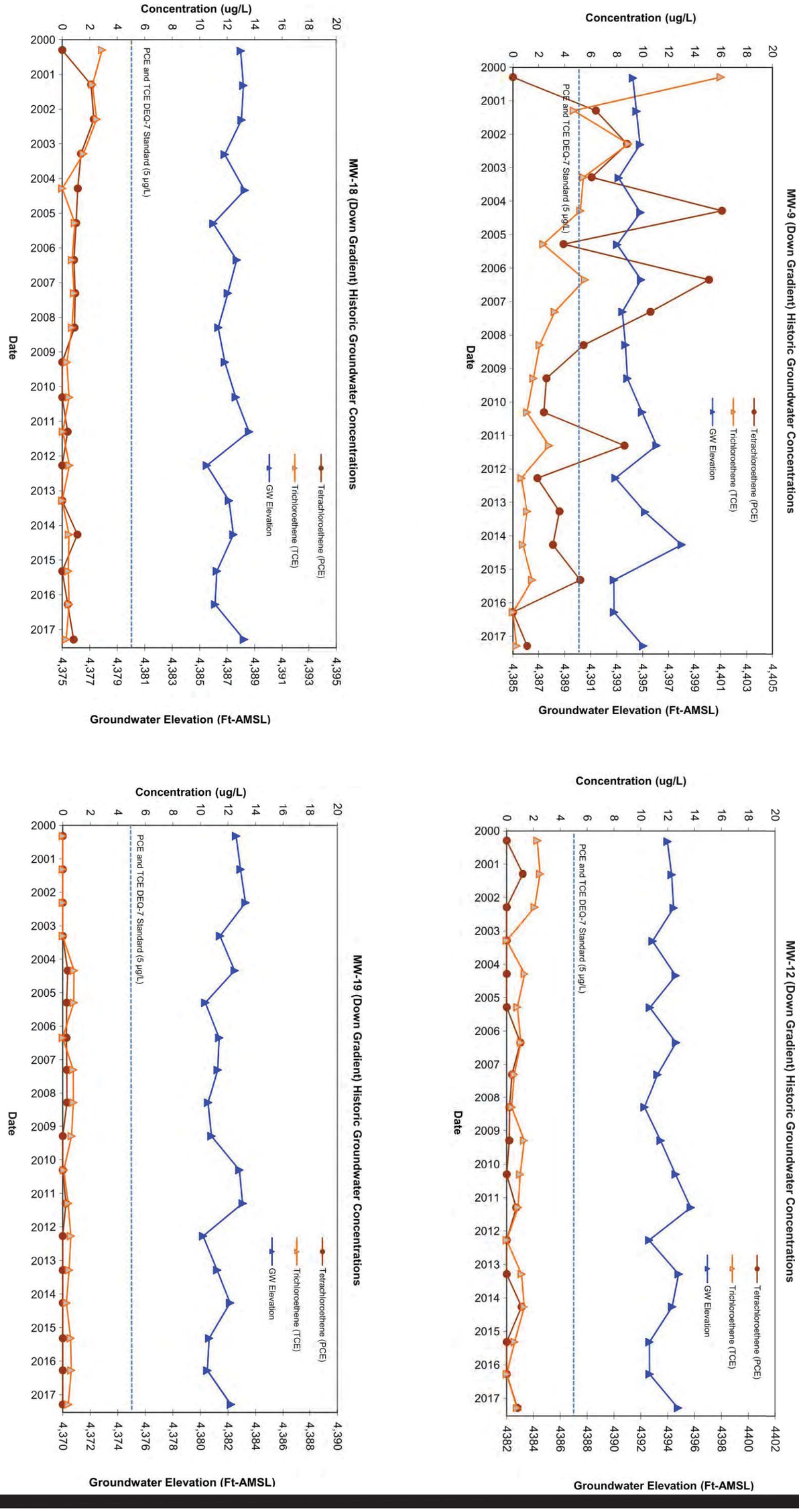
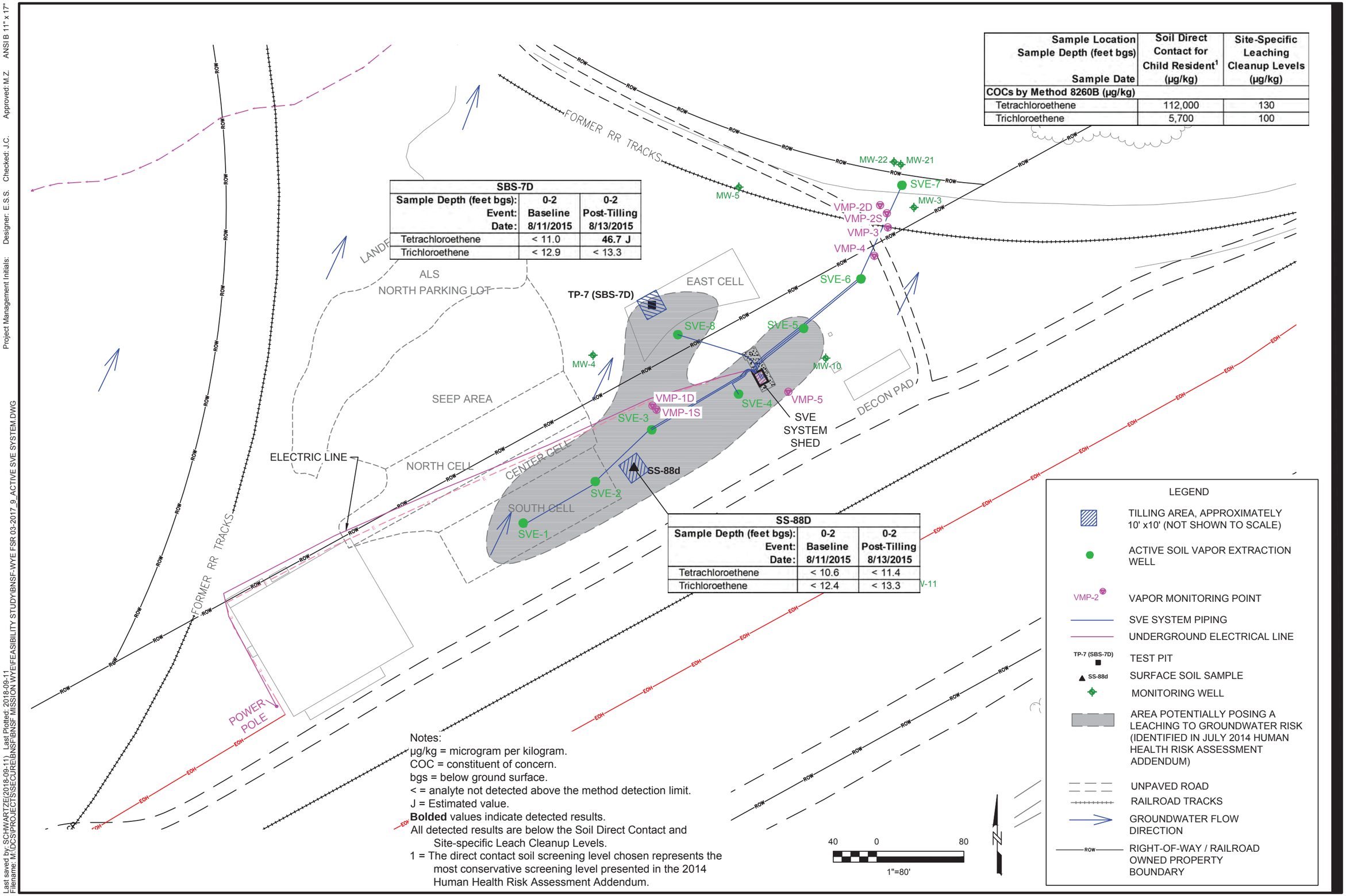


Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018

HISTORIC GROUNDWATER PCE AND TCE CONCENTRATIONS AND ELEVATIONS WELLS MW-9, MW-12, MW-18, AND MW-19

Figure: 8



Sample Location Sample Depth (feet bgs) Sample Date	Soil Direct Contact for Child Resident[1] (µg/kg)	Site-Specific Leaching Cleanup Levels (µg/kg)
COCs by Method 8260B (µg/kg)		
Tetrachloroethene	112,000	130
Trichloroethene	5,700	100

SBS-7D		
Sample Depth (feet bgs):	0-2	0-2
Event:	Baseline	Post-Tilling
Date:	8/11/2015	8/13/2015
Tetrachloroethene	< 11.0	**46.7 J**
Trichloroethene	< 12.9	< 13.3

SS-88D		
Sample Depth (feet bgs):	0-2	0-2
Event:	Baseline	Post-Tilling
Date:	8/11/2015	8/13/2015
Tetrachloroethene	< 10.6	< 11.4
Trichloroethene	< 12.4	< 13.3

Notes:
µg/kg = microgram per kilogram.
COC = constituent of concern.
bgs = below ground surface.
< = analyte not detected above the method detection limit.
J = Estimated value.
Bolded values indicate detected results.
All detected results are below the Soil Direct Contact and Site-specific Leach Cleanup Levels.
1 = The direct contact soil screening level chosen represents the most conservative screening level presented in the 2014 Human Health Risk Assessment Addendum.

Figure: 9

PILOT TEST SOIL TILLING ANALYTICAL RESULTS

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018

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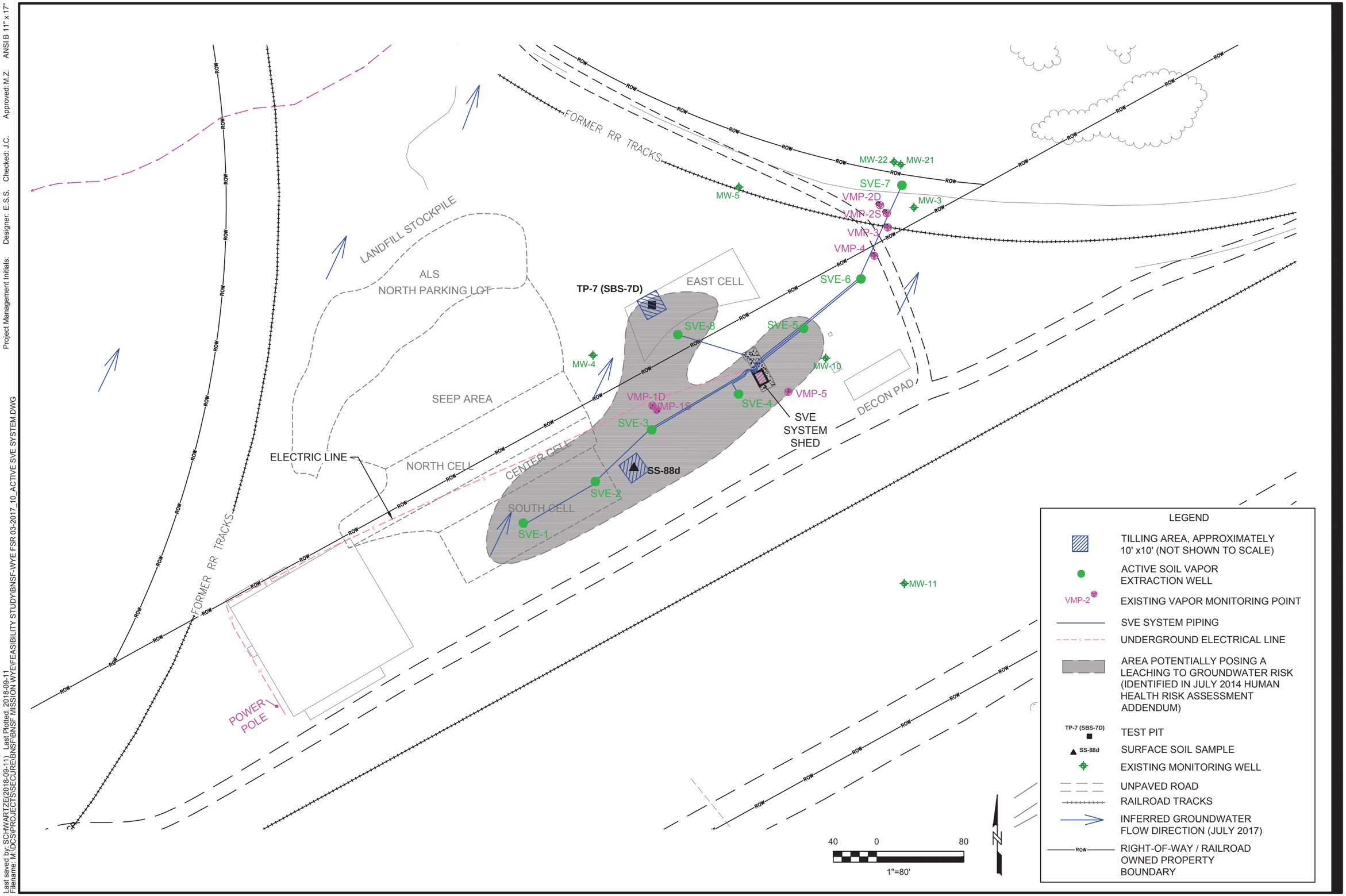

Figure: 10

PILOT TEST AREA
SVE SYSTEM LAYOUT AND
SURFACE SOIL REMEDIATION AREAS

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018

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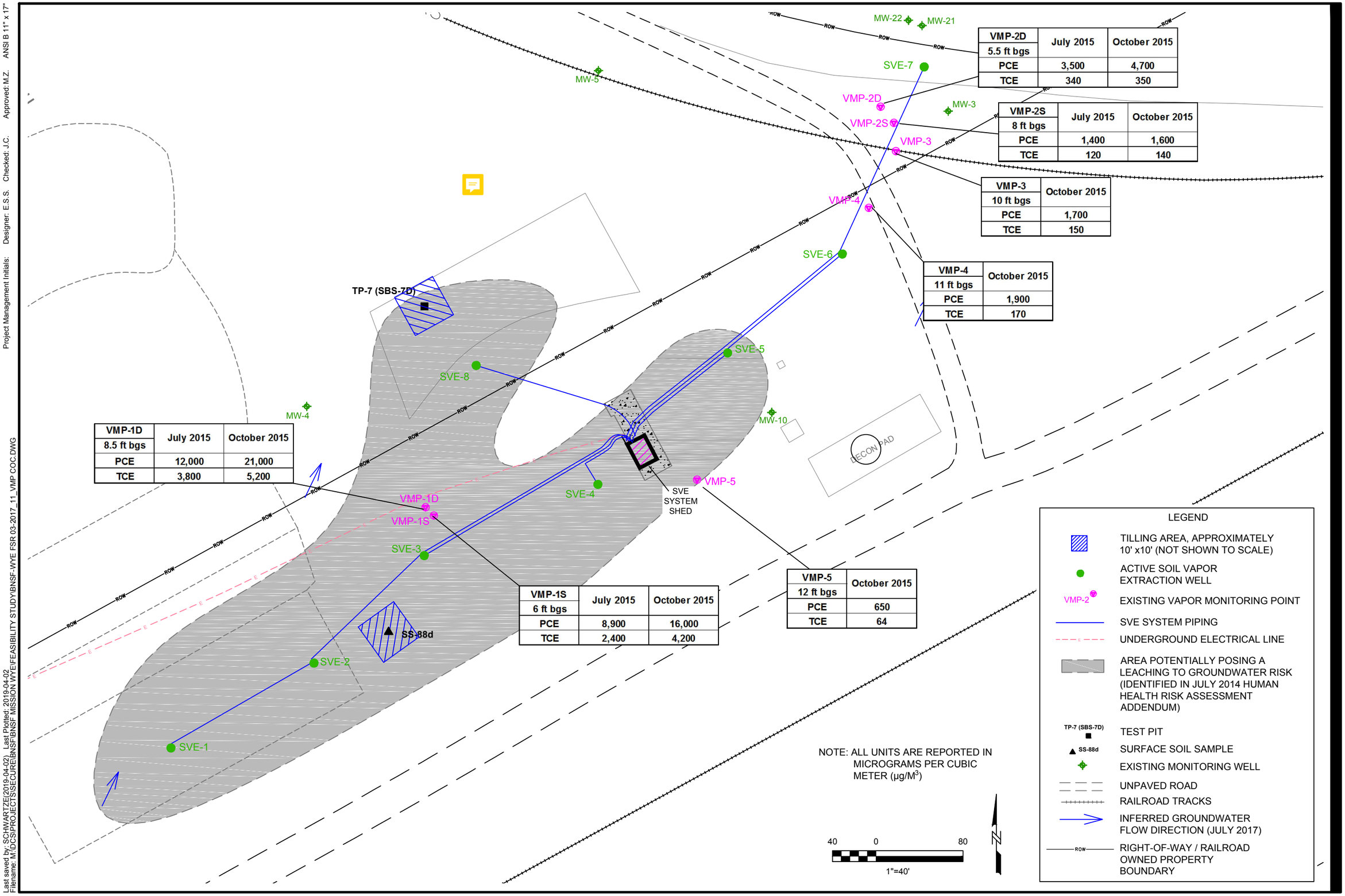

VMP-2D	July 2015	October 2015
5.5 ft bgs		
PCE	3,500	4,700
TCE	340	350

VMP-2S	July 2015	October 2015
8 ft bgs		
PCE	1,400	1,600
TCE	120	140

VMP-3	October 2015
10 ft bgs	
PCE	1,700
TCE	150

VMP-4	October 2015
11 ft bgs	
PCE	1,900
TCE	170

VMP-1D	July 2015	October 2015
8.5 ft bgs		
PCE	12,000	21,000
TCE	3,800	5,200

VMP-1S	July 2015	October 2015
6 ft bgs		
PCE	8,900	16,000
TCE	2,400	4,200

VMP-5	October 2015
12 ft bgs	
PCE	650
TCE	64

Figure: 11

INDIVIDUAL SVE LINES TREATMENT SYSTEM EFFLUENT

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018

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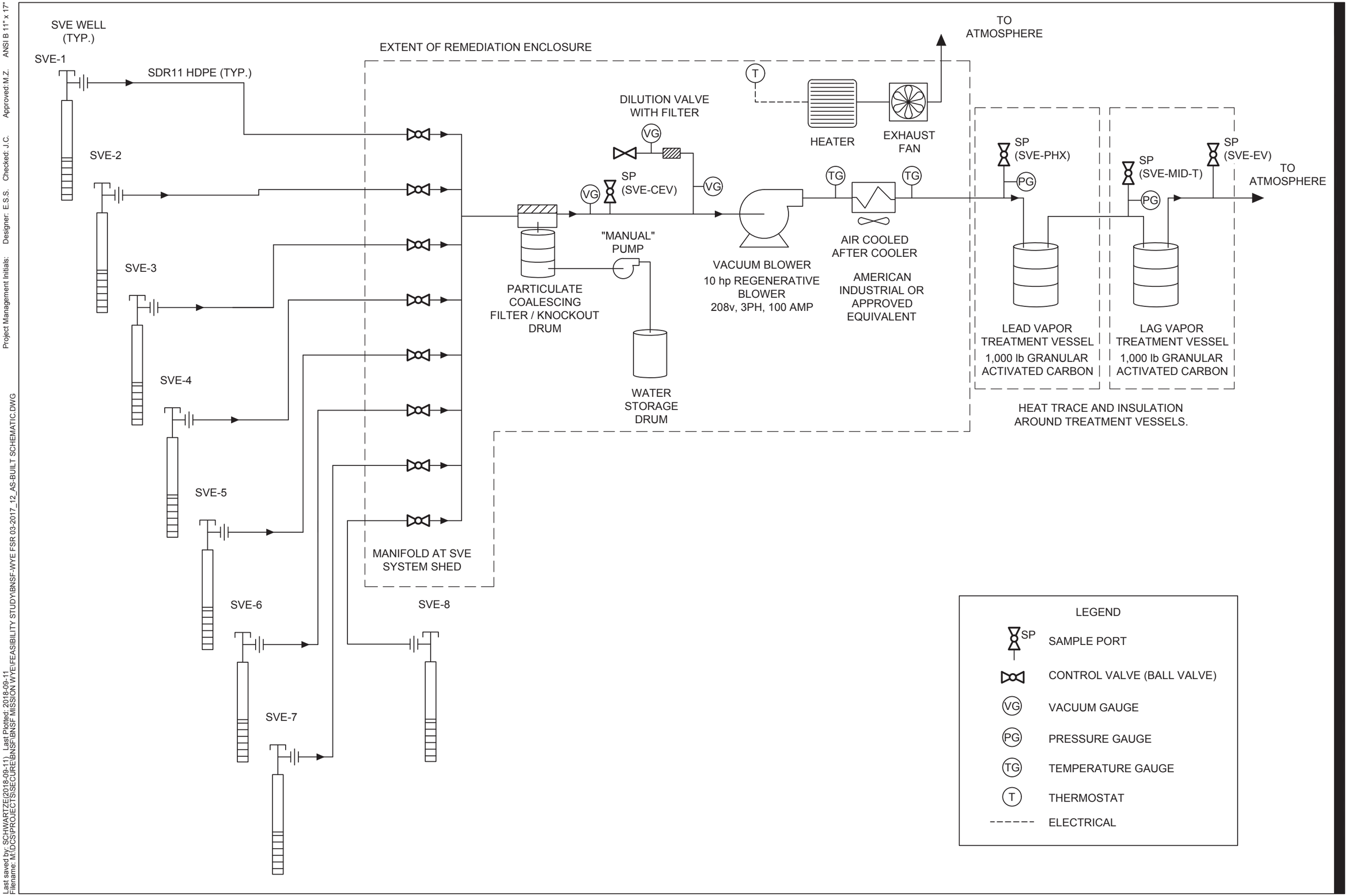

Figure: 12

AS-BUILT SCHEMATIC OF SVE SYSTEM

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018

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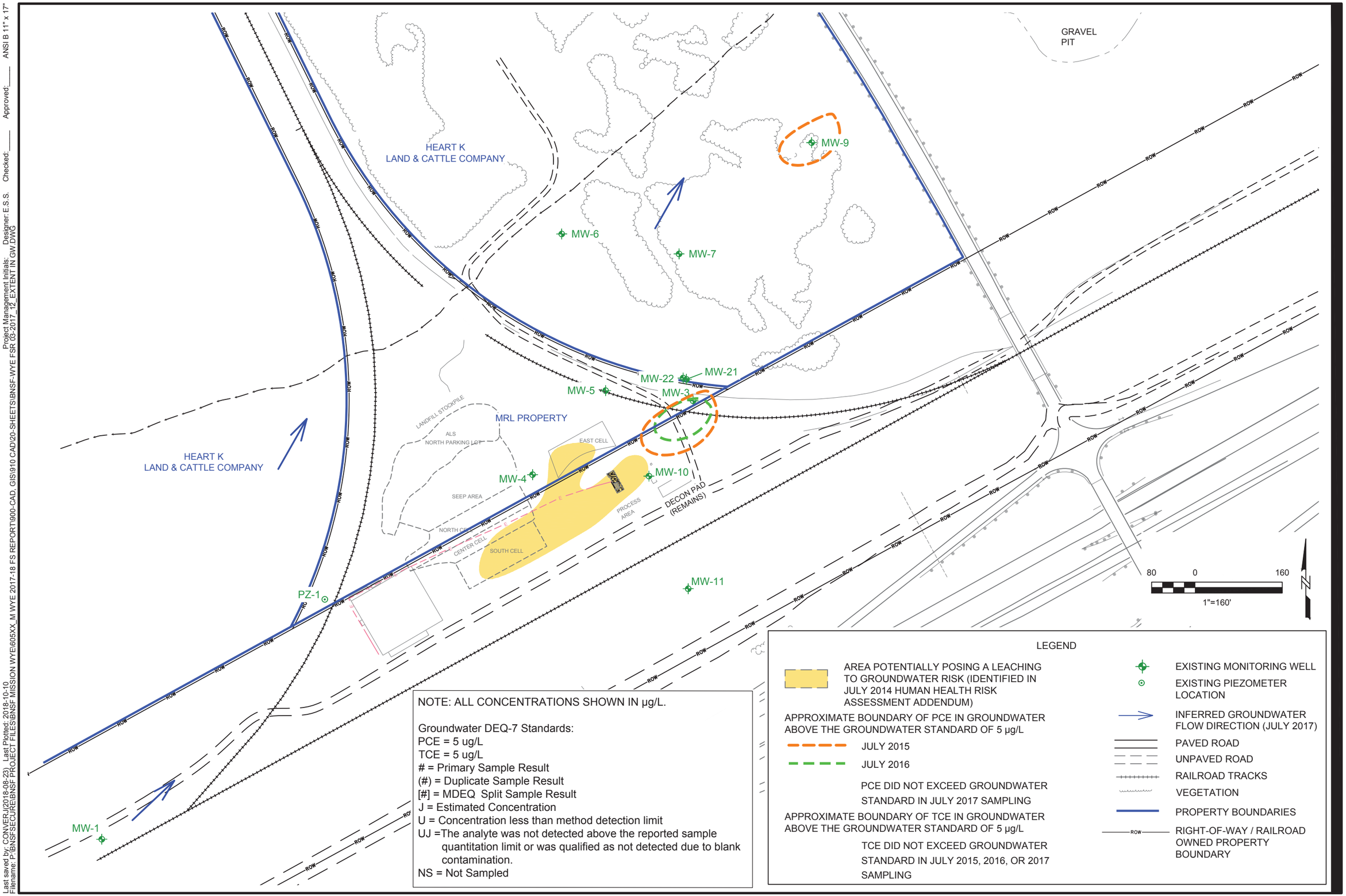

Figure: 13

COC CONCENTRATION IN GROUNDWATER DURING SVE SYSTEM OPERATION

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: 07/12/18

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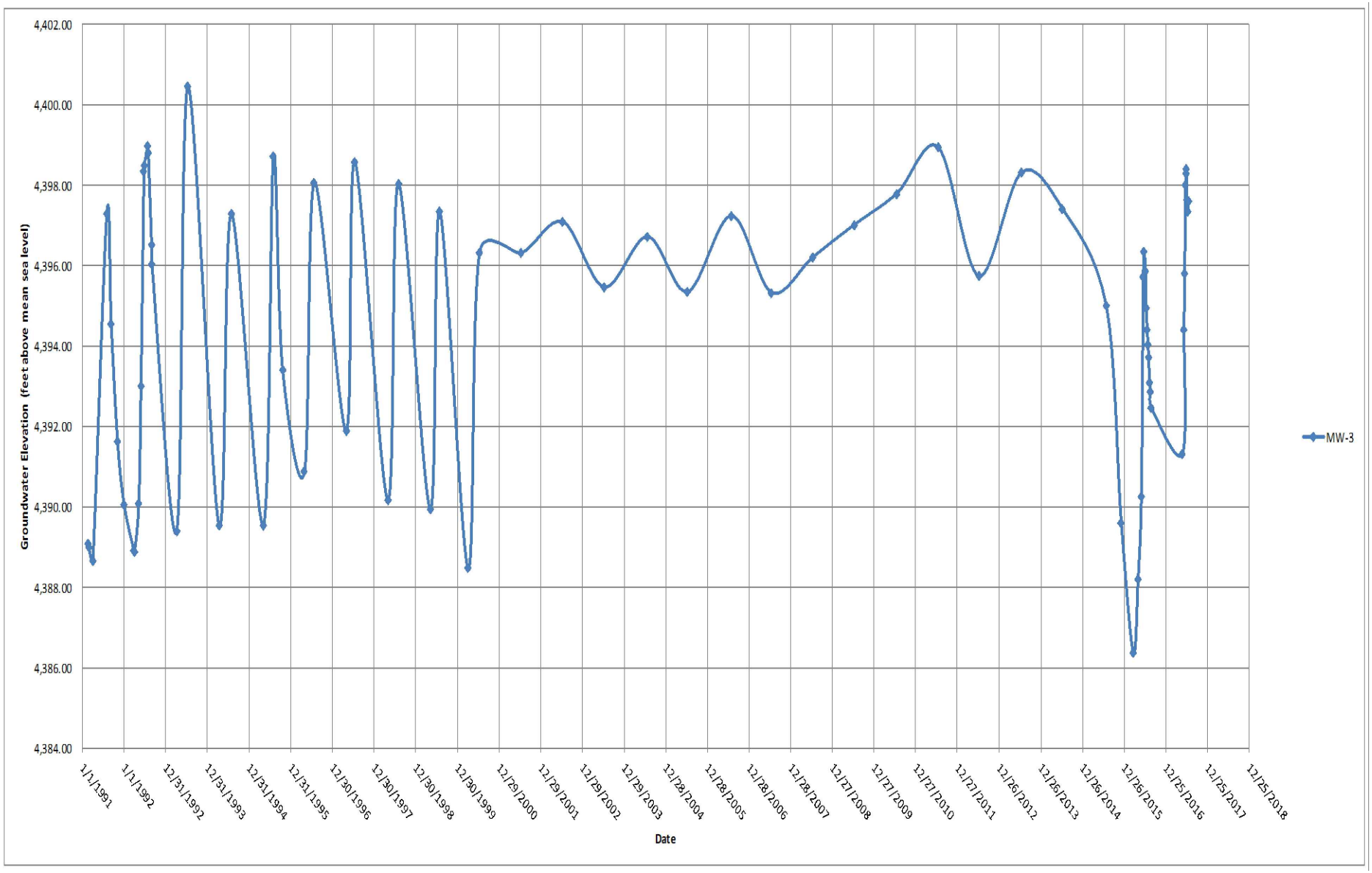
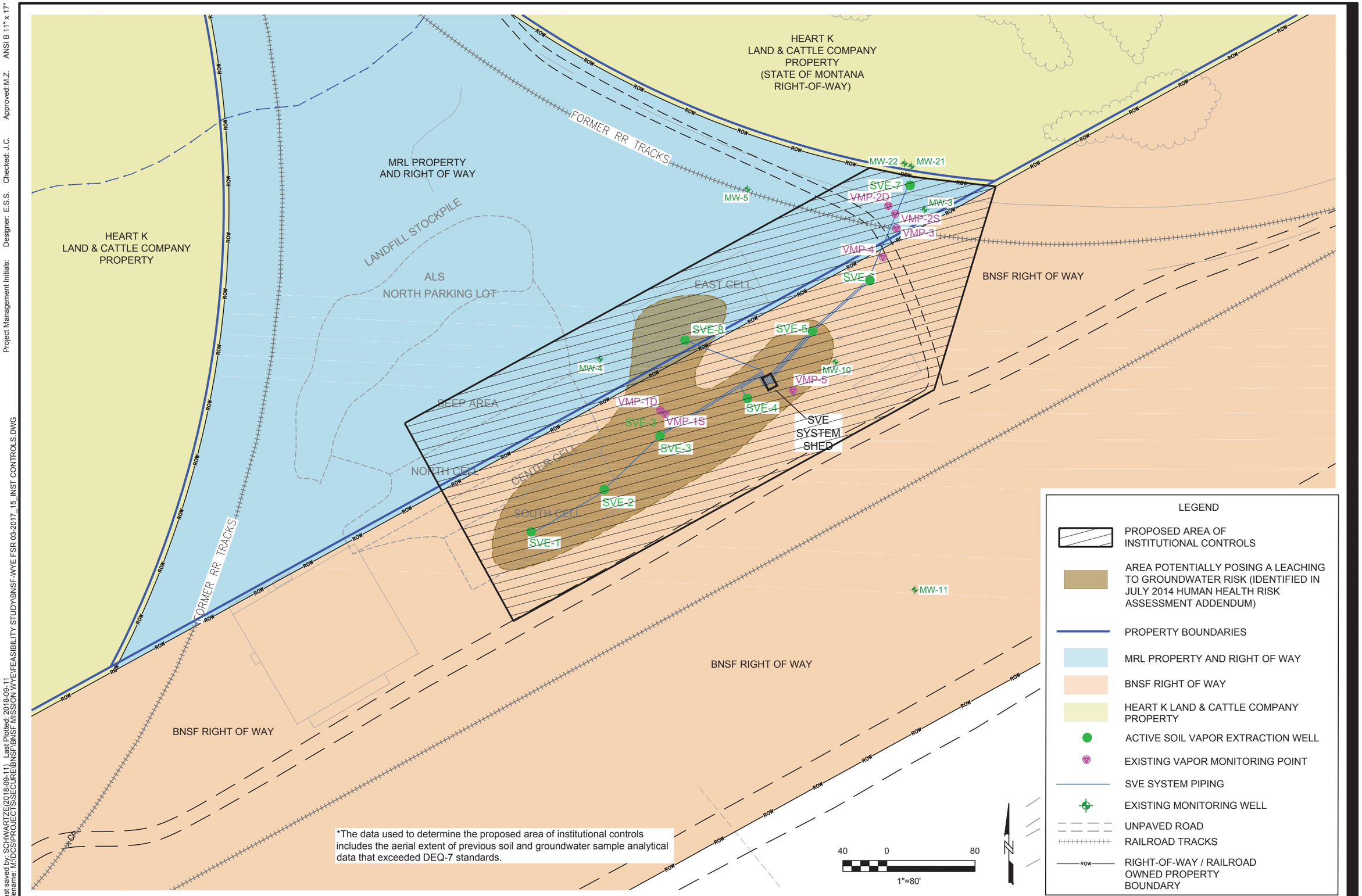


Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018

WELL MW-3 GROUNDWATER ELEVATION HYDROGRAPH

Figure: 14



*The data used to determine the proposed area of institutional controls includes the aerial extent of previous soil and groundwater sample analytical data that exceeded DEQ-7 standards.

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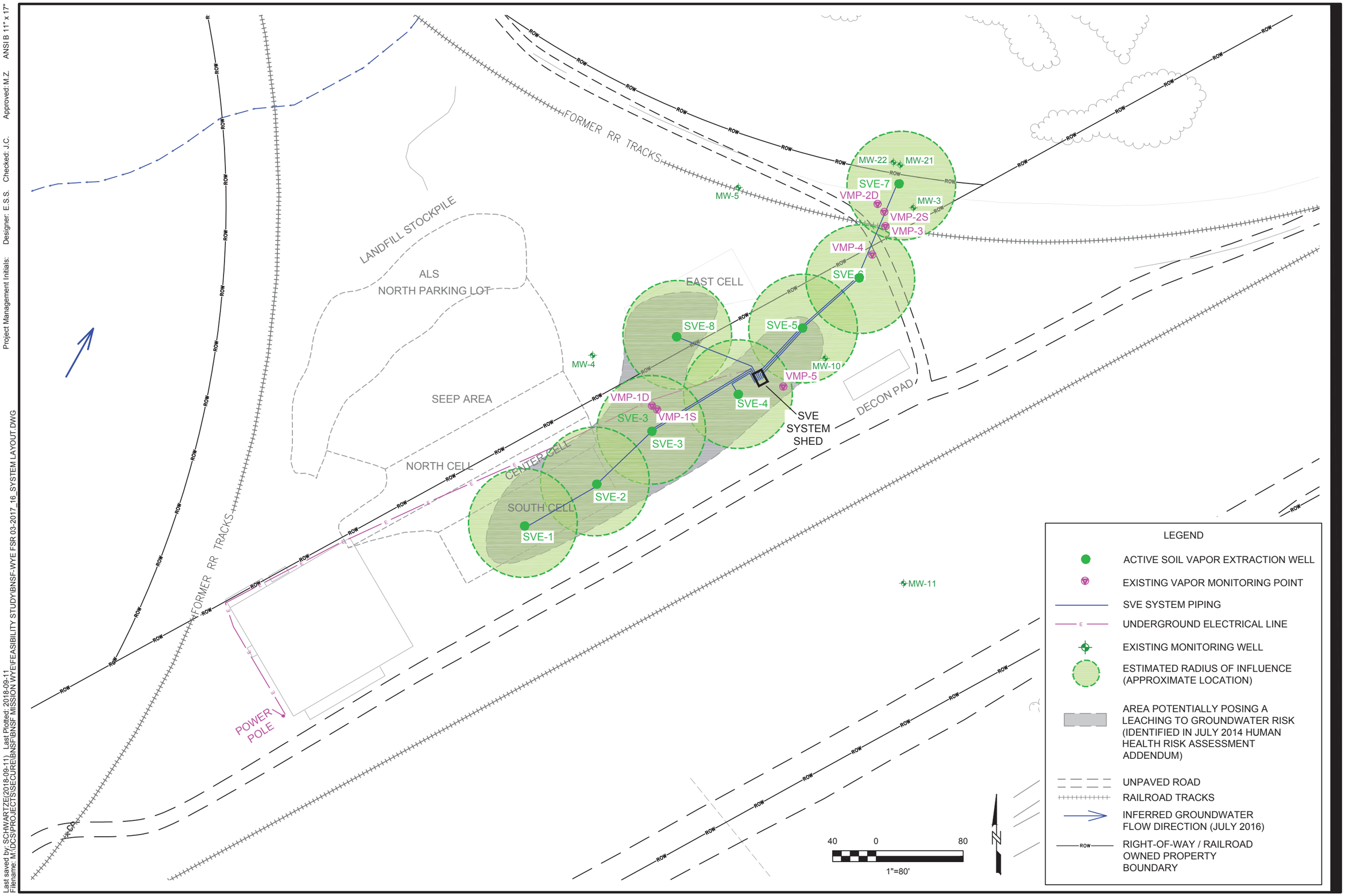
Project Management Initials: Designer: E.S.S. Checked: J.C. Approved:M.Z. ANSI B 11" x 17"

Figure: 15

PROPOSED INSTITUTIONAL CONTROLS AREA

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018



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Project Management Initials: Designer: E.S.S. Checked: J.C. Approved: M.Z. ANSI B 11" x 17"

Figure: 16

VAPOR EXTRACTION POINTS AND SVE SYSTEM LAYOUT

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: October 2018

Appendix A

Preliminary Environmental Requirements, Criteria, or Limitations

PRELIMINARY
ENVIRONMENTAL REQUIREMENTS, CRITERIA OR LIMITATIONS
MISSION WYE CECRA FACILITY

November 2014

Remedial action undertaken pursuant to the Comprehensive Environmental Cleanup and Responsibility Act (CECRA), § 75-10-701, *et seq.*, MCA, must "attain a degree of cleanup of the hazardous or deleterious substance and control of a threatened release or further release of that substance that assures protection of public health, safety and welfare and of the environment." Section 75-10-721(1), MCA. Additionally, DEQ "shall require cleanup consistent with applicable state or federal environmental requirements, criteria, or limitations" and "may consider substantive state or federal environmental requirements, criteria or limitation that are relevant to the facility conditions." Sections 75-10-721(2)(a) and (b), MCA.

There is a distinction between "applicable" requirements and those that are "relevant." "Applicable" requirements are those requirements that would legally apply at the facility regardless of the CECRA action. "Relevant" requirements are those requirements that are not applicable, but address situations or problems sufficiently similar to those at the facility and, therefore, are relevant for use at the facility. Attainment of "applicable" requirements is mandatory under CECRA. "Relevant" requirements may be considered by DEQ in approving remedial actions under CECRA. All relevant requirements identified in the Record of Decision (ROD) must be attained.

Environmental requirements, criteria or limitations (ERCLs) are generally of three types: action-specific, contaminant-specific, and location-specific. Action-specific requirements are those that are triggered by the performance of a certain activity as part of a particular remedy. They do not in themselves determine the remedy but rather indicate the manner in which the remedy must be implemented. Contaminant-specific requirements are those that establish an allowable level or concentration of a hazardous or deleterious substance in the environment or that prescribe a level or method of treatment for a hazardous or deleterious substance. Location-specific requirements are those that serve as restrictions on the concentration of a hazardous or deleterious substance or the conduct of activities solely because the facility is in a specific location or the action affects specified types of areas. Some ERCLs could be categorized in more than one way; in this case, they are generally not duplicated within the document.

CECRA defines as cleanup requirements only state and federal ERCLs. Remedial designs, implementation, operation, and maintenance must, nevertheless, comply with all other applicable laws, both state and federal. Many such laws, while not strictly environmental, have environmental impacts. Identification of all applicable laws, including health and safety laws and local regulations that must be complied with during implementation of the remedy, remains BNSF Railway Company's responsibility.

Many requirements listed here are promulgated as identical or nearly identical requirements in both federal and state law, usually pursuant to delegated environmental programs administered by the Environmental Protection Agency and the states, such as the requirements of the federal Clean Water Act and the Montana Water Quality Act. ERCLs and other laws that are unique to state law are also identified.

Within this document, are identified preliminary applicable or relevant state and federal ERCLs for the Mission Wye facility. These ERCLs are preliminary and are subject to change when the remedy for the Mission Wye facility is selected. The description of applicable and relevant federal and state requirements that follows includes summaries of the legal requirements that attempt to set out the requirement in a reasonably concise fashion that is useful in evaluating compliance with the

requirement. These descriptions are provided to allow the user a basic indication of the requirement without having to refer back to the statute or regulation itself. However, in the event of any inconsistency between the law itself and the summaries provided in this document, the actual requirement is ultimately the requirement as set out in the law, rather than any paraphrase of the law provided here.

1.0 ACTION-SPECIFIC ERCLs

1.1 Water Quality Requirements

1.1.1 Clean Water Act, Point Source Discharges Requirements, 33 USC §1342 (applicable, substantive provisions only): Section 402 of the Clean Water Act, 33 USC §§ 1342, *et seq.*, authorizes the issuance of permits for the discharge of any pollutant. This includes storm water discharges associated with industrial activity. *See*, 40 CFR 122.26(b)(14). Industrial activity includes inactive mining operations that discharge storm water contaminated by contact with or that has come into contact with any overburden, raw material, intermediate products, finished products, byproducts or waste products located on the site of such operations, *see*, 40 CFR 122.26(b)(14)(iii); landfills, land application sites, and open dumps that receive or have received any industrial wastes including those subject to regulation under RCRA subtitle D, *see*, 40 CFR 122.26(b)(14)(v); and construction activity including clearing, grading, and excavation activities, *see*, 40 CFR 122.26(b)(14)(x). Because the State of Montana has been delegated the authority to implement the Clean Water Act, these requirements are enforced in Montana through the Montana Pollutant Discharge Elimination System (MPDES). The MPDES requirements are set forth below.

ARM 17.30.1201 *et seq.*, (standards) and ARM 17.30.1301 *et seq.* (permits) (applicable): If point sources of water contamination are retained or created by any remediation activity, applicable Clean Water Act standards would apply to those discharges. The State of Montana established state standards and permit requirements in conformity with the Clean Water Act, and these standards and requirements apply to point source discharges. *See* ARM 17.30.1201.

ARM 17.30.1342-1344 (applicable): The State of Montana has been delegated the authority to implement the Clean Water Act and these requirements are enforced in Montana through the MPDES. These regulations set forth the substantive requirements applicable to all MPDES and National Pollutant Discharge Elimination System permits. The substantive requirements, including the requirement to properly operate and maintain all facilities and systems of treatment and control, are applicable requirements.

1.1.2 Montana Water Quality Act, §§ 75-5-101, *et seq.*, MCA:

Section 75-5-605, MCA (applicable), prohibits causing pollution of any state waters. Pollution is defined as contamination or other alteration of physical, chemical, or biological properties of state waters that exceeds that permitted by the water quality standards or the discharge, seepage, or drainage of any substances into state water that will likely create a nuisance or render the water harmful, detrimental or injurious to public health, recreation, safety, or welfare, or to livestock or wild animals. Also, it is unlawful to place or cause to be placed any wastes where they will cause pollution of any state waters.

Section 75-5-303, MCA (applicable), states that existing uses of state waters and the level of water quality necessary to protect the uses must be maintained and protected. Section 75-5-317, MCA, provides an exemption from nondegradation requirements that allows changes of existing water quality resulting from an emergency action or reclamation that is designed to protect the public health or the environment and that is approved, authorized, or required by the department. Degradation meeting these requirements may be considered nonsignificant.

ARM 17.30.637 (applicable), prohibits discharges containing substances that will: (a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining

shorelines; (b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials; (c) produce odors, colors or other conditions that create a nuisance or render undesirable tastes to fish flesh or make fish inedible; (d) create concentrations or combinations of materials that are toxic or harmful to human, animal, plant or aquatic life; or (e) create conditions that produce undesirable aquatic life.

ARM 17.30.705 (applicable), provides that for all state waters, existing and anticipated uses and the water quality necessary to protect these uses must be maintained and protected unless degradation is allowed under the nondegradation rules at ARM 17.30.708.

ARM 17.30.1011 (applicable), provides that any groundwater whose existing quality is higher than the standard for its classification must be maintained at that high quality unless degradation may be allowed under the principles established in Section 75-5-303, MCA and the nondegradation rules at ARM 17.30.701, *et seq.*

1.1.3 Stormwater Runoff Control Requirements

ARM 17.24.633 (relevant), provides all surface drainage from a disturbed area must be treated by the best technology currently available (BTCA). Sediment control through BTCA must be maintained until the disturbed area has been reclaimed, the revegetation requirements have been met, and the area meets state and federal requirements for the receiving stream.

ARM 17.30.1341 (applicable), DEQ issues storm water permits for certain activities. Generally, the permits require the permittee to implement best management practices (BMPs) and to take all reasonable steps to minimize or prevent any discharge that has a reasonable likelihood of adversely affecting human health or the environment. However, if there is evidence indicating potential or realized impacts on water quality due to any storm water discharge associated with the activity, an individual MPDES permit or alternative general permit may be required.

As appropriate, the general permit for stormwater for construction activities - General Permit for Storm Water Discharge Associated with Construction Activity, Permit No. MTR100000 (January 1, 2013) may be applicable: http://deq.mt.gov/wqinfo/WPBForms/pdf/SW%20CONST%20PER.pdf.

1.2 Air Standards

These standards, promulgated pursuant to section 109 of the Clean Air Act, 42 U.S.C. §§ 7401, *et seq.*, (applicable) are applicable to releases into the air from any cleanup activities.

Sections 75-2-101, *et seq.*, MCA, (applicable) provide that state emission standards are enforceable under the Montana Clean Air Act.

ARM 17.8.802 (applicable) incorporates by reference the air regulations in certain parts of CFR Title 40 regarding quality assurance requirements for prevention of significant deterioration air monitoring; standards of performance for new stationary sources; emission standards for hazardous air pollutants, and other standards and requirements.

ARM 17.8.805 (applicable) provides ambient air ceilings, and states that no concentrations of a pollutant may exceed concentrations permitted under with the applicable secondary or the primary national ambient air quality standard, whichever concentration is lowest for the pollutant for a period of exposure.

ARM 17.8.204 (applicable) provides for ambient air monitoring and provides that, generally, all ambient air monitoring, sampling and data collection, recording, analysis and transmittal must be in compliance with either the Montana Quality Assurance Manual or a project-specific Quality Assurance Project Plan depending on the entity performing such monitoring.

ARM 17.8.220 (applicable) prohibits causing or contributing to concentrations of particulate matter in the ambient air such that the mass of settle particulate matter exceeds a 30 day average: 10 gm/m^2, 30 day average. A measurement method is also provided.

Dust control regulations are promulgated at ARM 17.8.223 (applicable) as part of a federally approved State Implementation Plan (SIP), pursuant to the Clean Air Act of Montana, §§ 75-2-101 *et seq.*, MCA (applicable). Corresponding federal regulations are found at 40 CFR 50.6 (applicable).

ARM 17.8.308 (applicable) provides that no person shall cause or authorize the production, handling, transportation or storage of any material; or cause or authorize the use of any street, road, or parking lot; or operate a construction facility or demolition project, unless reasonable precautions to control emissions of airborne particulate matter are taken.

ARM 17.8.308 and ARM 17.8.304 (applicable) state that emissions of airborne particulate matter must be controlled so that they do not "exhibit an opacity of twenty percent (20%) or greater average over six consecutive minutes."

ARM 17.8.324 (applicable) contains certain standards regarding hydrocarbon emissions and the treatment, storage, and handling of petroleum products.

ARM 17.8.604 (applicable) lists certain wastes that may not be disposed of by open burning, including asbestos, oil or petroleum products, RCRA hazardous wastes, chemicals and wood and wood byproducts that have been coated, painted, stained, treated or contaminated by foreign material. Any waste that is moved from the premises where it was generated and any trade waste (material resulting from construction or operation of any business, trade, industry or demolition project) may be open burned only in accordance with the substantive requirements of ARM 17.8.611 or 612.

Section 82-4-231(10)(m), MCA, and ARM 17.24.761 (relevant) specifies a range of measures for controlling fugitive dust emissions during mining and reclamation activities.

1.3 Water Well Requirements

Sections 37-43-101 to 402, MCA (applicable) provides regulations and licensing requirements for drillers or makers of water wells and monitoring wells.

Section 85-2-505, MCA (applicable) precludes the wasting of groundwater. Any well producing waters that contaminate other waters must be plugged or capped, and wells must be constructed and maintained so as to prevent waste, contamination, or pollution of groundwater.

Section 85-2-516, MCA (applicable) states that within 60 days after any well is completed a well log report must be filed by the driller with the Montana Bureau of Mines and Geology.

ARM 36.21.801-810., (applicable) specifies certain requirements that must be fulfilled when constructing and abandoning monitoring wells.

1.4 Solid Waste Management Requirements

Montana Solid Waste Management Act and regulations, §§ 75-10-201, *et seq.*, MCA, ARM 17.50.101 *et seq.* (applicable) - Regulations promulgated under the Solid Waste Management Act, § 75-10-201, *et seq.*, MCA, and pursuant to the federal Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901 *et seq.* (RCRA Subtitle D) specify requirements that apply to the transportation of solid wastes and the operation, closure and post-closure care of solid waste facilities:

ARM 17.50.523 (applicable) **s**pecifies that solid waste must be transported in such a manner as to prevent its discharge, dumping, spilling, or leaking from the transport vehicle.

ARM 17.50.525 (applicable) specifies DEQ may inspect solid waste facilities at reasonable hours.

ARM 17.50.1009(1)(c) (applicable) requires that solid waste facilities not discharge pollutants in excess of state standards. A solid waste facility must contain a leachate collection system unless there is no potential for migration of a constituent in Appendix I or II to 40 CFR 258.

ARM 17.50.1106 (applicable) specifies the concentration of methane gas generated by a solid waste facility cannot exceed 25 percent of the lower explosive limit for methane in facility structures, excluding gas control or recovery system components, and cannot exceed the lower explosive limit for methane at the facility property boundary.

ARM 17.50.1204 (applicable) provides solid waste facilities must either be designed to ensure that MCLs are not exceeded or the solid waste facility must contain a composite liner and leachate collection system that complies with specified criteria.

ARM 17.50.1108 (applicable) requires that the owner or operator of a solid waste facility use barriers to control public access.

ARM 17.50.1109 (applicable) requires that owners or operators of solid waste facilities design, construct and maintain a run-on control system to prevent flow onto the active portion of the solid waste facility during the peak discharge from a 25-year storm and a run-off control system from the active portion of the solid waste facility to collect and control at least the water volume result from a 24-hour, 25-year storm.

ARM 17.50.1110 (applicable) prohibits any discharge of a pollutant from a solid waste facility to state waters, including wetlands, that violates any requirement of the Montana Water Quality Act. Prohibits any discharge from a solid waste facility of a nonpoint source of pollution to waters of the United States, including wetlands, that violates any requirement of an area-wide or statewide water quality management plan approved under the Federal Clean Water Act.

ARM 17.50.1111 (applicable) prohibits placement of bulk or noncharacterized waste into a solid waste facility, unless the waste is household waste other than septic liquid waste or leachate derived from and placed back into a facility with a composite liner and leachate collection and removal system.

ARM 17.50.1116 (applicable) sets forth requirements for operation of a solid waste facility, including: that solid waste facilities be created and maintained with supervision, fencing and signage; that owners or operators of solid waste facilities take effective measures to control litter and prevent the public from salvaging materials at the facility; and that the facility be designed to control litter, insects, rodents, odor, residues, waste water and air pollutants.

ARM 17.50.1403 (applicable) sets forth closure requirements for solid waste facilities. Solid waste facilities must meet the following criteria: (1) install a final cover that is designed to minimize infiltration and erosion; (2) design and construct the final cover system to minimize infiltration through the closed unit by the use of an infiltration layer that contains a minimum 18 inches of earthen material and has a permeability less than or equal to the permeability of any bottom liner, barrier layer, or natural subsoils or a permeability no greater than 1×10^{-5} cm/sec, whichever is less; and (3) minimize erosion of the final cover by the use of a seed bed layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.

ARM 17.50.1404 (applicable) sets forth post-closure care requirements for solid waste facilities. Post-closure care must be conducted for a period sufficient to protect human health and the environment. Post-closure care requires maintenance of the integrity and effectiveness of any final cover, including making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the cover and

comply with the groundwater monitoring requirements found at ARM Title 17, chapter 50, subchapter 7.

Section 75-10-206, MCA,(applicable) allows variances to be granted from solid waste regulations if failure to comply with the rules does not result in a danger to public health or safety or compliance with specific rules would produce hardship without producing benefits to the health and safety of the public that outweigh the hardship.

40 CFR Part 257 (applicable) establishes standards with which solid waste disposal must comply to avoid possible adverse effects on health or the environment. These criteria apply to any remedial alternatives that require any type of solid waste disposal at the facility. The criteria do not apply to hazardous waste disposal that is subject to regulation under subtitle C of the Resource Conservation and Recovery Act (RCRA). Part 257.3-2 provides for the protection of threatened or endangered species. Part 257.3-3 provides that a facility must not cause the discharge of pollutants into waters of the United Sates. Part 257.3-4 states that a facility or practice must not contaminate underground drinking water. Part 257.3-7 states that a facility or practice must not engage in open burning of solid waste. Part 257.3-8 states the explosive limits or other specifics regarding safety.

ARM 17.36.911 *et seq.* (applicable) governs subsurface wastewater treatment systems. If such a system is constructed, altered or extended as part of the remedial action, these regulations apply.

1.5 Hazardous Waste Management Requirements

1.5.1 RCRA, 42 U.S.C. §§ 6901 *et seq.*, (applicable, as incorporated by the Montana Hazardous Waste Act) and the Montana Hazardous Waste Act, §§ 75-10-401 *et seq.*, MCA, (applicable) and regulations.

These Acts establish a regulatory structure for the generation, transportation, treatment, storage and disposal of hazardous wastes. These requirements would be applicable to substances and actions at the facility that involve the active management of hazardous wastes. These ERCLs only apply to remedial actions involving listed or characteristic hazardous waste; any on-going operations involving hazardous waste must comply with state and federal requirements and permits.

Wastes may be designated as hazardous by either of two methods: listing or demonstration of a hazardous characteristic. Listed wastes are the specific types of wastes determined by EPA to be hazardous as identified in 40 CFR Part 261, Subpart D (40 CFR 261.30 - 261.33) (applicable, as incorporated by the Montana Hazardous Waste Act). Listed wastes are designated hazardous by virtue of their origin or source, and must be managed as hazardous wastes regardless of the concentration of hazardous constituents, unless eligible for a “no longer contained-in determination” from DEQ. For more information, *see* http://deq.mt.gov/Portals/112/Land/StateSuperfund/Documents/ContainedInGuidance.pdf. Characteristic wastes are those that by virtue of concentrations of hazardous constituents demonstrate the characteristic of ignitability, corrosivity, reactivity or toxicity, as described at 40 CFR Part 261, Subpart C (applicable, as incorporated by the Montana Hazardous Waste Act).

ARM 17.53.112 (applicable, as incorporated by the Montana Hazardous Waste Act) specifies that the presence of listed and characteristic hazardous waste require the permit requirements specified below that are applicable for the types of waste management units or the waste management practices anticipated in the remedial actions at the facility.

The RCRA regulations at 40 CFR Part 262 (applicable, as incorporated by the Montana Hazardous Waste Act) establish standards that apply to generators of hazardous waste. These standards include requirements for obtaining an EPA identification number and maintaining certain records and filing certain reports. These standards are applicable for any waste that will be transported off of the facility.

The RCRA regulations at 40 CFR Part 263 (applicable, as incorporated by the Montana Hazardous Waste Act) establish standards that apply to transporters of hazardous waste. These standards include requirements for immediate action for hazardous waste discharges. These standards are applicable for any transportation within the facility. These standards are independently applicable for any transportation off of the facility.

The regulations at 40 CFR 264, Subpart B (applicable, as incorporated by the Montana Hazardous Waste Act) establish general facility requirements. These standards include requirements for general waste analysis, security and location standards.

The regulations at 40 CFR 264, Subpart F (applicable, as incorporated by the Montana Hazardous Waste Act) establish requirements for groundwater protection for RCRA-regulated solid waste management units (i.e., waste piles, surface impoundments, land treatment units, and landfills). The regulations at Subpart F establish monitoring requirements for RCRA-regulated solid waste management units (i.e., waste piles, surface impoundments, land treatment units, and landfills). Subpart F provides for three general types of groundwater monitoring: detection monitoring (40 CFR 264.98); compliance monitoring (40 CFR 264.99); and corrective action monitoring (40 CFR 264.100). Monitoring wells must be cased according to 264.97(c).

Monitoring is required during the active life of a hazardous waste management unit. If hazardous waste remains, monitoring is required for a period necessary to protect human health and the environment.

40 CFR Part 264, Subpart G (applicable, as incorporated by the Montana Hazardous Waste Act) establishes that hazardous waste management facilities must be closed in such a manner as to (a) minimize the need for further maintenance and (b) control, minimize or eliminate, to the extent necessary to protect public health and the environment, post-closure escape of hazardous wastes, hazardous constituents, leachate, contaminated runoff or hazardous waste decomposition products to the ground or surface waters or to the atmosphere.

Requirements for facilities requiring post-closure care include the following: the facilities must undertake appropriate monitoring and maintenance actions, control public access, and control post-closure use of the property to ensure that the integrity of the final cover, liner, or containment system is not disturbed. In addition, all contaminated equipment, structures and soil must be properly disposed of or decontaminated unless exempt and free liquids are removed or solidified, the wastes stabilized, and the waste management unit covered.

40 CFR Part 264, Subparts I and J (applicable, as incorporated by the Montana Hazardous Waste Act) apply to owners and operators of facilities that store hazardous waste in containers, and store or treat hazardous waste in tanks, respectively. These regulations are applicable to any storage or treatment in these units at the facility. The related provisions of 40 CFR 261.7 regarding residues of hazardous waste in empty containers are also applicable.

40 CFR Part 264, Subpart S (applicable, as incorporated by the Montana Hazardous Waste Act) provides special provisions for cleanup; 40 CFR 264.552 allows the designation of a corrective action management unit (CAMU) located within the contiguous property under the control of the owner or operator where the wastes to be managed in the CAMU originated and provides requirements for siting, managing, and closing the CAMU. Placement of this CAMU-eligible waste does not constitute land disposal of hazardous waste. If staging piles are needed during remediation, compliance with 40 CFR 264.554 will be required.

40 CFR 264.554 sets forth the requirements for a staging pile. A staging pile must be located within the contiguous property under the control of the owner/operator where the wastes to be managed in the staging pile originated. The staging pile must be designed so as to prevent or minimize releases of hazardous wastes and hazardous constituents into the environment, and minimize or adequately

control cross-media transfer, as necessary to protect human health and the environment (for example, through the use of liners, covers, run-off/run-on controls, as appropriate). The staging pile must not operate for more than two years and cannot be used for treatment.

The Hazardous Waste Identification Rule (HWIR) Media Rule promulgated at 63 Fed. Reg. 65874 (November 30, 1998) (applicable, as incorporated by the Montana Hazardous Waste Act) allows listed waste treated to levels protective of human health and the environment to be disposed on the facility without triggering land disposal restrictions or minimum technology requirements for these disposal requirements.

40 CFR Part 270 (applicable, as incorporated by the Montana Hazardous Waste Act) sets forth the hazardous waste permit program. The requirements set forth in 40 CFR Part 270, Subpart C (permit conditions), including the requirement to properly operate and maintain all facilities and systems of treatment and control are applicable requirements.

1.5.2 The Montana Hazardous Waste Act, §§ 75-10-401 *et seq.*, MCA (applicable) and regulations.

This Act establishes a regulatory structure for the generation, transportation, treatment, storage and disposal of hazardous wastes. These requirements are applicable to substances and actions at the facility that involve listed and characteristic hazardous wastes.

ARM 17.53.501-502 (applicable) adopts the equivalent of RCRA regulations at 40 CFR Part 261, establishing standards for the identification and listing of hazardous wastes, including standards for recyclable materials and standards for empty containers, with certain State exceptions and additions.

ARM 17.53.601-604 (applicable) adopts the equivalent to RCRA regulations at 40 CFR Part 262, establishing standards that apply to generators of hazardous waste, including standards pertaining to the accumulation of hazardous wastes, with certain State exceptions and additions.

ARM 17.53.701-704 & 706-708 (applicable) adopts the equivalent to RCRA regulations at 40 CFR Part 263, establishing standards that apply to transporters of hazardous waste, with certain State exceptions and additions.

ARM 17.53.801-803 (applicable) adopts the equivalent to RCRA regulations at 40 CFR Part 264, establishing standards that apply to hazardous waste treatment, storage and disposal facilities, with certain State exceptions and additions.

ARM 17.53.1101-1102 (applicable) adopts the equivalent to RCRA regulations at 40 CFR Part 268, establishing land disposal restrictions, with certain State exceptions and additions.

Section 75-10-422 MCA (applicable) prohibits the unlawful disposal of hazardous wastes.

ARM 17.53.1201-1202 (applicable) adopts the equivalent to RCRA regulations at 40 CFR Part 270 and 124, which establish standards for permitted facilities, with certain State exceptions and additions.

ARM 17.53.1401 (applicable) adopts the equivalent of RCRA regulations at 40 CFR Part 279 that set forth the standards for the management of used oil.

1.6 Technology-Based Treatment

ARM 17.30.1203 (applicable): Provisions of 40 CFR Part 125 for criteria and standards for the imposition of technology-based treatment requirements are adopted and incorporated in DEQ permits. For toxic and nonconventional pollutants treatment must apply the best available technology economically achievable (BAT); for conventional pollutants, application of the best conventional pollutant control technology (BCT) is required. Where effluent limitations are not specified for the particular industry or industrial category at issue, BCT/BAT technology-based treatment requirements are determined on a case by case basis using best professional judgment (BPJ).

1.7 Underground Injection Control Program

The Underground Injection Control Program provided in 40 CFR Parts 144 and 146 (applicable) sets forth the standards and criteria for the injection of substances into aquifers. Wells are classified as Class I through V, depending on the location and the type of substance injected. For all classes, no owner may construct, operate or maintain an injection well in a manner that results in the contamination of an underground source of drinking water at levels that violate maximum contaminant levels (MCLs) or otherwise adversely affect the health of persons. Each classification may also contain further specific standards, depending on the classification.

1.8 Underground Storage Tank Requirements

If free product were found at the facility, these regulations would be relevant and appropriate for investigating and remediating the free product in the groundwater and/or soil. These regulations would be applicable if any components of an underground storage tank (UST) system were found at the facility.

40 CFR Part 280, Subpart F (relevant**)** sets forth requirements for Release Response and Corrective Action for underground storage tank (UST) Systems Containing Petroleum or Hazardous Substances. These include initial response, initial abatement measures, facility characterization, free product removal, and investigations for soil and groundwater cleanup.

40 CFR 280.64 (relevant) provides that where investigations in connection with leaking underground storage tanks reveal the presence of free product, owners and operators must remove free product to the maximum extent practicable as determined by the implementing agency. This regulation also requires that the free product removal be conducted in a manner that minimizes the spread of contamination into previously uncontaminated zones by using recovery and disposal techniques appropriate to the hydrogeologic conditions at the facility, and that properly treats, discharges or disposes of recovery byproducts in compliance with applicable local, state and federal regulations. Based upon 40 CFR 280.43 and ARM 17.56.407 (below), DEQ has determined that “to the maximum extent practicable” generally means 1/8 of an inch of free product or less.

40 CFR 280.64 (relevant) provides that abatement of free product migration is a minimum objective for the design of the free product removal system provides that any flammable products must be handled in a safe and competent manner to prevent fires or explosions.

40 CFR Part 280, Subpart D (relevant) sets forth requirements for release detection.

40 CFR 280.43 (relevant) specifies groundwater monitoring requirements for underground storage tanks and requires continuous monitoring devices or manual methods used to detect the presence of at least 1/8 of an inch of free product on top of the groundwater in the monitoring wells.

The Montana regulations regarding underground storage tanks include similar requirements.

ARM Title 17, Chapter 56, Sub-Chapter 4 (relevant) specifies release detection.

ARM 17.56.407 (relevant) specifies groundwater monitoring requirements for underground storage tanks and requires continuous monitoring devices or manual methods used to detect the presence of at least 1/8 of an inch of free product on top of the groundwater in the monitoring wells.

ARM Title 17, Chapter 56, Sub-Chapter 6 (relevant) specifies release response and corrective action for tanks containing petroleum or hazardous substances.

ARM 17.56.602 through 605 (relevant) requires certain mitigation measures including removal of as much of the regulated substance from the system as is necessary to prevent further release into the environment and prevention of further migration of the released substance into surrounding soil and groundwater. In particular, ARM 17.56.602(1)(c) (applicable) requires that after a release from an

underground storage tank system is identified in any manner, owners and operators must investigate to determine the possible presence of free product, begin free product removal as soon as practicable, conduct free product removal in a manner that minimizes the spread of contamination into previously uncontaminated zones by using recovery and disposal techniques appropriate to the hydrogeologic conditions at the site, and that properly treats, discharges or disposes of recovery byproducts in compliance with applicable local, state and federal regulations. This regulation also provides that abatement of free product migration is a minimum objective for the design of the free product removal system and provides that any flammable products must be handled in a safe and competent manner to prevent fires or explosions.

ARM 17.56.607(4)(d) (relevant) specifies that all free product must be removed to the maximum extent practicable before a release may be considered resolved.

ARM 17.56.702 (relevant) requires that all tanks and connecting piping that are taken out of service permanently must be removed from the ground. This applies if any remaining underground piping is encountered during remedial activities.

1.9 Reclamation and Revegetation Requirements

Certain portions of the Montana Strip and Underground Mining Reclamation Act and Montana Metal Mining Act, as outlined below, are relevant requirements for activities at the facility. While no mining activities are occurring at the facility, these requirements are relevant for the management and reclamation of areas disturbed by excavation, grading, or similar actions.

ARM 17.24.501 (relevant) gives general backfilling and final grading requirements.

ARM 17.24.631 (relevant) provides that long-term adverse changes in the hydrologic balance from mining and reclamation activities, such as changes in water quality and quantity, and location of surface water drainage channels must be minimized. Water pollution must be minimized and, where necessary, treatment methods utilized. Diversions of drainages to avoid contamination must be used in preference to the use of water treatment facilities. Other pollution minimization devices must be used, if appropriate, including stabilizing disturbed areas through land shaping, diverting runoff, planting quickly germinating and growing stands of temporary vegetation, regulating channel velocity of water, lining drainage channels with rock or vegetation, mulching, and control of acid-forming, and toxic-forming waste materials.

ARM 17.24.633 (relevant) states that all surface drainage from a disturbed area must be treated by the best technology currently available (BTCA). Treatment must continue until the area is stabilized.

ARM 17.24.635 through 17.24.637 (relevant) set forth requirements for temporary and permanent diversions.

ARM 17.24.638 (relevant) specifies sediment control measures to be implemented during operations.

ARM 17.24.640 (relevant) provides that discharge from sedimentation ponds, permanent and temporary impoundments, and diversions must be controlled by energy dissipaters, riprap channels, and other devices, where necessary, to reduce erosion, prevent deepening or enlargement of stream channels, and to minimize disturbance of the hydrologic balance.

ARM 17.24.641(relevant) indicates that practices to prevent drainage from acid or toxic forming spoil material into groundwater and surface water will be employed.

ARM 17.24.703 (relevant) requires that when using materials other than, or along with, soil for final surfacing in reclamation, the operator must demonstrate that the material (1) is at least as capable as the soil of supporting the approved vegetation and subsequent land use, and (2) the medium must be

the best available in the area to support vegetation. Such substitutes must be used in a manner consistent with the requirements for redistribution of soil in ARM 17.24.701 and 702.

ARM 17.24.713 (relevant) provides that seeding and planting of disturbed areas must be conducted during the first appropriate period for favorable planting after final seedbed preparation, but may not be more than ninety days after soil has been replaced.

ARM 17.24.714 (relevant) requires use of a mulch or cover crop or both until an adequate permanent cover can be established. Use of mulching and temporary cover may be suspended under certain conditions.

ARM 17.24.716 (relevant) establishes the required method of revegetation, and provides that introduced species may be substituted for native species as part of an approved plan for alternate vegetation.

ARM 17.24.721 (relevant) specifies that rills and gullies must be stabilized and the area reseeded and replanted if the rills and gullies are disrupting the reestablishment of the vegetative cover.

ARM 17.24.751(relevant) measures to prevent degradation of fish and wildlife habitat will be employed.

ARM 17.24.761 (relevant) requires that fugitive dust control measures will be employed during excavation and construction activities to minimize the emission of fugitive dust.

1.10 Noxious Weed Requirements

Section 7-22-2101(8)(a), MCA (applicable) defines “noxious weeds” as any exotic plant species established or that may be introduced in the state that may render land unfit for agriculture, forestry, livestock, wildlife, or other beneficial uses or that may harm native plant communities and that is designated: (i) as a statewide noxious weed by rule of the department; or (ii) as a district noxious weed by a board, following public notice of intent and a public hearing.

Section 7-22-2116(1), MCA (applicable), declares it is unlawful for any person to permit any noxious weed to propagate or go to seed on the person’s land unless they adhere to the noxious weed management program of the applicable weed management district or a noxious weed management agreement.

Designated noxious weeds are listed in ARM 4.5.201 through 4.5.210 (applicable).

Section 7-22-2152, MCA (applicable) requires that any person proposing certain actions including but not limited to a solid waste facility, a highway or road, a commercial, industrial, or government development, or any other development that needs state or local approval and that results in the potential for noxious weed infestation within a district must notify the district weed board at least 15 days prior to the activity. The board will require that the areas be seeded, planted, or otherwise managed to reestablish a cover of beneficial plants. The person committing the action must submit to the board a written plan specifying the methods to be used to accomplish revegetation at least 15 days prior to the activity. The plan must describe the time and method of seeding, fertilization practices, recommended plant species, use of weed-free seed, and the weed management procedures to be used. The plan is subject to approval by the board, which may require revisions to bring the revegetation plan into compliance with the district weed management plan. The activity for which notice is given may not occur until the plan is approved by the board and signed by the presiding officer of the board and by the person or a representative of the agency responsible for the action. The signed plan constitutes a binding agreement between the board and the person or agency. The plan must be approved, with revisions if necessary, within 10 days of receipt by the board.

2.0 CONTAMINANT-SPECIFIC ERCLs

2.1 Groundwater Standards

2.1.1 Safe Drinking Water Act – 42 U.S.C. § 300f *et seq*. and the National Primary Drinking Water Regulations (40 CFR Part 141) (relevant and potentially applicable) establish MCLs and maximum contaminant level goals (MCLGs) for contaminants in drinking water distributed in public water systems. The requirements were evaluated in this ERCLs analysis in conjunction with the ground water classification standards promulgated by the State of Montana.

Use of these standards for this action is fully supported by EPA regulations and guidance. The Preamble to the National Contingency Plan (NCP) clearly states that MCLs are relevant for groundwater that is a current or potential source of drinking water (55 Fed.Reg. 8750, March 8, 1990), and this determination is further supported by requirements in the regulations governing conduct of the RI/FS studies found at 40 CFR 300.430(e)(2)(i)(B). EPA's guidance on Remedial Action for Contaminated Groundwater at Superfund Sites states that "MCLs developed under the Safe Drinking Water Act generally are ARARs [the federal equivalent of ERCLs] for current or potential drinking water sources." MCLGs that are above zero are relevant under the same conditions (55 Fed.Reg. 8750-8752, March 8, 1990). *See also*, *State of Ohio v. EPA*, 997 F.2d 1520 (D.C. Cir. 1993), which upholds EPA's application of MCLs and non-zero MCLGs as ARARs for groundwater that is a potential drinking water source.

Chemical	MCLG	MCL
Tetrachloroethene	0[1]	5 µg/l
Trichloroethene	0[1]	5 µg/l
Vinyl chloride	0[1]	2 µg/l

[1] An MCLG of zero is not an appropriate standard for Superfund site cleanups.

2.1.2 The Montana Water Quality Act, §§ 75-5-101, *et seq.,* MCA (applicable) and regulations.

ARM 17.30.1005 and –1006 (applicable) provides that groundwater is classified I through IV based on its beneficial uses. Class I is the highest quality class; class IV the lowest. The groundwater at the Facility is classified as Class I, because it has a natural specific conductance less than or equal to 1,000 microSiemens/cm at 25ºC.

ARM 17.30.1006 (applicable) sets the standards for the different classes of groundwater.

The quality of Class I ground water must be maintained suitable for the following beneficial uses with little or no treatment: (i) public and private water supplies; (ii) culinary and food processing purposes; (iii) irrigation; (iv) drinking water for livestock and wildlife; and (v) commercial and industrial purposes.

Concentrations of dissolved substances in groundwater may not exceed the human health standards listed in Circular DEQ-7 Montana Numeric Water Quality Standards[1], (applicable) including narrative standards, which are promulgated pursuant to the state Water Quality Act, §§ 75-5-101, *et seq.*, MCA. Concentrations of other dissolved or suspended substances must not exceed levels that render the waters harmful, detrimental or injurious to beneficial uses. DEQ may use any pertinent credible information to determine these levels. Contaminants at the facility that do not have DEQ-7 standards include iron and manganese. In addition, the Secondary Maximum Contaminant Levels (SMCLS) specified in 40 CFR Part 143.3 provide guidance on levels of contaminants that would interfere with

[1] Montana Department of Environmental Quality, Water Quality Division, *Circular DEQ-7, Montana Numeric Water Quality Standards* (May 2017) ("DEQ-7")

the beneficial use of the groundwater. This regulation contains levels for iron, manganese, color, odor, and corrosivity.

For the primary contaminants of concern, the DEQ-7 standards are listed below. However, compliance with all DEQ-7 standards is required and remedial actions must meet the DEQ-7 standards for all contaminants at the facility, including any breakdown products generated during remedial actions.

Chemical	DEQ-7 Standard for Groundwater
Tetrachloroethene	5 µg/l
Trichloroethene	5 µg/l
Vinyl chloride	0.2 µg/l

No increase of a parameter that causes a violation of the nondegradation provisions of 75-5-303, MCA, is allowed for Class I groundwater.

ARM 17.30.1011 (applicable) provides that any ground water whose existing quality is higher than the standard for its classification must be maintained at that high quality unless degradation may be allowed under the principles established in § 75-5-303, MCA, and the nondegradation rules at ARM 17.30.701 *et seq.*

2.2 Surface Water Quality Standards

The Montana Water Quality Act, §§ 75-5-101 *et seq.*, MCA, (applicable) establishes requirements for restoring and maintaining the quality of surface and ground waters and the federal Clean Water Act, 33 U.S.C. §§ 1251 *et seq.*, establishes requirements for restoring and maintaining the quality of surface waters. Under these Acts the state has authority to adopt water quality standards designed to protect beneficial uses of each water body and to designate uses for each water body. Montana's regulations classify state waters according to quality, place restrictions on the discharge of pollutants to state waters and prohibit the degradation of state waters.

There are two gravel pits located near Mission Wye. ARM 17.30.615 (applicable) provides that the waters of the gravel pit pond are classified E-4, as a semi-permanent lake or pond that has an electrical conductivity (EC) less than 7,000 µS/cm.

The “E-4” classification standards are contained in ARM 17.30.655 (applicable) of the Montana water quality regulations. Waters classified E-4 are to be maintained suitable for aquatic life, agricultural purposes, secondary contact recreation, and wildlife.

In addition, Mission Wye is located in the Yellowstone River Basin and is approximately 2,000 feet south of the Yellowstone River. ARM 17.30.611 (applicable) provides that the waters of the mainstem of the Yellowstone River are classified as B-3.

The “B-3” classification standards are contained in ARM 17.30.625 (applicable) of the Montana water quality regulations. Waters classified B-3 are to be maintained suitable for drinking, culinary, and food processing (after conventional treatment); bathing, swimming, and recreation; aquatic and animal life; and agricultural and industrial water supply.

Also, the designated uses of a receiving water body under a different classification must be fully maintained. The acute and chronic aquatic life standards in DEQ-7 apply; tetrachloroethene, trichloroethene, and vinyl chloride do not have acute or chronic aquatic life standards.

For the primary contaminants of concern, the DEQ-7 human health levels are listed below. Although these standards are not applicable, they are relevant.

Chemical	**DEQ-7 Human Health Standard for Surface Water**
Tetrachloroethene	5 µg/l
Trichloroethene	5 µg/l
Vinyl chloride	0.22 µg/l

ARM 17.30.637 (applicable) prohibits discharges containing substances that will: (a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines; (b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials; (c) produce odors, colors or other conditions that create a nuisance or render undesirable tastes to fish flesh or make fish inedible; (d) create concentrations or combinations of materials that are toxic or harmful to human, animal, plant or aquatic life; (e) create conditions that produce undesirable aquatic life.

ARM 17.30.637 (applicable) also provides that leaching pads, tailing ponds, or water, waste or product holding facilities must be located, constructed, operated and maintained to prevent any discharge, seepage, drainage, infiltration, or flow that may result in pollution of state waters, and a monitoring system may be required to ensure such compliance. No pollutants may be discharged and no activities may be conducted that, either alone or in combination with other wastes or activities, result in the total dissolved gas pressure relative to the water surface exceeding 110 percent of saturation.

ARM 17.30.705 (applicable) provides that for any surface water, existing and anticipated uses and the water quality necessary to protect these uses must be maintained and protected unless degradation is allowed under the nondegradation rules at ARM 17.30.708.

ARM 17.30.641 (applicable) provides standards for sampling and analysis of water to determine quality.

ARM 17.30.646 (applicable) requires that bioassay tolerance concentrations be determined in a specified manner.

2.3 Air Standards

The Clean Air Act (42 U.S.C. §§ 7401 *et seq.*) (applicable) provides limitations on air emissions resulting from cleanup activities or emissions resulting from wind erosion of exposed hazardous substances. Some of these ERCLs, identified as action-specific requirements could also be identified here as contaminant-specific requirements, but will not be repeated.

The National Emission Standards for Hazardous Air Pollutants (NESHAPS), 40 CFR Part 61 (applicable) establishes emission standards for specific air pollutants.

Sections 75-2-101, *et seq.*, MCA, (applicable) provides that state emission standards are enforceable under the Montana Clean Air Act.

ARM 17.74 Subchapter 3 (applicable) addresses requirements related to persons or entities engaged in asbestos-related occupations, in charge of asbestos projects, or engaged in facility demolition or renovation activities. Training requirements for persons engaged in asbestos-type occupations are specified.

The Asbestos Control Act (§§ 75-2-501 *et seq.*, MCA) (applicable) establishes requirements for asbestos projects including permitting and inspection requirements.

ARM 17.8.220 (applicable) provides that no person may cause or contribute to concentrations of particulate matter in the ambient air such that the mass of settled particulate matter exceeds a 30-day average of 10 $gm/m^{2.}$ A measurement method is also provided.

ARM 17.8.221 (applicable) provides concentrations of particulate matter in ambient air must not exceed annual average scattering coefficient of 3×10^{-5} per meter.

ARM 17.8.223 (applicable) provides PM-10 concentrations in ambient air must not exceed a 90-day average of 1.5 micrograms per cubic meter of air and an annual average of 50 micrograms per cubic meter of air.

Ambient air standards under section 109 of the Clean Air Act are also promulgated for carbon monoxide, hydrogen sulfide, nitrogen dioxide, sulfur dioxide, ozone, and lead. If emissions of these compounds were to occur at the facility in connection with any cleanup action, these standards would also be applicable. *See* ARM 17.8.210, 17.8.211, 17.8.212, 17.8.213, 17.8.214, and 17.8.222.

3.0 LOCATION-SPECIFIC ERCLS

3.1 Endangered Species

3.1.1. The Endangered Species Act (relevant). This statute and implementing regulations (16 U.S.C. § 1531 *et seq.*, 50 CFR Part 402, and 40 CFR 257.3-2) require that any federal activity or federally authorized activity may not jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify a critical habitat. Compliance with this requirement involves consultation with the U.S. Fish and Wildlife Service (USFWS) and a determination of whether there are listed or proposed species or critical habitats present at the facility, and, if so, whether any proposed activities will impact such wildlife or habitat.

3.1.2 Montana Nongame and Endangered Species Act, §§ 87-5-101 *et seq.* (applicable): Endangered species should be protected in order to maintain and to the extent possible enhance their numbers. These sections list endangered species, prohibited acts and penalties. *See also*, § 87-5-201, MCA, (applicable) concerning protection of wild birds, nests and eggs; and ARM 12.5.201 (applicable) prohibiting certain activities with respect to specified endangered species.

3.2 Migratory Bird Treaty Act

This requirement (16 USC §§ 703 *et seq.*) (relevant) establishes a federal responsibility for the protection of the international migratory bird resource and requires continued consultation with the appropriate program within the USFWS during remedial design and remedial construction to ensure that the cleanup of the facility does not unnecessarily impact migratory birds.

3.3 Bald Eagle Protection Act

This requirement (16 USC §§ 668 *et seq.*) (relevant) establishes a federal responsibility for protection of bald and golden eagles, and requires continued consultation with the appropriate program within the USFWS during remedial design and remedial construction to ensure that any cleanup of the facility does not unnecessarily adversely affect the bald and golden eagle.

3.4 Historic Sites, Buildings, Objects and Antiquities Act

These requirements, found at 16 USC 461 *et seq.*, (relevant) provide that, in conducting an environmental review of a proposed action, the responsible official must consider the existence and location of natural landmarks using information provided by the National Park Service pursuant to 36 CFR § 62.6(d) to avoid undesirable impacts upon such landmarks.

Montana Human Skeletal Remains and Burial Site Protection Act, MCA 22-3-801 et seq., (applicable) requires the reporting of any discovery of human remains to the county coroner immediately. The act requires work to cease until the coroner makes certain determinations.

3.5 Resource Conservation and Recovery Act:

40 CFR 264.18 (relevant) provides location requirements for owners and operators of hazardous waste management units. Portions of new management units must not be located within 200 feet of a fault that has had displacement in Holocene time and management units in or near a 100 year floodplain must be designed, constructed, operated, and maintained to avoid washout.

3.6 Fish and Wildlife Coordination Act

These standards are found at 16 USC § 661 *et seq.* and 40 CFR 6.302(g) (relevant) and require that federally funded or authorized projects ensure that any modification of any stream or other water body affected by a funded or authorized action provide for adequate protection of fish and wildlife resources.

3.7 Protection of Wetlands Order

This requirement (Executive Order No. 11,990, referenced in 40 CFR Part 35, Appendix A to Subpart H) (relevant) mandates that federal agencies and potentially responsible parties avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practicable alternative exists.

Section 404(b)(1), 33 U.S.C. § 1344(b)(1) (relevant) also prohibits the discharge of dredged or fill material into waters of the United States. Together, these requirements create a “no net loss” of wetlands standard.

3.8 Solid Waste Management Requirements

Regulations promulgated under the Solid Waste Management Act, §§ 75-10-201 *et seq.*, MCA, (applicable) specify requirements that apply to the location of any solid waste management facility.

ARM 17.50.1005 (applicable) specifies a solid waste facility may not be located in a wetland, unless there is no demonstrable practicable alternative.

ARM 17.50.1006 (applicable) specifies a solid waste facility cannot be located within 200 feet (60 meters) of a fault that has had displacement in Holocene time without demonstration that an alternative setback will prevent damage to the structural integrity of the solid waste facility and will be protective of human health and the environment.

ARM 17.50.1007 (applicable) specifies a solid waste facility may not be located in a seismic impact zone without demonstration, by a Montana licensed engineer, that the solid waste structure is designed to resist the maximum horizontal acceleration in lithified earth material for the site.

ARM 17.50.1008 (applicable) specifies a solid waste facility may not be located in an unstable area (determined by consideration of local soil conditions, local geographic or geomorphologic features, and local artificial features or events, both surface and subsurface) without demonstration, by a Montana licensed engineer, that the solid waste facility is designed to ensure that the integrity of the structural components will not be disrupted.

ARM 17.50.1009 (applicable) sets forth general requirements applying to the location of any solid waste facility. Among other things, the location must have sufficient acreage, including adequate separation of wastes from underlying groundwater or adjacent surface water, must be located so as to prevent pollution of ground, surface, and private and public water supply systems, and must allow for reclamation of the land.

Under ARM 17.50.1009, a facility for the treatment, storage or disposal of solid wastes:

1. must be located where a sufficient acreage of land is suitable for solid waste management, including adequate separation of wastes from underlying ground water or adjacent surface water;[2]

2. must be located where local roads are capable of providing access in all weather conditions and local bridges are capable of supporting vehicles with maximum rated loads;

3. must be located in a manner that does not allow the discharge of pollutants in excess of state standards for the protection of state waters, public water supply systems, or private water supply systems;

4. drainage structures must be installed where necessary to prevent surface runoff from entering waste management areas; and

5. must be located to allow for closure, post-closure, and planned uses of the land.

Section 75-10-212, MCA (applicable) prohibits dumping or leaving any debris or refuse upon or within 200 yards of any highway, road, street, or alley of the State or other public property, or on privately owned property where hunting, fishing, or other recreation is permitted. However, the restriction relating to privately owned property does not apply to the owner, his agents, or those disposing of debris or refuse with the owner's consent.

3.9 Sage Grouse Requirements

Montana Greater Sage-Grouse Stewardship Act, §§ 2-15-243 and 76-22-101, *et seq*., MCA, and related Executive Orders 10-2014, 12-2015, and 21-2015 (applicable, substantive provisions only): Establishes a map of sage-grouse Core Areas, Connectivity Areas, and General Habitat (Executive Order 21-2015 at https://sagegrouse.mt.gov/images/exec_order_map.jpg), a Montana sage-grouse oversight team, and a Sage Grouse Habitat Conservation program. If a remedial action will occur within one of the designated areas on the map, consultation is required with the Sage Grouse Habitat Conservation program, which is housed within the Department of Natural Resources and Conservation (https://sagegrouse.mt.gov/). Certain activities are prohibited or limited within the designated areas on the map. See the Core Area Stipulations, General Habitat Stipulations, and Connectivity Habitat Stipulations in Attachment D of Executive Order 10-2014, as amended by Executive Order 12-2015, including requirements/restrictions on surface disturbance; surface occupancy; seasonal use limitations; transportation limitations; pipelines; overhead power lines and communications towers; noise; vegetation removal; sagebrush eradication; wildfire and prescribed burns; monitoring; reclamation; conifer expansion; and rangelands. The industry-specific stipulations (for oil and gas, mining, coal mining, and wind energy industries) within Core Areas in Attachment D may be relevant, depending upon the type of facility and activities required for remedial action. A waiver of the various requirements is allowed through creation of a Special Management Area where a planned land use or activities associated with "valid rights" cannot be implemented. "Valid rights" are defined as "legal

[2] The extent of separation shall be established on a case-by-case basis, considering terrain and the type of underlying soil formations, and facility design.

‘rights’ or interest that are associated with land or mineral estate and that cannot be divested from the estate until that interest expires, is relinquished, or acquired.” (Executive Order 10-2014, Attachment H). The procedures for Special Management Areas are outlined in Attachment E to Executive Order 10-2014, as amended by Executive Order 12-2015. Certain activities outlined in Attachment F of Executive Order 10-2014, as amended by Executive Order 12-2015, are exempt from these requirements.

Appendix B

Initial Alternatives Screening Table

Table B-1 Initial Alternatives Screening (From FS Pilot Test Work Plan)
BNSF Mission Wye, Livingston, Montana

Technologies	Applicability	Implementability	Effectiveness	Reliability	Cost	Rationale
COMMON ELEMENT						
No Action	Worse	Best	Worse	Worse	None	Not recommended as a potential option based on not addressing remedial goals of reducing the risk to human health and the environment posed by the remaining impacts at Mission Wye including meeting DEQ-7 standards. **Retained as a baseline option.**
Institutional Controls (ICs)	Best	Above Average	Average	Above Average	Low	Implementation of ICs does address the goal of reducing risks to human health and the environment on the facility by restricting groundwater and land use. Can be applied over entire facility. **Retained as a potential option in combination with other approaches.**
GROUNDWATER						
Monitored Natural Attenuation	Average	Above Average	Average	Average	Low	Monitored natural attenuation may achieve DEQ-7 standards over time. **Retained as a potential option.**
Pump-and-Treat	Average	Average	Worse	Average	High	Addresses the goal of meeting DEQ-7 standards in groundwater downgradient of railroad owned property. Large cobbles in the subsurface may require specialized drilling techniques. Not retained as a potential option because of high groundwater flow rates and low PCE/TCE concentrations in groundwater.
Air Sparging	Above Average	Average	Average	Above Average	Medium	Addresses the goal of meeting DEQ-7 standards in groundwater. Large cobbles in the subsurface may require specialized drilling techniques. **Retained as a potential option; may be combined with other approaches.**
In-Situ Chemical Oxidation (ISCO)	Average	Average	Below Average	Below Average	High	Not recommended as a potential option due to extent of the source area and heterogeneous soils, which limits the effectiveness of oxidant placement and high groundwater flow rates, which limit the contact time with groundwater. In addition, ISCO is typically applied to high-level concentrations and NAPL in soil and groundwater due to the strength of ISCO, thus eliminated even though previously considered viable. ISCO also destroyed indigenous bacteria and can eliminate natural attenuation mechanisms. **Not retained as a potential option.**
Enhanced Bioremediation	Average	Average	Average	Below Average	Medium	Not recommended as a potential option due to extent of the source area and heterogeneous soils; in addition, high groundwater flow rates and high dissolved oxygen content in the groundwater are impediments to establishing the anaerobic conditions which are required for PCE/TCE. This technology may also result in generation of daughter products including vinyl chloride, which is a carcinogen and recalcitrant under aerobic conditions. **Not retained as a potential option.**
Phytoremediation	Average	Below Average	Worse	Average	Low	Not recommended as a potential option due to phytoremediations limitation to groundwater within 15 feet BGS and the long time to implement (years). **Not retained as a potential option.**
Reactive Barrier Wall	Above Average	Below Average	Worse	Above Average	High	Addresses the goal of meeting DEQ-7 standards in groundwater. The key impediment to this option is with potential difficulty with installation at Mission Wye due to large cobbles in the subsurface. **Retained as a potential option; may be combined with other approaches.**
In-Well Air Stripping	Average	Average	Worse	Average	Low-Medium	Relies on air stripping within well but limited due to extent of the source area and heterogeneous soils. Does not address the goal of meeting DEQ-7 standards in groundwater. Large cobbles in the subsurface may require specialized drilling techniques. **Not retained as a potential option.**
Passive Treatment Wells	Above Average	Average	Worse	NA	Low	Relies on natural groundwater gradients and diffusion to distribute bioremediation but limited due to extent of the source area and heterogeneous soils. Does not address the goal of meeting DEQ-7 standards in groundwater. Large cobbles in the subsurface may require specialized drilling techniques. **Not retained as a potential option.**
SOIL						
Excavation (0-2 feet bgs and 2-18 feet bgs)	Best	Above Average	Above Average	Above Average	High	Excavation of surface soil "hot-spots" addresses the goal of reducing risks to human health and the environment due to direct soil contact and from groundwater by reducing the potential for leaching to groundwater. **Retained as a potential option for surface soils, and may be used in combination with other approaches.**
In-situ aeration/soil tilling using a ripper or a rock rake (limited to surface soils from 0-2 feet bgs)	Above Average	Above Average	Above Average	Above Average	Low	Tilling promotes aeration of surface soil "hot-spots" which promotes degradation of organics and meet and addresses the goal of reducing risks to human health and the environment by reducing the potential for leaching to groundwater. **Retained as a potential option for surface soil and possibly in combination with other approaches.**
Passive SVE (0-18 feet bgs); includes soil leaching pathway	Average	Average	Average	Average	Low	Passive SVE addresses the goal of reducing risks to human health and the environment from groundwater by reducing source mass and the potential for leaching to groundwater. **Retained as a potential option.**
Active SVE (0-18 feet bgs)	Above Average	Average	Above Average	Above Average	Medium	Active SVE addresses the goal of reducing risks to human health and the environment from groundwater by reducing source mass and the potential for leaching to groundwater. **Retained as a potential option.**
Phytoremediation (limited to 0 to 15 feet bgs)	Average	Below Average	Worse	Average	Low	Not recommended as a potential option due to phytoremediations limitation to groundwater within 15 feet BGS and the long time to implement (years). **Not retained as a potential option.**
Soil Flushing (0 to 18 feet bgs)	Above Average	Worse	Above Average	Above Average	High	Not recommended as a potential option due to extent of the source area and heterogeneous soils, which limits the effectiveness of soil flushing and results in the potential for mobilization of contaminants to groundwater. Requires groundwater control and containment and treatment. Impacted source material would be left in place and may trigger land use restrictions. **Not retained as a potential option.**
In-Situ Chemical Oxidation (ISCO)	Average	Average	Average	Below Average	High	Not recommended as a potential option due to extent of the source area and heterogeneous soils, which limits the effectiveness of oxidant placement and high groundwater flow rates, which limit the contact time with groundwater. In addition, ISCO is typically applied to high-level concentrations and NAPL in soil and groundwater due to the strength of ISCO, thus eliminated even though previously considered viable. ISCO also destroyed indigenous bacteria and can eliminate natural attenuation mechanisms. **Not retained as a potential option.**
In-Situ Solidification/Stabilization (0 to 18 feet bgs)	Average	Average	Average	Below Average	High	Not recommended as a potential option due to extent of the source area and heterogeneous soils, which limits the effectiveness of stabilization and results in the potential for ongoing leaching to groundwater. Impacted source material would be left in place and may trigger land use restrictions. **Not retained as a potential option.**
Ex-situ Biopiles (0-18 feet bgs)	Above Average	Worse	Average	Above Average	High	Not recommended as a potential option due to depth and extent of the source area and heterogeneous soils (incl. rocks and cobbles), which limits the effectiveness of excavation of soils for ex-situ biopiles. **Not retained as a potential option.**

Notes:

Surface Soil Treatment - 0 to 2 feet below ground surface at SS-88d and SBS-7D sample locations (approximately 25 square feet at each location)
Best to Worst Criteria indicative of strong to poor performance.
Low to High cost indicative of Least expensive to most expensive for capital and O&M considered cumulatively.
This table was originally prepared for and included in the FS Pilot Test Work Plan (AECOM 2015a) and has been further refined.

Appendix C

Soil Tilling Pilot Test Data and MDEQ Approval

Location Livingston, MT Date 8-10-2015

Project / Client Mission Wye / BNSF

60°F, Sunny, breeze CG

0650 - CG on site at Mission Wye. Remediation shed already in place on concrete pad. Site walk and inspection

0910 - Olympus (Neil & Wally) onsite w/utility locate guy. Discuss line locations.

1000 - Olympus off site to get supplies. CG UMPs prep. VMP Completion equipment & Complete ~~UMPs~~ ONG

1310 - Olympus back on-site.

1340 - Olympus off site for more supplies.

1425 - Olympus back on-site. Discuss safety & HASP location. Begin trenching at west end and doing surface completion of SVE-3.

1700 - off site

CMG

Location Livingston, MT Date 8-~~10~~ 11-2015

Project / Client Mission Wye / BNSF

60°F, Sunny, breeze Scale

0640 - on site at Mission Wye.

0655 - Olympus on site.

0810 - Yreh on-site. Conduct site walk & discuss progress/plan.

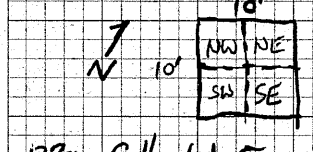
0955 - Sim w/ Trihydro on-site.

1000 - SR(DEQ) on-site. Kick-off/safety meeting. Discussed field deviations known at time, including trenching SVE line outside of fenced area for safety and access reasons and possibly running SVE system down while prior to sampling to allow PVC glue to off-gas and not show up in samples.

1130 - Collected 5 sample aliquots from plot SBS-7D. These are:
- SBS-7D-NE Till/08112015 (0-2 ft.)
- SBS-7D-NW Till/08112015 (0-2 ft.)
- SBS-7D-SE Till/08112015 (0-2 ft.)
- SBS-7D-SW Till/08112015 (0-2 ft.)
- SBS-7D-C Till/08112015 (0-2 ft.)

- SR stated that sample aliquots should be taken from bottom of pilot holes in each quadrant. BNSF agrees.

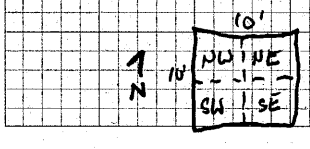
1200 - Tilled whole 10'x10' plot for SBS-7D to 2 ft. deep. Tilled using a mini-excavator with a bucket attachment.



SBS-7D plot

1230 - Collected 5 sample aliquots from SS-88d. These are
- SS-88d-NE Till/08112015 (0-2 ft.)
- SS-88d-NW Till/08112015 (0-2 ft.)
- SS-88d-SE Till/08112015 (0-2 ft.)
- SS-88d-SW Till/08112015 (0-2 ft.)

1245 - Tilled whole 10'x10' SS-88d plot to 2 ft. deep using mini-excavator w/ bucket.



SS-88d plot

Cont. →

Stop

Location _____ Date 8-11-2015 Cont.

Project / Client _____ /

1307 - CG off site to ship samples.
1400 - Samples delivered to UPS by hand for overnight delivery to Pace Analytical. Yueh, Sarah, and Jim off site.
1420 - CG back on-site. Olympus continues trenching and making SUE completions.
1710 - off site for day.

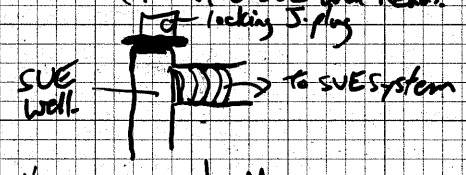
CRG

Location Livingston, MT Date 8-12-2015

Project / Client Mission Wye / BNSF

60°F, cloudy, breeze _____ Scale

0710 - on site at Mission Wye. Neil to get supplies. Wally to continue trenching. CG to continue oversight and site cleanup.
0820 - Jim w/ Trihydro ~~arrived~~ CG site.
0945 - Trenching complete.
1000 - Neil back on site. Begin assembling manifold.
1105 - Break for lunch & equipment.
1205 - Back on-site.
1320 - Olympus proposed using J-plugs (lockable) instead of screw-on caps at SUE well heads. Because SUE is the remedial technology, which will create vacuum and not pressure, CG and Jim agree and will ask DEQ for approval. SR and DEQ agree so long as it doesn't alter the integrity of the system. Future modification, including replacing J-plugs w/ threaded caps, is possible. This modification will be used for all 8 SUE well heads. Diagram below:



1630 - Olympus proposed adding a moisture trap and pump access point to the lowest point in the line from SUE-7 (which will be trenched outside of the fenced area) to allow removal of any water that condenses in the pipe. Called both YC and SR to discuss. Both agree.
1645 - off site for day.

CRG

Location Livingston, MT Date 8-13-2015

Project / Client Mission Wye / BNSF

60°F, Sunny, Breeze

0700 - On-site at Mission Wye. Connect SVE-8.

0815 - Offsite for supplies. Olympus to Bozeman, CG & Jim to Livingston for UPM modification supplies. CG experiment & build vapor sampling shroud.

1030 - Olympus back on site. Prep. to complete SVE-7 with moisture trap in trenched-in line.

1110 - Began trenching SVE-7 line.

1130 - placed moisture trap in excavation. Moisture trap consists of 3.5 ft. of 4" PVC (schedule 80) installed as a sump below the SVE-7 line. See diagram at right (p.89)

1205 ~~1205~~ - Break for lunch/supplies for sampling.

1300 - Back on-site.

1345 - Collected 5 composite aliquots from plot SBS-7D:

- SBS-7D-C Till/08132015 (0-2ft.)
- SBS-7D-NW Till/08132015 (0-2ft.)
- SBS-7D-NE Till/08132015 (0-2ft.)
- SBS-7D-SW Till/08132015 (0-2ft.)
- SBS-7D-SE Till/08132015 (0-2ft.)

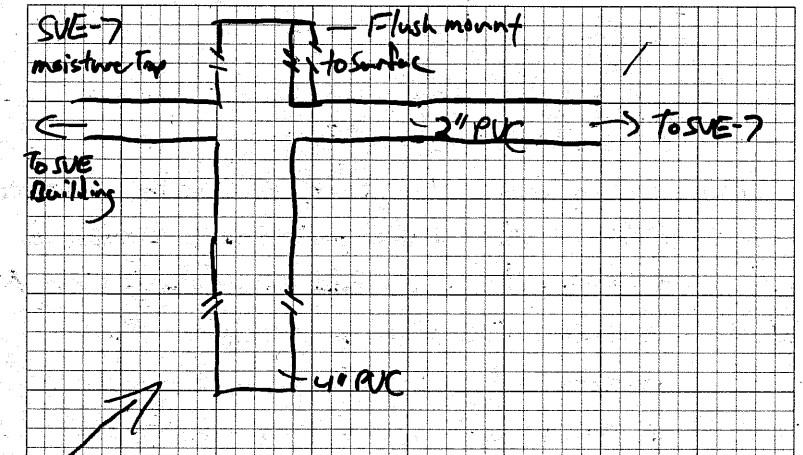
1415 - Collected 5 composite aliquots from plot SS-88d:

- SS-88d-C till/08132015 (0-2ft.)
- SS-88d-NW Till/08132015 (0-2ft.)
- SS-88d-NE Till/08132015 (0-2ft.)
- SS-88d-SW Till/08132015 (0-2ft.)
- SS-88d-SE Till/0813/2015 (0-2 ft.)

Location Date 8-13-2015 Cont.

Project / Client

Scale



1420 - CG to ship samples. Jim agrees to stay and continue oversight.

1510 - Sampled shipped via UPS overnight to Pace.

1520 - Return to site. Olympus & Prybydaz leaving. No more supplies to continue work.

1540 - off site for day

CRG

Pace Analytical Services, Inc.
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August 18, 2015

Shelly Young
AECOM, Inc.
207 North Broadway, Suite 315
Billings, MT 59101

RE: Project: BNSF Mission Wye
Pace Project No.: 10317933

Dear Shelly Young:
Enclosed are the analytical results for sample(s) received by the laboratory on August 12, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

cc: Anna Kakai, AECOM

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CERTIFICATIONS

Project: BNSF Mission Wye
Pace Project No.: 10317933

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: BNSF Mission Wye
Pace Project No.: 10317933

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10317933001	**SBS-7D Till/08112015 (0-2ft)**	Solid	08/11/15 11:30	08/12/15 09:00
10317933002	**SS-88d Till/08112015 (0-2ft)**	Solid	08/11/15 12:30	08/12/15 09:00

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SAMPLE ANALYTE COUNT

Project: BNSF Mission Wye
Pace Project No.: 10317933

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10317933001	**SBS-7D Till/08112015 (0-2ft)**	ASTM D2974	JDL	1	PASI-M
		EPA 8260B	AMT	70	PASI-M
10317933002	**SS-88d Till/08112015 (0-2ft)**	ASTM D2974	JDL	1	PASI-M
		EPA 8260B	AMT	70	PASI-M

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PROJECT NARRATIVE

Project: BNSF Mission Wye
Pace Project No.: 10317933

Method: **EPA 8260B**
Description: 8260B MSV 5030 Med Level
Client: AECOM
Date: August 18, 2015

General Information:
2 samples were analyzed for EPA 8260B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

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 5035/5030B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

QC Batch: MSV/32778

SS: This analyte did not meet the secondary source verification criteria for the initial calibration. The reported result should be considered an estimated value.

- LCS (Lab ID: 2050818)
  - Bromomethane
- MS (Lab ID: 2050819)
  - Bromomethane

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.

Surrogates:
All surrogates 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: MSV/32778

B: Analyte was detected in the associated method blank.

- BLANK for HBN 372246 [MSV/3277 (Lab ID: 2050817)
  - Methylene Chloride

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits 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: BNSF Mission Wye
Pace Project No.: 10317933

Method: **EPA 8260B**
Description: 8260B MSV 5030 Med Level
Client: AECOM
Date: August 18, 2015

Duplicate Sample:
All duplicate sample results were within method 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: BNSF Mission Wye
Pace Project No.: 10317933

Sample: SBS-7D Till/08112015 (0-2ft) **Lab ID: 10317933001** Collected: 08/11/15 11:30 Received: 08/12/15 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**6.4**	%	0.10	0.10	1		08/13/15 13:43		
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B								
Acetone	ND	ug/kg	1060	238	1	08/14/15 10:26	08/14/15 20:46	67-64-1	
Allyl chloride	ND	ug/kg	213	13.0	1	08/14/15 10:26	08/14/15 20:46	107-05-1	
Benzene	ND	ug/kg	21.3	7.4	1	08/14/15 10:26	08/14/15 20:46	71-43-2	
Bromobenzene	ND	ug/kg	53.2	12.9	1	08/14/15 10:26	08/14/15 20:46	108-86-1	
Bromochloromethane	ND	ug/kg	53.2	10.2	1	08/14/15 10:26	08/14/15 20:46	74-97-5	
Bromodichloromethane	ND	ug/kg	53.2	9.5	1	08/14/15 10:26	08/14/15 20:46	75-27-4	
Bromoform	ND	ug/kg	213	12.7	1	08/14/15 10:26	08/14/15 20:46	75-25-2	
Bromomethane	ND	ug/kg	532	93.3	1	08/14/15 10:26	08/14/15 20:46	74-83-9	
2-Butanone (MEK)	ND	ug/kg	266	88.2	1	08/14/15 10:26	08/14/15 20:46	78-93-3	
n-Butylbenzene	ND	ug/kg	53.2	10	1	08/14/15 10:26	08/14/15 20:46	104-51-8	
sec-Butylbenzene	ND	ug/kg	53.2	10.8	1	08/14/15 10:26	08/14/15 20:46	135-98-8	
tert-Butylbenzene	ND	ug/kg	53.2	14.2	1	08/14/15 10:26	08/14/15 20:46	98-06-6	
Carbon tetrachloride	ND	ug/kg	53.2	12.9	1	08/14/15 10:26	08/14/15 20:46	56-23-5	
Chlorobenzene	ND	ug/kg	53.2	8.6	1	08/14/15 10:26	08/14/15 20:46	108-90-7	
Chloroethane	ND	ug/kg	532	25.4	1	08/14/15 10:26	08/14/15 20:46	75-00-3	
Chloroform	ND	ug/kg	53.2	8.9	1	08/14/15 10:26	08/14/15 20:46	67-66-3	
Chloromethane	ND	ug/kg	213	10.7	1	08/14/15 10:26	08/14/15 20:46	74-87-3	
2-Chlorotoluene	ND	ug/kg	53.2	11.0	1	08/14/15 10:26	08/14/15 20:46	95-49-8	
4-Chlorotoluene	ND	ug/kg	53.2	10	1	08/14/15 10:26	08/14/15 20:46	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/kg	532	41.1	1	08/14/15 10:26	08/14/15 20:46	96-12-8	
Dibromochloromethane	ND	ug/kg	53.2	8.2	1	08/14/15 10:26	08/14/15 20:46	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/kg	53.2	8.5	1	08/14/15 10:26	08/14/15 20:46	106-93-4	
Dibromomethane	ND	ug/kg	53.2	12.5	1	08/14/15 10:26	08/14/15 20:46	74-95-3	
1,2-Dichlorobenzene	ND	ug/kg	53.2	12.9	1	08/14/15 10:26	08/14/15 20:46	95-50-1	
1,3-Dichlorobenzene	ND	ug/kg	53.2	13.0	1	08/14/15 10:26	08/14/15 20:46	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	53.2	11.3	1	08/14/15 10:26	08/14/15 20:46	106-46-7	
Dichlorodifluoromethane	ND	ug/kg	213	13.1	1	08/14/15 10:26	08/14/15 20:46	75-71-8	
1,1-Dichloroethane	ND	ug/kg	53.2	10.2	1	08/14/15 10:26	08/14/15 20:46	75-34-3	
1,2-Dichloroethane	ND	ug/kg	53.2	11.9	1	08/14/15 10:26	08/14/15 20:46	107-06-2	
1,1-Dichloroethene	ND	ug/kg	53.2	12.1	1	08/14/15 10:26	08/14/15 20:46	75-35-4	
cis-1,2-Dichloroethene	ND	ug/kg	53.2	18.9	1	08/14/15 10:26	08/14/15 20:46	156-59-2	
trans-1,2-Dichloroethene	ND	ug/kg	53.2	8.7	1	08/14/15 10:26	08/14/15 20:46	156-60-5	
Dichlorofluoromethane	ND	ug/kg	532	50.0	1	08/14/15 10:26	08/14/15 20:46	75-43-4	
1,2-Dichloropropane	ND	ug/kg	53.2	10.8	1	08/14/15 10:26	08/14/15 20:46	78-87-5	
1,3-Dichloropropane	ND	ug/kg	53.2	8.3	1	08/14/15 10:26	08/14/15 20:46	142-28-9	
2,2-Dichloropropane	ND	ug/kg	213	21.5	1	08/14/15 10:26	08/14/15 20:46	594-20-7	
1,1-Dichloropropene	ND	ug/kg	53.2	10.6	1	08/14/15 10:26	08/14/15 20:46	563-58-6	
cis-1,3-Dichloropropene	ND	ug/kg	53.2	5.5	1	08/14/15 10:26	08/14/15 20:46	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/kg	53.2	20.6	1	08/14/15 10:26	08/14/15 20:46	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/kg	213	17.3	1	08/14/15 10:26	08/14/15 20:46	60-29-7	
Ethylbenzene	ND	ug/kg	53.2	8.0	1	08/14/15 10:26	08/14/15 20:46	100-41-4	

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ANALYTICAL RESULTS

Project: BNSF Mission Wye
Pace Project No.: 10317933

Sample: SBS-7D Till/08112015 (0-2ft) **Lab ID: 10317933001** Collected: 08/11/15 11:30 Received: 08/12/15 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B								
Hexachloro-1,3-butadiene	ND	ug/kg	266	22.6	1	08/14/15 10:26	08/14/15 20:46	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/kg	53.2	9.7	1	08/14/15 10:26	08/14/15 20:46	98-82-8	
p-Isopropyltoluene	ND	ug/kg	53.2	9.3	1	08/14/15 10:26	08/14/15 20:46	99-87-6	
Methylene Chloride	**75.9J**	ug/kg	213	15.8	1	08/14/15 10:26	08/14/15 20:46	75-09-2	B
4-Methyl-2-pentanone (MIBK)	ND	ug/kg	266	67.6	1	08/14/15 10:26	08/14/15 20:46	108-10-1	
Methyl-tert-butyl ether	ND	ug/kg	53.2	10	1	08/14/15 10:26	08/14/15 20:46	1634-04-4	
Naphthalene	ND	ug/kg	213	76.7	1	08/14/15 10:26	08/14/15 20:46	91-20-3	
n-Propylbenzene	ND	ug/kg	53.2	11.4	1	08/14/15 10:26	08/14/15 20:46	103-65-1	
Styrene	ND	ug/kg	53.2	8.4	1	08/14/15 10:26	08/14/15 20:46	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/kg	53.2	10.2	1	08/14/15 10:26	08/14/15 20:46	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/kg	53.2	10.2	1	08/14/15 10:26	08/14/15 20:46	79-34-5	
Tetrachloroethene	ND	ug/kg	53.2	11.0	1	08/14/15 10:26	08/14/15 20:46	127-18-4	
Tetrahydrofuran	ND	ug/kg	2130	84.1	1	08/14/15 10:26	08/14/15 20:46	109-99-9	
Toluene	ND	ug/kg	53.2	10.2	1	08/14/15 10:26	08/14/15 20:46	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/kg	53.2	20.6	1	08/14/15 10:26	08/14/15 20:46	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/kg	53.2	9.7	1	08/14/15 10:26	08/14/15 20:46	120-82-1	
1,1,1-Trichloroethane	ND	ug/kg	53.2	10.3	1	08/14/15 10:26	08/14/15 20:46	71-55-6	
1,1,2-Trichloroethane	ND	ug/kg	53.2	14.6	1	08/14/15 10:26	08/14/15 20:46	79-00-5	
Trichloroethene	ND	ug/kg	53.2	12.9	1	08/14/15 10:26	08/14/15 20:46	79-01-6	
Trichlorofluoromethane	ND	ug/kg	213	36.8	1	08/14/15 10:26	08/14/15 20:46	75-69-4	
1,2,3-Trichloropropane	ND	ug/kg	213	14.7	1	08/14/15 10:26	08/14/15 20:46	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/kg	213	12.5	1	08/14/15 10:26	08/14/15 20:46	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/kg	53.2	10.6	1	08/14/15 10:26	08/14/15 20:46	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/kg	53.2	10.3	1	08/14/15 10:26	08/14/15 20:46	108-67-8	
Vinyl chloride	ND	ug/kg	21.3	9.6	1	08/14/15 10:26	08/14/15 20:46	75-01-4	
Xylene (Total)	ND	ug/kg	159	31.8	1	08/14/15 10:26	08/14/15 20:46	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	103	%.	55-150		1	08/14/15 10:26	08/14/15 20:46	17060-07-0	
Toluene-d8 (S)	105	%.	61-125		1	08/14/15 10:26	08/14/15 20:46	2037-26-5	
4-Bromofluorobenzene (S)	100	%.	54-131		1	08/14/15 10:26	08/14/15 20:46	460-00-4	

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ANALYTICAL RESULTS

Project: BNSF Mission Wye
Pace Project No.: 10317933

Sample: SS-88d Till/08112015 (0-2ft) **Lab ID: 10317933002** Collected: 08/11/15 12:30 Received: 08/12/15 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**5.0**	%	0.10	0.10	1		08/13/15 13:43		
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B								
Acetone	ND	ug/kg	1030	230	1	08/14/15 10:26	08/14/15 21:07	67-64-1	
Allyl chloride	ND	ug/kg	205	12.5	1	08/14/15 10:26	08/14/15 21:07	107-05-1	
Benzene	ND	ug/kg	20.5	7.2	1	08/14/15 10:26	08/14/15 21:07	71-43-2	
Bromobenzene	ND	ug/kg	51.3	12.4	1	08/14/15 10:26	08/14/15 21:07	108-86-1	
Bromochloromethane	ND	ug/kg	51.3	9.8	1	08/14/15 10:26	08/14/15 21:07	74-97-5	
Bromodichloromethane	ND	ug/kg	51.3	9.1	1	08/14/15 10:26	08/14/15 21:07	75-27-4	
Bromoform	ND	ug/kg	205	12.2	1	08/14/15 10:26	08/14/15 21:07	75-25-2	
Bromomethane	ND	ug/kg	513	90.2	1	08/14/15 10:26	08/14/15 21:07	74-83-9	
2-Butanone (MEK)	ND	ug/kg	257	85.2	1	08/14/15 10:26	08/14/15 21:07	78-93-3	
n-Butylbenzene	ND	ug/kg	51.3	9.7	1	08/14/15 10:26	08/14/15 21:07	104-51-8	
sec-Butylbenzene	ND	ug/kg	51.3	10.5	1	08/14/15 10:26	08/14/15 21:07	135-98-8	
tert-Butylbenzene	ND	ug/kg	51.3	13.8	1	08/14/15 10:26	08/14/15 21:07	98-06-6	
Carbon tetrachloride	ND	ug/kg	51.3	12.4	1	08/14/15 10:26	08/14/15 21:07	56-23-5	
Chlorobenzene	ND	ug/kg	51.3	8.3	1	08/14/15 10:26	08/14/15 21:07	108-90-7	
Chloroethane	ND	ug/kg	513	24.5	1	08/14/15 10:26	08/14/15 21:07	75-00-3	
Chloroform	ND	ug/kg	51.3	8.6	1	08/14/15 10:26	08/14/15 21:07	67-66-3	
Chloromethane	ND	ug/kg	205	10.4	1	08/14/15 10:26	08/14/15 21:07	74-87-3	
2-Chlorotoluene	ND	ug/kg	51.3	10.6	1	08/14/15 10:26	08/14/15 21:07	95-49-8	
4-Chlorotoluene	ND	ug/kg	51.3	9.6	1	08/14/15 10:26	08/14/15 21:07	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/kg	513	39.7	1	08/14/15 10:26	08/14/15 21:07	96-12-8	
Dibromochloromethane	ND	ug/kg	51.3	7.9	1	08/14/15 10:26	08/14/15 21:07	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/kg	51.3	8.3	1	08/14/15 10:26	08/14/15 21:07	106-93-4	
Dibromomethane	ND	ug/kg	51.3	12.1	1	08/14/15 10:26	08/14/15 21:07	74-95-3	
1,2-Dichlorobenzene	ND	ug/kg	51.3	12.4	1	08/14/15 10:26	08/14/15 21:07	95-50-1	
1,3-Dichlorobenzene	ND	ug/kg	51.3	12.5	1	08/14/15 10:26	08/14/15 21:07	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	51.3	10.9	1	08/14/15 10:26	08/14/15 21:07	106-46-7	
Dichlorodifluoromethane	ND	ug/kg	205	12.6	1	08/14/15 10:26	08/14/15 21:07	75-71-8	
1,1-Dichloroethane	ND	ug/kg	51.3	9.8	1	08/14/15 10:26	08/14/15 21:07	75-34-3	
1,2-Dichloroethane	ND	ug/kg	51.3	11.5	1	08/14/15 10:26	08/14/15 21:07	107-06-2	
1,1-Dichloroethene	ND	ug/kg	51.3	11.7	1	08/14/15 10:26	08/14/15 21:07	75-35-4	
cis-1,2-Dichloroethene	ND	ug/kg	51.3	18.3	1	08/14/15 10:26	08/14/15 21:07	156-59-2	
trans-1,2-Dichloroethene	ND	ug/kg	51.3	8.4	1	08/14/15 10:26	08/14/15 21:07	156-60-5	
Dichlorofluoromethane	ND	ug/kg	513	48.3	1	08/14/15 10:26	08/14/15 21:07	75-43-4	
1,2-Dichloropropane	ND	ug/kg	51.3	10.5	1	08/14/15 10:26	08/14/15 21:07	78-87-5	
1,3-Dichloropropane	ND	ug/kg	51.3	8.0	1	08/14/15 10:26	08/14/15 21:07	142-28-9	
2,2-Dichloropropane	ND	ug/kg	205	20.7	1	08/14/15 10:26	08/14/15 21:07	594-20-7	
1,1-Dichloropropene	ND	ug/kg	51.3	10.3	1	08/14/15 10:26	08/14/15 21:07	563-58-6	
cis-1,3-Dichloropropene	ND	ug/kg	51.3	5.3	1	08/14/15 10:26	08/14/15 21:07	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/kg	51.3	19.9	1	08/14/15 10:26	08/14/15 21:07	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/kg	205	16.7	1	08/14/15 10:26	08/14/15 21:07	60-29-7	
Ethylbenzene	ND	ug/kg	51.3	7.7	1	08/14/15 10:26	08/14/15 21:07	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/kg	257	21.9	1	08/14/15 10:26	08/14/15 21:07	87-68-3	

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ANALYTICAL RESULTS

Project: BNSF Mission Wye
Pace Project No.: 10317933

Sample: SS-88d Till/08112015 (0-2ft) **Lab ID: 10317933002** Collected: 08/11/15 12:30 Received: 08/12/15 09:00 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B								
Isopropylbenzene (Cumene)	ND	ug/kg	51.3	9.3	1	08/14/15 10:26	08/14/15 21:07	98-82-8	
p-Isopropyltoluene	ND	ug/kg	51.3	9.0	1	08/14/15 10:26	08/14/15 21:07	99-87-6	
Methylene Chloride	**62.6J**	ug/kg	205	15.3	1	08/14/15 10:26	08/14/15 21:07	75-09-2	B
4-Methyl-2-pentanone (MIBK)	ND	ug/kg	257	65.3	1	08/14/15 10:26	08/14/15 21:07	108-10-1	
Methyl-tert-butyl ether	ND	ug/kg	51.3	9.6	1	08/14/15 10:26	08/14/15 21:07	1634-04-4	
Naphthalene	ND	ug/kg	205	74.0	1	08/14/15 10:26	08/14/15 21:07	91-20-3	
n-Propylbenzene	ND	ug/kg	51.3	11.0	1	08/14/15 10:26	08/14/15 21:07	103-65-1	
Styrene	ND	ug/kg	51.3	8.2	1	08/14/15 10:26	08/14/15 21:07	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/kg	51.3	9.9	1	08/14/15 10:26	08/14/15 21:07	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/kg	51.3	9.8	1	08/14/15 10:26	08/14/15 21:07	79-34-5	
Tetrachloroethene	ND	ug/kg	51.3	10.6	1	08/14/15 10:26	08/14/15 21:07	127-18-4	
Tetrahydrofuran	ND	ug/kg	2050	81.2	1	08/14/15 10:26	08/14/15 21:07	109-99-9	
Toluene	ND	ug/kg	51.3	9.8	1	08/14/15 10:26	08/14/15 21:07	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/kg	51.3	19.9	1	08/14/15 10:26	08/14/15 21:07	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/kg	51.3	9.3	1	08/14/15 10:26	08/14/15 21:07	120-82-1	
1,1,1-Trichloroethane	ND	ug/kg	51.3	10	1	08/14/15 10:26	08/14/15 21:07	71-55-6	
1,1,2-Trichloroethane	ND	ug/kg	51.3	14.1	1	08/14/15 10:26	08/14/15 21:07	79-00-5	
Trichloroethene	ND	ug/kg	51.3	12.4	1	08/14/15 10:26	08/14/15 21:07	79-01-6	
Trichlorofluoromethane	ND	ug/kg	205	35.5	1	08/14/15 10:26	08/14/15 21:07	75-69-4	
1,2,3-Trichloropropane	ND	ug/kg	205	14.2	1	08/14/15 10:26	08/14/15 21:07	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/kg	205	12.1	1	08/14/15 10:26	08/14/15 21:07	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/kg	51.3	10.3	1	08/14/15 10:26	08/14/15 21:07	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/kg	51.3	9.9	1	08/14/15 10:26	08/14/15 21:07	108-67-8	
Vinyl chloride	ND	ug/kg	20.5	9.2	1	08/14/15 10:26	08/14/15 21:07	75-01-4	
Xylene (Total)	ND	ug/kg	154	30.7	1	08/14/15 10:26	08/14/15 21:07	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	101	%.	55-150		1	08/14/15 10:26	08/14/15 21:07	17060-07-0	
Toluene-d8 (S)	104	%.	61-125		1	08/14/15 10:26	08/14/15 21:07	2037-26-5	
4-Bromofluorobenzene (S)	100	%.	54-131		1	08/14/15 10:26	08/14/15 21:07	460-00-4	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye
Pace Project No.: 10317933

QC Batch: MPRP/56958
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 10317933001, 10317933002

SAMPLE DUPLICATE: 2049959

Parameter	Units	10317900001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	43.3	46.0	6	30	

SAMPLE DUPLICATE: 2050124

Parameter	Units	10317511001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	8.7	11.1	25	30	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye
Pace Project No.: 10317933

QC Batch: MSV/32778 | Analysis Method: EPA 8260B
QC Batch Method: EPA 5035/5030B | Analysis Description: 8260B MSV 5030 Med Level
Associated Lab Samples: 10317933001, 10317933002

METHOD BLANK: 2050817 | Matrix: Solid
Associated Lab Samples: 10317933001, 10317933002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	ND	50.0	08/14/15 14:14	
1,1,1-Trichloroethane	ug/kg	ND	50.0	08/14/15 14:14	
1,1,2,2-Tetrachloroethane	ug/kg	ND	50.0	08/14/15 14:14	
1,1,2-Trichloroethane	ug/kg	ND	50.0	08/14/15 14:14	
1,1,2-Trichlorotrifluoroethane	ug/kg	ND	200	08/14/15 14:14	
1,1-Dichloroethane	ug/kg	ND	50.0	08/14/15 14:14	
1,1-Dichloroethene	ug/kg	ND	50.0	08/14/15 14:14	
1,1-Dichloropropene	ug/kg	ND	50.0	08/14/15 14:14	
1,2,3-Trichlorobenzene	ug/kg	ND	50.0	08/14/15 14:14	
1,2,3-Trichloropropane	ug/kg	ND	200	08/14/15 14:14	
1,2,4-Trichlorobenzene	ug/kg	ND	50.0	08/14/15 14:14	
1,2,4-Trimethylbenzene	ug/kg	ND	50.0	08/14/15 14:14	
1,2-Dibromo-3-chloropropane	ug/kg	ND	500	08/14/15 14:14	
1,2-Dibromoethane (EDB)	ug/kg	ND	50.0	08/14/15 14:14	
1,2-Dichlorobenzene	ug/kg	ND	50.0	08/14/15 14:14	
1,2-Dichloroethane	ug/kg	ND	50.0	08/14/15 14:14	
1,2-Dichloropropane	ug/kg	ND	50.0	08/14/15 14:14	
1,3,5-Trimethylbenzene	ug/kg	ND	50.0	08/14/15 14:14	
1,3-Dichlorobenzene	ug/kg	ND	50.0	08/14/15 14:14	
1,3-Dichloropropane	ug/kg	ND	50.0	08/14/15 14:14	
1,4-Dichlorobenzene	ug/kg	ND	50.0	08/14/15 14:14	
2,2-Dichloropropane	ug/kg	ND	200	08/14/15 14:14	
2-Butanone (MEK)	ug/kg	ND	250	08/14/15 14:14	
2-Chlorotoluene	ug/kg	ND	50.0	08/14/15 14:14	
4-Chlorotoluene	ug/kg	ND	50.0	08/14/15 14:14	
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	250	08/14/15 14:14	
Acetone	ug/kg	ND	1000	08/14/15 14:14	
Allyl chloride	ug/kg	ND	200	08/14/15 14:14	
Benzene	ug/kg	ND	20.0	08/14/15 14:14	
Bromobenzene	ug/kg	ND	50.0	08/14/15 14:14	
Bromochloromethane	ug/kg	ND	50.0	08/14/15 14:14	
Bromodichloromethane	ug/kg	ND	50.0	08/14/15 14:14	
Bromoform	ug/kg	ND	200	08/14/15 14:14	
Bromomethane	ug/kg	ND	500	08/14/15 14:14	
Carbon tetrachloride	ug/kg	ND	50.0	08/14/15 14:14	
Chlorobenzene	ug/kg	ND	50.0	08/14/15 14:14	
Chloroethane	ug/kg	ND	500	08/14/15 14:14	
Chloroform	ug/kg	ND	50.0	08/14/15 14:14	
Chloromethane	ug/kg	ND	200	08/14/15 14:14	
cis-1,2-Dichloroethene	ug/kg	ND	50.0	08/14/15 14:14	
cis-1,3-Dichloropropene	ug/kg	ND	50.0	08/14/15 14:14	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye
Pace Project No.: 10317933

METHOD BLANK: 2050817 Matrix: Solid
Associated Lab Samples: 10317933001, 10317933002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Dibromochloromethane	ug/kg	ND	50.0	08/14/15 14:14	
Dibromomethane	ug/kg	ND	50.0	08/14/15 14:14	
Dichlorodifluoromethane	ug/kg	ND	200	08/14/15 14:14	
Dichlorofluoromethane	ug/kg	ND	500	08/14/15 14:14	
Diethyl ether (Ethyl ether)	ug/kg	ND	200	08/14/15 14:14	
Ethylbenzene	ug/kg	ND	50.0	08/14/15 14:14	
Hexachloro-1,3-butadiene	ug/kg	ND	250	08/14/15 14:14	
Isopropylbenzene (Cumene)	ug/kg	ND	50.0	08/14/15 14:14	
Methyl-tert-butyl ether	ug/kg	ND	50.0	08/14/15 14:14	
Methylene Chloride	ug/kg	56.9J	200	08/14/15 14:14	
n-Butylbenzene	ug/kg	ND	50.0	08/14/15 14:14	
n-Propylbenzene	ug/kg	ND	50.0	08/14/15 14:14	
Naphthalene	ug/kg	ND	200	08/14/15 14:14	
p-Isopropyltoluene	ug/kg	ND	50.0	08/14/15 14:14	
sec-Butylbenzene	ug/kg	ND	50.0	08/14/15 14:14	
Styrene	ug/kg	ND	50.0	08/14/15 14:14	
tert-Butylbenzene	ug/kg	ND	50.0	08/14/15 14:14	
Tetrachloroethene	ug/kg	ND	50.0	08/14/15 14:14	
Tetrahydrofuran	ug/kg	ND	2000	08/14/15 14:14	
Toluene	ug/kg	ND	50.0	08/14/15 14:14	
trans-1,2-Dichloroethene	ug/kg	ND	50.0	08/14/15 14:14	
trans-1,3-Dichloropropene	ug/kg	ND	50.0	08/14/15 14:14	
Trichloroethene	ug/kg	ND	50.0	08/14/15 14:14	
Trichlorofluoromethane	ug/kg	ND	200	08/14/15 14:14	
Vinyl chloride	ug/kg	ND	20.0	08/14/15 14:14	
Xylene (Total)	ug/kg	ND	150	08/14/15 14:14	
1,2-Dichloroethane-d4 (S)	%.	105	55-150	08/14/15 14:14	
4-Bromofluorobenzene (S)	%.	102	54-131	08/14/15 14:14	
Toluene-d8 (S)	%.	102	61-125	08/14/15 14:14	

LABORATORY CONTROL SAMPLE: 2050818

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	1000	1130	113	75-125	
1,1,1-Trichloroethane	ug/kg	1000	1030	103	66-125	
1,1,2,2-Tetrachloroethane	ug/kg	1000	951	95	69-125	
1,1,2-Trichloroethane	ug/kg	1000	1050	105	75-125	
1,1,2-Trichlorotrifluoroethane	ug/kg	1000	1160	116	55-125	
1,1-Dichloroethane	ug/kg	1000	928	93	67-125	
1,1-Dichloroethene	ug/kg	1000	976	98	62-125	
1,1-Dichloropropene	ug/kg	1000	1010	101	65-125	
1,2,3-Trichlorobenzene	ug/kg	1000	761	76	58-132	
1,2,3-Trichloropropane	ug/kg	1000	989	99	71-125	
1,2,4-Trichlorobenzene	ug/kg	1000	825	83	63-128	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye
Pace Project No.: 10317933

LABORATORY CONTROL SAMPLE: 2050818

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/kg	1000	1090	109	74-125	
1,2-Dibromo-3-chloropropane	ug/kg	2500	1780	71	55-142	
1,2-Dibromoethane (EDB)	ug/kg	1000	1020	102	75-125	
1,2-Dichlorobenzene	ug/kg	1000	1010	101	75-125	
1,2-Dichloroethane	ug/kg	1000	1080	108	71-125	
1,2-Dichloropropane	ug/kg	1000	1030	103	74-125	
1,3,5-Trimethylbenzene	ug/kg	1000	1070	107	72-125	
1,3-Dichlorobenzene	ug/kg	1000	1100	110	75-125	
1,3-Dichloropropane	ug/kg	1000	1100	110	75-125	
1,4-Dichlorobenzene	ug/kg	1000	1100	110	75-125	
2,2-Dichloropropane	ug/kg	1000	1030	103	45-125	
2-Butanone (MEK)	ug/kg	5000	3600	72	39-136	
2-Chlorotoluene	ug/kg	1000	1090	109	73-125	
4-Chlorotoluene	ug/kg	1000	1070	107	74-125	
4-Methyl-2-pentanone (MIBK)	ug/kg	5000	4700	94	55-132	
Acetone	ug/kg	5000	4820	96	55-131	
Allyl chloride	ug/kg	1000	1040	104	53-125	
Benzene	ug/kg	1000	963	96	69-125	
Bromobenzene	ug/kg	1000	1050	105	75-125	
Bromochloromethane	ug/kg	1000	953	95	75-125	
Bromodichloromethane	ug/kg	1000	1110	111	75-125	
Bromoform	ug/kg	1000	938	94	71-125	
Bromomethane	ug/kg	1000	991	99	42-150	SS
Carbon tetrachloride	ug/kg	1000	1030	103	62-125	
Chlorobenzene	ug/kg	1000	1120	112	75-125	
Chloroethane	ug/kg	1000	1010	101	41-150	
Chloroform	ug/kg	1000	1020	102	72-125	
Chloromethane	ug/kg	1000	869	87	50-125	
cis-1,2-Dichloroethene	ug/kg	1000	903	90	73-125	
cis-1,3-Dichloropropene	ug/kg	1000	1030	103	74-125	
Dibromochloromethane	ug/kg	1000	1070	107	75-125	
Dibromomethane	ug/kg	1000	1030	103	75-125	
Dichlorodifluoromethane	ug/kg	1000	925	92	30-125	
Dichlorofluoromethane	ug/kg	1000	1050	105	30-150	
Diethyl ether (Ethyl ether)	ug/kg	1000	927	93	58-125	
Ethylbenzene	ug/kg	1000	1110	111	72-125	
Hexachloro-1,3-butadiene	ug/kg	1000	1060	106	59-138	
Isopropylbenzene (Cumene)	ug/kg	1000	1100	110	72-125	
Methyl-tert-butyl ether	ug/kg	1000	938	94	72-125	
Methylene Chloride	ug/kg	1000	950	95	71-125	
n-Butylbenzene	ug/kg	1000	983	98	65-125	
n-Propylbenzene	ug/kg	1000	1070	107	71-125	
Naphthalene	ug/kg	1000	650	65	55-139	
p-Isopropyltoluene	ug/kg	1000	950	95	69-125	
sec-Butylbenzene	ug/kg	1000	1160	116	68-125	
Styrene	ug/kg	1000	1110	111	75-125	
tert-Butylbenzene	ug/kg	1000	1040	104	70-125	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye
Pace Project No.: 10317933

LABORATORY CONTROL SAMPLE: 2050818

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	ug/kg	1000	1120	112	69-125	
Tetrahydrofuran	ug/kg	10000	10600	106	62-129	
Toluene	ug/kg	1000	1140	114	72-125	
trans-1,2-Dichloroethene	ug/kg	1000	972	97	68-125	
trans-1,3-Dichloropropene	ug/kg	1000	1110	111	74-125	
Trichloroethene	ug/kg	1000	1100	110	72-125	
Trichlorofluoromethane	ug/kg	1000	1120	112	30-150	
Vinyl chloride	ug/kg	1000	893	89	53-125	
Xylene (Total)	ug/kg	3000	3280	109	74-125	
1,2-Dichloroethane-d4 (S)	%.			94	55-150	
4-Bromofluorobenzene (S)	%.			99	54-131	
Toluene-d8 (S)	%.			102	61-125	

MATRIX SPIKE SAMPLE: 2050819

Parameter	Units	10317639008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	ND	1020	1200	117	62-150	
1,1,1-Trichloroethane	ug/kg	ND	1020	1090	106	58-150	
1,1,2,2-Tetrachloroethane	ug/kg	ND	1020	1270	124	30-150	
1,1,2-Trichloroethane	ug/kg	ND	1020	1200	117	61-149	
1,1,2-Trichlorotrifluoroethane	ug/kg	ND	1020	1140	111	45-150	
1,1-Dichloroethane	ug/kg	ND	1020	1050	102	56-150	
1,1-Dichloroethene	ug/kg	ND	1020	1020	100	48-150	
1,1-Dichloropropene	ug/kg	ND	1020	1090	107	58-150	
1,2,3-Trichlorobenzene	ug/kg	ND	1020	1200	117	55-150	
1,2,3-Trichloropropane	ug/kg	ND	1020	1220	119	57-148	
1,2,4-Trichlorobenzene	ug/kg	ND	1020	1160	113	61-150	
1,2,4-Trimethylbenzene	ug/kg	ND	1020	1100	107	64-150	
1,2-Dibromo-3-chloropropane	ug/kg	ND	2570	2490	97	40-150	
1,2-Dibromoethane (EDB)	ug/kg	ND	1020	1170	114	62-147	
1,2-Dichlorobenzene	ug/kg	ND	1020	1150	113	73-133	
1,2-Dichloroethane	ug/kg	ND	1020	1060	103	63-132	
1,2-Dichloropropane	ug/kg	ND	1020	1150	112	69-127	
1,3,5-Trimethylbenzene	ug/kg	ND	1020	1140	111	63-137	
1,3-Dichlorobenzene	ug/kg	ND	1020	1190	117	69-133	
1,3-Dichloropropane	ug/kg	ND	1020	1210	118	70-130	
1,4-Dichlorobenzene	ug/kg	ND	1020	1200	117	69-130	
2,2-Dichloropropane	ug/kg	ND	1020	1020	99	54-135	
2-Butanone (MEK)	ug/kg	ND	5120	4270	83	49-145	
2-Chlorotoluene	ug/kg	ND	1020	1180	115	68-129	
4-Chlorotoluene	ug/kg	ND	1020	1140	111	67-134	
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	5120	5850	114	60-150	
Acetone	ug/kg	ND	5120	4860	95	65-135	
Allyl chloride	ug/kg	ND	1020	1080	106	55-126	
Benzene	ug/kg	ND	1020	1040	102	63-126	

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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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: BNSF Mission Wye
Pace Project No.: 10317933

MATRIX SPIKE SAMPLE: 2050819

Parameter	Units	10317639008 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Bromobenzene	ug/kg	ND	1020	1180	115	68-133	
Bromochloromethane	ug/kg	ND	1020	1010	99	66-130	
Bromodichloromethane	ug/kg	ND	1020	1200	117	68-129	
Bromoform	ug/kg	ND	1020	1090	106	63-135	
Bromomethane	ug/kg	ND	1020	1050	98	30-150	SS
Carbon tetrachloride	ug/kg	ND	1020	1060	104	56-140	
Chlorobenzene	ug/kg	ND	1020	1210	118	69-130	
Chloroethane	ug/kg	ND	1020	1050	102	46-150	
Chloroform	ug/kg	ND	1020	1060	103	70-127	
Chloromethane	ug/kg	ND	1020	898	88	51-125	
cis-1,2-Dichloroethene	ug/kg	ND	1020	997	97	68-125	
cis-1,3-Dichloropropene	ug/kg	ND	1020	1060	104	67-126	
Dibromochloromethane	ug/kg	ND	1020	1190	116	66-135	
Dibromomethane	ug/kg	ND	1020	1080	106	68-132	
Dichlorodifluoromethane	ug/kg	ND	1020	847	83	30-138	
Dichlorofluoromethane	ug/kg	ND	1020	1120	109	30-150	
Diethyl ether (Ethyl ether)	ug/kg	ND	1020	1090	107	56-135	
Ethylbenzene	ug/kg	ND	1020	1220	119	69-126	
Hexachloro-1,3-butadiene	ug/kg	ND	1020	1320	129	50-150	
Isopropylbenzene (Cumene)	ug/kg	ND	1020	1100	107	65-135	
Methyl-tert-butyl ether	ug/kg	ND	1020	1060	104	66-129	
Methylene Chloride	ug/kg	ND	1020	1010	89	64-125	
n-Butylbenzene	ug/kg	ND	1020	1060	103	62-141	
n-Propylbenzene	ug/kg	ND	1020	1170	114	65-135	
Naphthalene	ug/kg	ND	1020	996	97	62-150	
p-Isopropyltoluene	ug/kg	ND	1020	1040	101	62-139	
sec-Butylbenzene	ug/kg	ND	1020	1260	123	64-137	
Styrene	ug/kg	ND	1020	1150	112	70-132	
tert-Butylbenzene	ug/kg	ND	1020	1170	114	65-136	
Tetrachloroethene	ug/kg	ND	1020	1250	122	61-142	
Tetrahydrofuran	ug/kg	ND	10200	11000	108	68-138	
Toluene	ug/kg	87.5	1020	1200	108	66-128	
trans-1,2-Dichloroethene	ug/kg	ND	1020	1030	101	63-129	
trans-1,3-Dichloropropene	ug/kg	ND	1020	1180	115	67-132	
Trichloroethene	ug/kg	ND	1020	1190	116	52-150	
Trichlorofluoromethane	ug/kg	ND	1020	1100	108	39-150	
Vinyl chloride	ug/kg	ND	1020	851	83	50-125	
Xylene (Total)	ug/kg	ND	3080	3540	115	70-130	
1,2-Dichloroethane-d4 (S)	%.				90	55-150	
4-Bromofluorobenzene (S)	%.				100	54-131	
Toluene-d8 (S)	%.				102	61-125	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye
Pace Project No.: 10317933

SAMPLE DUPLICATE: 2050878

Parameter	Units	10318139005 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	ND	ND		30	
1,1,1-Trichloroethane	ug/kg	ND	ND		30	
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND		30	
1,1,2-Trichloroethane	ug/kg	ND	ND		30	
1,1,2-Trichlorotrifluoroethane	ug/kg	ND	ND		30	
1,1-Dichloroethane	ug/kg	ND	ND		30	
1,1-Dichloroethene	ug/kg	ND	ND		30	
1,1-Dichloropropene	ug/kg	ND	ND		30	
1,2,3-Trichlorobenzene	ug/kg	ND	ND		30	
1,2,3-Trichloropropane	ug/kg	ND	ND		30	
1,2,4-Trichlorobenzene	ug/kg	ND	ND		30	
1,2,4-Trimethylbenzene	ug/kg	ND	ND		30	
1,2-Dibromo-3-chloropropane	ug/kg	ND	ND		30	
1,2-Dibromoethane (EDB)	ug/kg	ND	ND		30	
1,2-Dichlorobenzene	ug/kg	ND	ND		30	
1,2-Dichloroethane	ug/kg	ND	ND		30	
1,2-Dichloropropane	ug/kg	ND	ND		30	
1,3,5-Trimethylbenzene	ug/kg	ND	ND		30	
1,3-Dichlorobenzene	ug/kg	ND	ND		30	
1,3-Dichloropropane	ug/kg	ND	ND		30	
1,4-Dichlorobenzene	ug/kg	ND	ND		30	
2,2-Dichloropropane	ug/kg	ND	ND		30	
2-Butanone (MEK)	ug/kg	ND	ND		30	
2-Chlorotoluene	ug/kg	ND	ND		30	
4-Chlorotoluene	ug/kg	ND	ND		30	
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	ND		30	
Acetone	ug/kg	ND	ND		30	
Allyl chloride	ug/kg	ND	ND		30	
Benzene	ug/kg	ND	ND		30	
Bromobenzene	ug/kg	ND	ND		30	
Bromochloromethane	ug/kg	ND	ND		30	
Bromodichloromethane	ug/kg	ND	ND		30	
Bromoform	ug/kg	ND	ND		30	
Bromomethane	ug/kg	ND	ND		30	
Carbon tetrachloride	ug/kg	ND	ND		30	
Chlorobenzene	ug/kg	ND	ND		30	
Chloroethane	ug/kg	ND	ND		30	
Chloroform	ug/kg	ND	ND		30	
Chloromethane	ug/kg	ND	ND		30	
cis-1,2-Dichloroethene	ug/kg	ND	ND		30	
cis-1,3-Dichloropropene	ug/kg	ND	ND		30	
Dibromochloromethane	ug/kg	ND	ND		30	
Dibromomethane	ug/kg	ND	ND		30	
Dichlorodifluoromethane	ug/kg	ND	ND		30	
Dichlorofluoromethane	ug/kg	ND	ND		30	
Diethyl ether (Ethyl ether)	ug/kg	ND	ND		30	
Ethylbenzene	ug/kg	ND	ND		30	

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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: BNSF Mission Wye
Pace Project No.: 10317933

SAMPLE DUPLICATE: 2050878

Parameter	Units	10318139005 Result	Dup Result	RPD	Max RPD	Qualifiers
Hexachloro-1,3-butadiene	ug/kg	ND	ND		30	
Isopropylbenzene (Cumene)	ug/kg	ND	ND		30	
Methyl-tert-butyl ether	ug/kg	ND	ND		30	
Methylene Chloride	ug/kg	ND	77.8J		30	
n-Butylbenzene	ug/kg	ND	ND		30	
n-Propylbenzene	ug/kg	ND	ND		30	
Naphthalene	ug/kg	ND	ND		30	
p-Isopropyltoluene	ug/kg	ND	ND		30	
sec-Butylbenzene	ug/kg	ND	ND		30	
Styrene	ug/kg	ND	ND		30	
tert-Butylbenzene	ug/kg	ND	ND		30	
Tetrachloroethene	ug/kg	ND	ND		30	
Tetrahydrofuran	ug/kg	ND	ND		30	
Toluene	ug/kg	ND	ND		30	
trans-1,2-Dichloroethene	ug/kg	ND	ND		30	
trans-1,3-Dichloropropene	ug/kg	ND	ND		30	
Trichloroethene	ug/kg	ND	ND		30	
Trichlorofluoromethane	ug/kg	ND	ND		30	
Vinyl chloride	ug/kg	ND	ND		30	
Xylene (Total)	ug/kg	ND	ND		30	
1,2-Dichloroethane-d4 (S)	%.	104	106	8		
4-Bromofluorobenzene (S)	%.	101	102	7		
Toluene-d8 (S)	%.	104	103	5		

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QUALIFIERS

Project: BNSF Mission Wye
Pace Project No.: 10317933

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

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 decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

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.
SS	This analyte did not meet the secondary source verification criteria for the initial calibration. The reported result should be considered an estimated value.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BNSF Mission Wye
Pace Project No.: 10317933

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10317933001	**SBS-7D Till/08112015 (0-2ft)**	ASTM D2974	MPRP/56958		
10317933002	**SS-88d Till/08112015 (0-2ft)**	ASTM D2974	MPRP/56958		
10317933001	**SBS-7D Till/08112015 (0-2ft)**	EPA 5035/5030B	MSV/32778	EPA 8260B	MSV/32797
10317933002	**SS-88d Till/08112015 (0-2ft)**	EPA 5035/5030B	MSV/32778	EPA 8260B	MSV/32797

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10317933

RUSH JM 8/12/15

Page: 1 of 1

1928982

Section A Required Client Information:

Company: AECOM
Address: 207 N. Broadway Ste. 315, Billings, MT 59101
Email To: shelly.young@aecom.com
Phone: Fax:
Requested Due Date/TAT: 5-day

Section B Required Project Information:

Report To: Shelly Young (shelly.young@aecom.com)
Copy To: Yueh Chuang (yueh.chuang@bnsf.com); Cole Grover (cole.grover@aecom.com)
Purchase Order No.:
Project Name: BNSF Mission Wye
Project Number:

Section C Invoice Information:

Attention: Shelly Young
Company Name: AECOM
Address: Same as Section A.
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MT

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N): Analysis Test: BTEX (VOCs)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start Date	Composite Start Time	Composite End/Grab Date	Composite End/Grab Time	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	BTEX (VOCs)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	SBS-7D-NE Till/08112015 (0-2ft.)	SL	G			8/11/2015	1130	1		X								X		1991
2	SBS-7D-NW Till/08112015 (0-2ft.)						↓			X								X		"
3	SBS-7D-SE Till/08112015 (0-2ft.)									X								X		"
4	SBS-7D-SW Till/08112015 (0-2ft.)						↓			X								X		"
5	SBS-7D-C Till/08112015 (0-2ft.)						↓			X								X		"
6	SS-88d-NE Till/08112015 (0-2ft.)						1230			X								X		
7	SS-88d-NW Till/08112015 (0-2ft.)						↓			X								X		
8	SS-88d-SW Till/08112015 (0-2ft.)									X								X		
9	SS-88d-SE Till/08112015 (0-2ft.)									X								X		
10	SS-88d-C Till/08112015 (0-2ft.)						↓			X								X		
11										X										
12																				

Please Composite all SBS-7D aliquots into composite: SBS-7D Till/08112015 (0-2ft.) and all SS-88d aliquots into: SS-88d Till/08112015 (0-2ft.)

Attention!

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
See composite directions above at right.	Cole R. Grover / AECOM	8/11/2015	1245	Pace	8/12/15	9:00	0.5	Y	N Y JM 8/12/15	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Cole R. Grover

SIGNATURE of SAMPLER: Cole R. Grover

DATE Signed (MM/DD/YY): 8/11/2015

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 23Feb2015 Page 1 of 1
	Document No.: **F-MN-L-213-rev.13**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: AECOM

Project #: WO#: 10317933 (10317933)

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 1Z 1R9 A44 01 3578 3390

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

Thermometer Used: ☐ B88A9130516413 ☐ B88A912167504 ☑ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.6 **Cooler Temp Corrected (°C):** 0.5 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** -0.1 **Date and Initials of Person Examining Contents:** JM 8/12/15

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)? ☐ Yes ☑ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☑ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				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. 5-Day
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. Note if sediment is visible in the dissolved container
Sample Labels Match COC?	☐ Yes	☑ No	☐ N/A	12. Sample ID does not match. Sample label ID: SS-88d-SWT:11
-Includes Date/Time/ID/Analysis Matrix: SL				
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 #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	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: CAD **Date:** 8-13-15

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 26, 2015

Shelly Young
AECOM, Inc.
207 North Broadway, Suite 315
Billings, MT 59101

RE: Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

Dear Shelly Young:
Enclosed are the analytical results for sample(s) received by the laboratory on August 14, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

This report was revised to correct the sample ID for the second sample.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

cc: Mr. Yueh Chuang, BNSF Railway
Cole Grover, AECOM
Anna Kakai, AECOM

REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

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: BNSF Mission Wye Revised
Pace Project No.: 10318251

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10318251001	**SBS-7D Till/08132015 (0-2ft)**	Solid	08/13/15 13:45	08/14/15 09:20
10318251006	**SS-88d Till/08132015(0-2ft)**	Solid	08/13/15 14:15	08/14/15 09:20

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SAMPLE ANALYTE COUNT

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10318251001	**SBS-7D Till/08132015 (0-2ft)**	ASTM D2974	JDL	1	PASI-M
		EPA 8260B	DJB	70	PASI-M
10318251006	**SS-88d Till/08132015(0-2ft)**	ASTM D2974	JDL	1	PASI-M
		EPA 8260B	AMT	70	PASI-M

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PROJECT NARRATIVE

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

Method: **EPA 8260B**
Description: 8260B MSV 5030 Med Level
Client: AECOM
Date: August 26, 2015

General Information:
2 samples were analyzed for EPA 8260B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

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 5035/5030B 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.

Surrogates:
All surrogates 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.

Duplicate Sample:
All duplicate sample results were within method 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: BNSF Mission Wye Revised
Pace Project No.: 10318251

Sample: SBS-7D Till/08132015 (0-2ft) **Lab ID: 10318251001** Collected: 08/13/15 13:45 Received: 08/14/15 09:20 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**11.2**	%	0.10	0.10	1		08/18/15 11:23		
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B								
Acetone	ND	ug/kg	1100	246	1	08/20/15 09:31	08/20/15 16:34	67-64-1	
Allyl chloride	ND	ug/kg	219	13.4	1	08/20/15 09:31	08/20/15 16:34	107-05-1	
Benzene	ND	ug/kg	21.9	7.7	1	08/20/15 09:31	08/20/15 16:34	71-43-2	
Bromobenzene	ND	ug/kg	54.8	13.3	1	08/20/15 09:31	08/20/15 16:34	108-86-1	
Bromochloromethane	ND	ug/kg	54.8	10.5	1	08/20/15 09:31	08/20/15 16:34	74-97-5	
Bromodichloromethane	ND	ug/kg	54.8	9.8	1	08/20/15 09:31	08/20/15 16:34	75-27-4	
Bromoform	ND	ug/kg	219	13.0	1	08/20/15 09:31	08/20/15 16:34	75-25-2	
Bromomethane	ND	ug/kg	548	96.3	1	08/20/15 09:31	08/20/15 16:34	74-83-9	
2-Butanone (MEK)	ND	ug/kg	274	91.0	1	08/20/15 09:31	08/20/15 16:34	78-93-3	
n-Butylbenzene	ND	ug/kg	219	10.3	1	08/20/15 09:31	08/20/15 16:34	104-51-8	
sec-Butylbenzene	ND	ug/kg	54.8	11.2	1	08/20/15 09:31	08/20/15 16:34	135-98-8	
tert-Butylbenzene	ND	ug/kg	54.8	14.7	1	08/20/15 09:31	08/20/15 16:34	98-06-6	
Carbon tetrachloride	ND	ug/kg	54.8	13.3	1	08/20/15 09:31	08/20/15 16:34	56-23-5	
Chlorobenzene	ND	ug/kg	54.8	8.9	1	08/20/15 09:31	08/20/15 16:34	108-90-7	
Chloroethane	ND	ug/kg	548	26.2	1	08/20/15 09:31	08/20/15 16:34	75-00-3	
Chloroform	ND	ug/kg	54.8	9.2	1	08/20/15 09:31	08/20/15 16:34	67-66-3	
Chloromethane	ND	ug/kg	219	11.1	1	08/20/15 09:31	08/20/15 16:34	74-87-3	
2-Chlorotoluene	ND	ug/kg	54.8	11.3	1	08/20/15 09:31	08/20/15 16:34	95-49-8	
4-Chlorotoluene	ND	ug/kg	54.8	10.3	1	08/20/15 09:31	08/20/15 16:34	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/kg	548	42.4	1	08/20/15 09:31	08/20/15 16:34	96-12-8	
Dibromochloromethane	ND	ug/kg	54.8	8.5	1	08/20/15 09:31	08/20/15 16:34	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/kg	54.8	8.8	1	08/20/15 09:31	08/20/15 16:34	106-93-4	
Dibromomethane	ND	ug/kg	54.8	12.9	1	08/20/15 09:31	08/20/15 16:34	74-95-3	
1,2-Dichlorobenzene	ND	ug/kg	54.8	13.3	1	08/20/15 09:31	08/20/15 16:34	95-50-1	
1,3-Dichlorobenzene	ND	ug/kg	54.8	13.4	1	08/20/15 09:31	08/20/15 16:34	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	54.8	11.6	1	08/20/15 09:31	08/20/15 16:34	106-46-7	
Dichlorodifluoromethane	ND	ug/kg	219	13.5	1	08/20/15 09:31	08/20/15 16:34	75-71-8	
1,1-Dichloroethane	ND	ug/kg	54.8	10.5	1	08/20/15 09:31	08/20/15 16:34	75-34-3	
1,2-Dichloroethane	ND	ug/kg	54.8	12.3	1	08/20/15 09:31	08/20/15 16:34	107-06-2	
1,1-Dichloroethene	ND	ug/kg	54.8	12.5	1	08/20/15 09:31	08/20/15 16:34	75-35-4	
cis-1,2-Dichloroethene	ND	ug/kg	54.8	19.5	1	08/20/15 09:31	08/20/15 16:34	156-59-2	
trans-1,2-Dichloroethene	ND	ug/kg	54.8	9.0	1	08/20/15 09:31	08/20/15 16:34	156-60-5	
Dichlorofluoromethane	ND	ug/kg	548	51.5	1	08/20/15 09:31	08/20/15 16:34	75-43-4	
1,2-Dichloropropane	ND	ug/kg	54.8	11.2	1	08/20/15 09:31	08/20/15 16:34	78-87-5	
1,3-Dichloropropane	ND	ug/kg	54.8	8.6	1	08/20/15 09:31	08/20/15 16:34	142-28-9	
2,2-Dichloropropane	ND	ug/kg	219	22.2	1	08/20/15 09:31	08/20/15 16:34	594-20-7	
1,1-Dichloropropene	ND	ug/kg	54.8	11.0	1	08/20/15 09:31	08/20/15 16:34	563-58-6	
cis-1,3-Dichloropropene	ND	ug/kg	54.8	5.7	1	08/20/15 09:31	08/20/15 16:34	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/kg	54.8	21.3	1	08/20/15 09:31	08/20/15 16:34	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/kg	219	17.9	1	08/20/15 09:31	08/20/15 16:34	60-29-7	
Ethylbenzene	ND	ug/kg	54.8	8.2	1	08/20/15 09:31	08/20/15 16:34	100-41-4	

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ANALYTICAL RESULTS

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

Sample: SBS-7D Till/08132015 (0-2ft) **Lab ID: 10318251001** Collected: 08/13/15 13:45 Received: 08/14/15 09:20 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B								
Hexachloro-1,3-butadiene	ND	ug/kg	274	23.4	1	08/20/15 09:31	08/20/15 16:34	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/kg	219	10	1	08/20/15 09:31	08/20/15 16:34	98-82-8	
p-Isopropyltoluene	ND	ug/kg	219	9.6	1	08/20/15 09:31	08/20/15 16:34	99-87-6	
Methylene Chloride	ND	ug/kg	219	16.3	1	08/20/15 09:31	08/20/15 16:34	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/kg	1100	69.7	1	08/20/15 09:31	08/20/15 16:34	108-10-1	
Methyl-tert-butyl ether	ND	ug/kg	54.8	10.3	1	08/20/15 09:31	08/20/15 16:34	1634-04-4	
Naphthalene	ND	ug/kg	548	79.1	1	08/20/15 09:31	08/20/15 16:34	91-20-3	
n-Propylbenzene	ND	ug/kg	54.8	11.7	1	08/20/15 09:31	08/20/15 16:34	103-65-1	
Styrene	ND	ug/kg	219	8.7	1	08/20/15 09:31	08/20/15 16:34	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/kg	54.8	10.5	1	08/20/15 09:31	08/20/15 16:34	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/kg	54.8	10.5	1	08/20/15 09:31	08/20/15 16:34	79-34-5	
Tetrachloroethene	**46.7J**	ug/kg	54.8	11.3	1	08/20/15 09:31	08/20/15 16:34	127-18-4	
Tetrahydrofuran	ND	ug/kg	2190	86.7	1	08/20/15 09:31	08/20/15 16:34	109-99-9	
Toluene	ND	ug/kg	54.8	10.5	1	08/20/15 09:31	08/20/15 16:34	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/kg	54.8	21.3	1	08/20/15 09:31	08/20/15 16:34	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/kg	219	10	1	08/20/15 09:31	08/20/15 16:34	120-82-1	
1,1,1-Trichloroethane	ND	ug/kg	54.8	10.7	1	08/20/15 09:31	08/20/15 16:34	71-55-6	
1,1,2-Trichloroethane	ND	ug/kg	54.8	15.0	1	08/20/15 09:31	08/20/15 16:34	79-00-5	
Trichloroethene	ND	ug/kg	54.8	13.3	1	08/20/15 09:31	08/20/15 16:34	79-01-6	
Trichlorofluoromethane	ND	ug/kg	219	37.9	1	08/20/15 09:31	08/20/15 16:34	75-69-4	
1,2,3-Trichloropropane	ND	ug/kg	219	15.1	1	08/20/15 09:31	08/20/15 16:34	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/kg	219	12.9	1	08/20/15 09:31	08/20/15 16:34	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/kg	219	11.0	1	08/20/15 09:31	08/20/15 16:34	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/kg	219	10.6	1	08/20/15 09:31	08/20/15 16:34	108-67-8	
Vinyl chloride	ND	ug/kg	21.9	9.9	1	08/20/15 09:31	08/20/15 16:34	75-01-4	
Xylene (Total)	ND	ug/kg	329	32.8	1	08/20/15 09:31	08/20/15 16:34	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	118	%.	55-150		1	08/20/15 09:31	08/20/15 16:34	17060-07-0	
Toluene-d8 (S)	100	%.	61-125		1	08/20/15 09:31	08/20/15 16:34	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	54-131		1	08/20/15 09:31	08/20/15 16:34	460-00-4	

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ANALYTICAL RESULTS

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

Sample: SS-88d Till/08132015(0-2ft) **Lab ID: 10318251006** Collected: 08/13/15 14:15 Received: 08/14/15 09:20 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
Dry Weight	Analytical Method: ASTM D2974								
Percent Moisture	**11.2**	%	0.10	0.10	1		08/19/15 14:27		
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B								
Acetone	ND	ug/kg	1100	247	1	08/24/15 10:25	08/24/15 17:49	67-64-1	
Allyl chloride	ND	ug/kg	220	13.4	1	08/24/15 10:25	08/24/15 17:49	107-05-1	
Benzene	ND	ug/kg	22.0	7.7	1	08/24/15 10:25	08/24/15 17:49	71-43-2	
Bromobenzene	ND	ug/kg	55.1	13.3	1	08/24/15 10:25	08/24/15 17:49	108-86-1	
Bromochloromethane	ND	ug/kg	55.1	10.6	1	08/24/15 10:25	08/24/15 17:49	74-97-5	
Bromodichloromethane	ND	ug/kg	55.1	9.8	1	08/24/15 10:25	08/24/15 17:49	75-27-4	
Bromoform	ND	ug/kg	220	13.1	1	08/24/15 10:25	08/24/15 17:49	75-25-2	
Bromomethane	ND	ug/kg	551	96.8	1	08/24/15 10:25	08/24/15 17:49	74-83-9	
2-Butanone (MEK)	ND	ug/kg	276	91.5	1	08/24/15 10:25	08/24/15 17:49	78-93-3	
n-Butylbenzene	ND	ug/kg	220	10.4	1	08/24/15 10:25	08/24/15 17:49	104-51-8	
sec-Butylbenzene	ND	ug/kg	55.1	11.2	1	08/24/15 10:25	08/24/15 17:49	135-98-8	
tert-Butylbenzene	ND	ug/kg	55.1	14.8	1	08/24/15 10:25	08/24/15 17:49	98-06-6	
Carbon tetrachloride	ND	ug/kg	55.1	13.3	1	08/24/15 10:25	08/24/15 17:49	56-23-5	
Chlorobenzene	ND	ug/kg	55.1	8.9	1	08/24/15 10:25	08/24/15 17:49	108-90-7	
Chloroethane	ND	ug/kg	551	26.3	1	08/24/15 10:25	08/24/15 17:49	75-00-3	
Chloroform	ND	ug/kg	55.1	9.2	1	08/24/15 10:25	08/24/15 17:49	67-66-3	
Chloromethane	ND	ug/kg	220	11.1	1	08/24/15 10:25	08/24/15 17:49	74-87-3	
2-Chlorotoluene	ND	ug/kg	55.1	11.4	1	08/24/15 10:25	08/24/15 17:49	95-49-8	
4-Chlorotoluene	ND	ug/kg	55.1	10.3	1	08/24/15 10:25	08/24/15 17:49	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/kg	551	42.7	1	08/24/15 10:25	08/24/15 17:49	96-12-8	
Dibromochloromethane	ND	ug/kg	55.1	8.5	1	08/24/15 10:25	08/24/15 17:49	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/kg	55.1	8.9	1	08/24/15 10:25	08/24/15 17:49	106-93-4	
Dibromomethane	ND	ug/kg	55.1	13.0	1	08/24/15 10:25	08/24/15 17:49	74-95-3	
1,2-Dichlorobenzene	ND	ug/kg	55.1	13.3	1	08/24/15 10:25	08/24/15 17:49	95-50-1	
1,3-Dichlorobenzene	ND	ug/kg	55.1	13.4	1	08/24/15 10:25	08/24/15 17:49	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	55.1	11.7	1	08/24/15 10:25	08/24/15 17:49	106-46-7	
Dichlorodifluoromethane	ND	ug/kg	220	13.6	1	08/24/15 10:25	08/24/15 17:49	75-71-8	
1,1-Dichloroethane	ND	ug/kg	55.1	10.5	1	08/24/15 10:25	08/24/15 17:49	75-34-3	
1,2-Dichloroethane	ND	ug/kg	55.1	12.3	1	08/24/15 10:25	08/24/15 17:49	107-06-2	
1,1-Dichloroethene	ND	ug/kg	55.1	12.6	1	08/24/15 10:25	08/24/15 17:49	75-35-4	
cis-1,2-Dichloroethene	ND	ug/kg	55.1	19.6	1	08/24/15 10:25	08/24/15 17:49	156-59-2	
trans-1,2-Dichloroethene	ND	ug/kg	55.1	9.0	1	08/24/15 10:25	08/24/15 17:49	156-60-5	
Dichlorofluoromethane	ND	ug/kg	551	51.8	1	08/24/15 10:25	08/24/15 17:49	75-43-4	
1,2-Dichloropropane	ND	ug/kg	55.1	11.2	1	08/24/15 10:25	08/24/15 17:49	78-87-5	
1,3-Dichloropropane	ND	ug/kg	55.1	8.6	1	08/24/15 10:25	08/24/15 17:49	142-28-9	
2,2-Dichloropropane	ND	ug/kg	220	22.3	1	08/24/15 10:25	08/24/15 17:49	594-20-7	
1,1-Dichloropropene	ND	ug/kg	55.1	11.0	1	08/24/15 10:25	08/24/15 17:49	563-58-6	
cis-1,3-Dichloropropene	ND	ug/kg	55.1	5.7	1	08/24/15 10:25	08/24/15 17:49	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/kg	55.1	21.4	1	08/24/15 10:25	08/24/15 17:49	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/kg	220	18.0	1	08/24/15 10:25	08/24/15 17:49	60-29-7	
Ethylbenzene	ND	ug/kg	55.1	8.2	1	08/24/15 10:25	08/24/15 17:49	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/kg	276	23.5	1	08/24/15 10:25	08/24/15 17:49	87-68-3	

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ANALYTICAL RESULTS

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

Sample: SS-88d Till/08132015(0-2ft) **Lab ID: 10318251006** Collected: 08/13/15 14:15 Received: 08/14/15 09:20 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B								
Isopropylbenzene (Cumene)	ND	ug/kg	220	10.0	1	08/24/15 10:25	08/24/15 17:49	98-82-8	
p-Isopropyltoluene	ND	ug/kg	220	9.6	1	08/24/15 10:25	08/24/15 17:49	99-87-6	
Methylene Chloride	ND	ug/kg	220	16.4	1	08/24/15 10:25	08/24/15 17:49	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/kg	1100	70.1	1	08/24/15 10:25	08/24/15 17:49	108-10-1	
Methyl-tert-butyl ether	ND	ug/kg	55.1	10.3	1	08/24/15 10:25	08/24/15 17:49	1634-04-4	
Naphthalene	ND	ug/kg	551	79.5	1	08/24/15 10:25	08/24/15 17:49	91-20-3	
n-Propylbenzene	ND	ug/kg	55.1	11.8	1	08/24/15 10:25	08/24/15 17:49	103-65-1	
Styrene	ND	ug/kg	220	8.8	1	08/24/15 10:25	08/24/15 17:49	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/kg	55.1	10.6	1	08/24/15 10:25	08/24/15 17:49	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/kg	55.1	10.5	1	08/24/15 10:25	08/24/15 17:49	79-34-5	
Tetrachloroethene	ND	ug/kg	55.1	11.4	1	08/24/15 10:25	08/24/15 17:49	127-18-4	
Tetrahydrofuran	ND	ug/kg	2200	87.2	1	08/24/15 10:25	08/24/15 17:49	109-99-9	
Toluene	ND	ug/kg	55.1	10.6	1	08/24/15 10:25	08/24/15 17:49	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/kg	55.1	21.4	1	08/24/15 10:25	08/24/15 17:49	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/kg	220	10.0	1	08/24/15 10:25	08/24/15 17:49	120-82-1	
1,1,1-Trichloroethane	ND	ug/kg	55.1	10.7	1	08/24/15 10:25	08/24/15 17:49	71-55-6	
1,1,2-Trichloroethane	ND	ug/kg	55.1	15.1	1	08/24/15 10:25	08/24/15 17:49	79-00-5	
Trichloroethene	ND	ug/kg	55.1	13.3	1	08/24/15 10:25	08/24/15 17:49	79-01-6	
Trichlorofluoromethane	ND	ug/kg	220	38.1	1	08/24/15 10:25	08/24/15 17:49	75-69-4	
1,2,3-Trichloropropane	ND	ug/kg	220	15.2	1	08/24/15 10:25	08/24/15 17:49	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/kg	220	13.0	1	08/24/15 10:25	08/24/15 17:49	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/kg	220	11.0	1	08/24/15 10:25	08/24/15 17:49	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/kg	220	10.7	1	08/24/15 10:25	08/24/15 17:49	108-67-8	
Vinyl chloride	ND	ug/kg	22.0	9.9	1	08/24/15 10:25	08/24/15 17:49	75-01-4	
Xylene (Total)	ND	ug/kg	331	33.0	1	08/24/15 10:25	08/24/15 17:49	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	117	%.	55-150		1	08/24/15 10:25	08/24/15 17:49	17060-07-0	
Toluene-d8 (S)	101	%.	61-125		1	08/24/15 10:25	08/24/15 17:49	2037-26-5	
4-Bromofluorobenzene (S)	107	%.	54-131		1	08/24/15 10:25	08/24/15 17:49	460-00-4	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

QC Batch: MPRP/57059
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 10318251001

SAMPLE DUPLICATE: 2053147

Parameter	Units	10318251001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	11.2	10.7	5	30	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

QC Batch: MPRP/57098
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 10318251006

SAMPLE DUPLICATE: 2054406

Parameter	Units	10318340002 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	21.6	23.1	7	30	

SAMPLE DUPLICATE: 2054435

Parameter	Units	10317778001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	6.6	6.7	2	30	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

QC Batch: MSV/32828
QC Batch Method: EPA 5035/5030B
Analysis Method: EPA 8260B
Analysis Description: 8260B MSV 5030 Med Level
Associated Lab Samples: 10318251001

METHOD BLANK: 2053797
Matrix: Solid
Associated Lab Samples: 10318251001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	ND	50.0	08/20/15 11:55	
1,1,1-Trichloroethane	ug/kg	ND	50.0	08/20/15 11:55	
1,1,2,2-Tetrachloroethane	ug/kg	ND	50.0	08/20/15 11:55	
1,1,2-Trichloroethane	ug/kg	ND	50.0	08/20/15 11:55	
1,1,2-Trichlorotrifluoroethane	ug/kg	ND	200	08/20/15 11:55	
1,1-Dichloroethane	ug/kg	ND	50.0	08/20/15 11:55	
1,1-Dichloroethene	ug/kg	ND	50.0	08/20/15 11:55	
1,1-Dichloropropene	ug/kg	ND	50.0	08/20/15 11:55	
1,2,3-Trichlorobenzene	ug/kg	ND	50.0	08/20/15 11:55	
1,2,3-Trichloropropane	ug/kg	ND	200	08/20/15 11:55	
1,2,4-Trichlorobenzene	ug/kg	98.9J	200	08/20/15 11:55	
1,2,4-Trimethylbenzene	ug/kg	ND	200	08/20/15 11:55	
1,2-Dibromo-3-chloropropane	ug/kg	ND	500	08/20/15 11:55	
1,2-Dibromoethane (EDB)	ug/kg	ND	50.0	08/20/15 11:55	
1,2-Dichlorobenzene	ug/kg	ND	50.0	08/20/15 11:55	
1,2-Dichloroethane	ug/kg	ND	50.0	08/20/15 11:55	
1,2-Dichloropropane	ug/kg	ND	50.0	08/20/15 11:55	
1,3,5-Trimethylbenzene	ug/kg	ND	200	08/20/15 11:55	
1,3-Dichlorobenzene	ug/kg	ND	50.0	08/20/15 11:55	
1,3-Dichloropropane	ug/kg	ND	50.0	08/20/15 11:55	
1,4-Dichlorobenzene	ug/kg	ND	50.0	08/20/15 11:55	
2,2-Dichloropropane	ug/kg	ND	200	08/20/15 11:55	
2-Butanone (MEK)	ug/kg	ND	250	08/20/15 11:55	
2-Chlorotoluene	ug/kg	ND	50.0	08/20/15 11:55	
4-Chlorotoluene	ug/kg	ND	50.0	08/20/15 11:55	
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	1000	08/20/15 11:55	
Acetone	ug/kg	ND	1000	08/20/15 11:55	
Allyl chloride	ug/kg	ND	200	08/20/15 11:55	
Benzene	ug/kg	ND	20.0	08/20/15 11:55	
Bromobenzene	ug/kg	ND	50.0	08/20/15 11:55	
Bromochloromethane	ug/kg	ND	50.0	08/20/15 11:55	
Bromodichloromethane	ug/kg	ND	50.0	08/20/15 11:55	
Bromoform	ug/kg	ND	200	08/20/15 11:55	
Bromomethane	ug/kg	ND	500	08/20/15 11:55	
Carbon tetrachloride	ug/kg	ND	50.0	08/20/15 11:55	
Chlorobenzene	ug/kg	ND	50.0	08/20/15 11:55	
Chloroethane	ug/kg	ND	500	08/20/15 11:55	
Chloroform	ug/kg	ND	50.0	08/20/15 11:55	
Chloromethane	ug/kg	ND	200	08/20/15 11:55	
cis-1,2-Dichloroethene	ug/kg	ND	50.0	08/20/15 11:55	
cis-1,3-Dichloropropene	ug/kg	ND	50.0	08/20/15 11:55	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

METHOD BLANK: 2053797 Matrix: Solid
Associated Lab Samples: 10318251001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Dibromochloromethane	ug/kg	ND	50.0	08/20/15 11:55	
Dibromomethane	ug/kg	ND	50.0	08/20/15 11:55	
Dichlorodifluoromethane	ug/kg	ND	200	08/20/15 11:55	
Dichlorofluoromethane	ug/kg	ND	500	08/20/15 11:55	
Diethyl ether (Ethyl ether)	ug/kg	ND	200	08/20/15 11:55	
Ethylbenzene	ug/kg	ND	50.0	08/20/15 11:55	
Hexachloro-1,3-butadiene	ug/kg	ND	250	08/20/15 11:55	
Isopropylbenzene (Cumene)	ug/kg	ND	200	08/20/15 11:55	
Methyl-tert-butyl ether	ug/kg	ND	50.0	08/20/15 11:55	
Methylene Chloride	ug/kg	ND	200	08/20/15 11:55	
n-Butylbenzene	ug/kg	ND	200	08/20/15 11:55	
n-Propylbenzene	ug/kg	ND	50.0	08/20/15 11:55	
Naphthalene	ug/kg	ND	500	08/20/15 11:55	
p-Isopropyltoluene	ug/kg	ND	200	08/20/15 11:55	
sec-Butylbenzene	ug/kg	ND	50.0	08/20/15 11:55	
Styrene	ug/kg	ND	200	08/20/15 11:55	
tert-Butylbenzene	ug/kg	ND	50.0	08/20/15 11:55	
Tetrachloroethene	ug/kg	ND	50.0	08/20/15 11:55	
Tetrahydrofuran	ug/kg	ND	2000	08/20/15 11:55	
Toluene	ug/kg	ND	50.0	08/20/15 11:55	
trans-1,2-Dichloroethene	ug/kg	ND	50.0	08/20/15 11:55	
trans-1,3-Dichloropropene	ug/kg	ND	50.0	08/20/15 11:55	
Trichloroethene	ug/kg	ND	50.0	08/20/15 11:55	
Trichlorofluoromethane	ug/kg	ND	200	08/20/15 11:55	
Vinyl chloride	ug/kg	ND	20.0	08/20/15 11:55	
Xylene (Total)	ug/kg	ND	300	08/20/15 11:55	
1,2-Dichloroethane-d4 (S)	%.	109	55-150	08/20/15 11:55	
4-Bromofluorobenzene (S)	%.	102	54-131	08/20/15 11:55	
Toluene-d8 (S)	%.	99	61-125	08/20/15 11:55	

LABORATORY CONTROL SAMPLE: 2053798

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	1000	1030	103	75-125	
1,1,1-Trichloroethane	ug/kg	1000	999	100	66-125	
1,1,2,2-Tetrachloroethane	ug/kg	1000	902	90	69-125	
1,1,2-Trichloroethane	ug/kg	1000	999	100	75-125	
1,1,2-Trichlorotrifluoroethane	ug/kg	1000	1090	109	55-125	
1,1-Dichloroethane	ug/kg	1000	934	93	67-125	
1,1-Dichloroethene	ug/kg	1000	907	91	62-125	
1,1-Dichloropropene	ug/kg	1000	931	93	65-125	
1,2,3-Trichlorobenzene	ug/kg	1000	870	87	58-132	
1,2,3-Trichloropropane	ug/kg	1000	881	88	71-125	
1,2,4-Trichlorobenzene	ug/kg	1000	927	93	63-128	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

LABORATORY CONTROL SAMPLE: 2053798

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/kg	1000	999	100	74-125	
1,2-Dibromo-3-chloropropane	ug/kg	2500	2170	87	55-142	
1,2-Dibromoethane (EDB)	ug/kg	1000	990	99	75-125	
1,2-Dichlorobenzene	ug/kg	1000	1060	106	75-125	
1,2-Dichloroethane	ug/kg	1000	930	93	71-125	
1,2-Dichloropropane	ug/kg	1000	957	96	74-125	
1,3,5-Trimethylbenzene	ug/kg	1000	1010	101	72-125	
1,3-Dichlorobenzene	ug/kg	1000	1030	103	75-125	
1,3-Dichloropropane	ug/kg	1000	986	99	75-125	
1,4-Dichlorobenzene	ug/kg	1000	974	97	75-125	
2,2-Dichloropropane	ug/kg	1000	1040	104	45-125	
2-Butanone (MEK)	ug/kg	5000	3470	69	39-136	
2-Chlorotoluene	ug/kg	1000	1080	108	73-125	
4-Chlorotoluene	ug/kg	1000	1090	109	74-125	
4-Methyl-2-pentanone (MIBK)	ug/kg	5000	4250	85	55-132	
Acetone	ug/kg	5000	4630	93	55-131	
Allyl chloride	ug/kg	1000	858	86	53-125	
Benzene	ug/kg	1000	924	92	69-125	
Bromobenzene	ug/kg	1000	1020	102	75-125	
Bromochloromethane	ug/kg	1000	882	88	75-125	
Bromodichloromethane	ug/kg	1000	978	98	75-125	
Bromoform	ug/kg	1000	946	95	71-125	
Bromomethane	ug/kg	1000	967	97	42-150	
Carbon tetrachloride	ug/kg	1000	1120	112	62-125	
Chlorobenzene	ug/kg	1000	969	97	75-125	
Chloroethane	ug/kg	1000	890	89	41-150	
Chloroform	ug/kg	1000	917	92	72-125	
Chloromethane	ug/kg	1000	817	82	50-125	
cis-1,2-Dichloroethene	ug/kg	1000	951	95	73-125	
cis-1,3-Dichloropropene	ug/kg	1000	1040	104	74-125	
Dibromochloromethane	ug/kg	1000	979	98	75-125	
Dibromomethane	ug/kg	1000	943	94	75-125	
Dichlorodifluoromethane	ug/kg	1000	918	92	30-125	
Dichlorofluoromethane	ug/kg	1000	939	94	30-150	
Diethyl ether (Ethyl ether)	ug/kg	1000	858	86	58-125	
Ethylbenzene	ug/kg	1000	1040	104	72-125	
Hexachloro-1,3-butadiene	ug/kg	1000	1180	118	59-138	
Isopropylbenzene (Cumene)	ug/kg	1000	998	100	72-125	
Methyl-tert-butyl ether	ug/kg	1000	946	95	72-125	
Methylene Chloride	ug/kg	1000	911	91	71-125	
n-Butylbenzene	ug/kg	1000	1010	101	65-125	
n-Propylbenzene	ug/kg	1000	1030	103	71-125	
Naphthalene	ug/kg	1000	875	88	55-139	
p-Isopropyltoluene	ug/kg	1000	1010	101	69-125	
sec-Butylbenzene	ug/kg	1000	1020	102	68-125	
Styrene	ug/kg	1000	981	98	75-125	
tert-Butylbenzene	ug/kg	1000	1050	105	70-125	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

LABORATORY CONTROL SAMPLE: 2053798

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	ug/kg	1000	990	99	69-125	
Tetrahydrofuran	ug/kg	10000	10300	103	62-129	
Toluene	ug/kg	1000	982	98	72-125	
trans-1,2-Dichloroethene	ug/kg	1000	923	92	68-125	
trans-1,3-Dichloropropene	ug/kg	1000	1010	101	74-125	
Trichloroethene	ug/kg	1000	961	96	72-125	
Trichlorofluoromethane	ug/kg	1000	1080	108	30-150	
Vinyl chloride	ug/kg	1000	905	90	53-125	
Xylene (Total)	ug/kg	3000	3090	103	74-125	
1,2-Dichloroethane-d4 (S)	%.			102	55-150	
4-Bromofluorobenzene (S)	%.			100	54-131	
Toluene-d8 (S)	%.			101	61-125	

MATRIX SPIKE SAMPLE: 2053799

Parameter	Units	10318399003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	<0.054 mg/kg	1030	877	85	62-150	
1,1,1-Trichloroethane	ug/kg	<0.054 mg/kg	1030	877	85	58-150	
1,1,2,2-Tetrachloroethane	ug/kg	<0.054 mg/kg	1030	854	83	30-150	
1,1,2-Trichloroethane	ug/kg	<0.054 mg/kg	1030	904	88	61-149	
1,1,2-Trichlorotrifluoroethane	ug/kg	<0.22 mg/kg	1030	922	90	45-150	
1,1-Dichloroethane	ug/kg	<0.054 mg/kg	1030	866	84	56-150	
1,1-Dichloroethene	ug/kg	<0.054 mg/kg	1030	823	80	48-150	
1,1-Dichloropropene	ug/kg	<0.054 mg/kg	1030	891	87	58-150	
1,2,3-Trichlorobenzene	ug/kg	<0.054 mg/kg	1030	896	87	55-150	
1,2,3-Trichloropropane	ug/kg	<0.22 mg/kg	1030	829	81	57-148	
1,2,4-Trichlorobenzene	ug/kg	<0.22 mg/kg	1030	844	82	61-150	
1,2,4-Trimethylbenzene	ug/kg	<0.22 mg/kg	1030	869	85	64-150	
1,2-Dibromo-3-chloropropane	ug/kg	<0.54 mg/kg	2570	2100	82	40-150	
1,2-Dibromoethane (EDB)	ug/kg	<0.054 mg/kg	1030	883	86	62-147	
1,2-Dichlorobenzene	ug/kg	<0.054 mg/kg	1030	895	87	73-133	
1,2-Dichloroethane	ug/kg	<0.054 mg/kg	1030	845	82	63-132	
1,2-Dichloropropane	ug/kg	<0.054 mg/kg	1030	880	86	69-127	
1,3,5-Trimethylbenzene	ug/kg	<0.22 mg/kg	1030	862	84	63-137	
1,3-Dichlorobenzene	ug/kg	<0.054 mg/kg	1030	866	84	69-133	
1,3-Dichloropropane	ug/kg	<0.054 mg/kg	1030	853	83	70-130	
1,4-Dichlorobenzene	ug/kg	<0.054 mg/kg	1030	842	82	69-130	
2,2-Dichloropropane	ug/kg	<0.22 mg/kg	1030	879	86	54-135	
2-Butanone (MEK)	ug/kg	<0.27 mg/kg	5140	3780	74	49-145	
2-Chlorotoluene	ug/kg	<0.054 mg/kg	1030	890	87	68-129	
4-Chlorotoluene	ug/kg	<0.054 mg/kg	1030	924	90	67-134	
4-Methyl-2-pentanone (MIBK)	ug/kg	<1.1 mg/kg	5140	4070	79	60-150	
Acetone	ug/kg	<1.1 mg/kg	5140	4320	84	65-135	
Allyl chloride	ug/kg	<0.22 mg/kg	1030	861	84	55-126	
Benzene	ug/kg	<0.022 mg/kg	1030	839	82	63-126	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

MATRIX SPIKE SAMPLE: 2053799

Parameter	Units	10318399003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Bromobenzene	ug/kg	<0.054 mg/kg	1030	843	82	68-133	
Bromochloromethane	ug/kg	<0.054 mg/kg	1030	805	78	66-130	
Bromodichloromethane	ug/kg	<0.054 mg/kg	1030	853	83	68-129	
Bromoform	ug/kg	<0.22 mg/kg	1030	816	79	63-135	
Bromomethane	ug/kg	<0.54 mg/kg	1030	1040	101	30-150	
Carbon tetrachloride	ug/kg	<0.054 mg/kg	1030	907	88	56-140	
Chlorobenzene	ug/kg	<0.054 mg/kg	1030	878	85	69-130	
Chloroethane	ug/kg	<0.54 mg/kg	1030	949	92	46-150	
Chloroform	ug/kg	<0.054 mg/kg	1030	844	82	70-127	
Chloromethane	ug/kg	<0.22 mg/kg	1030	904	88	51-125	
cis-1,2-Dichloroethene	ug/kg	<0.054 mg/kg	1030	855	83	68-125	
cis-1,3-Dichloropropene	ug/kg	<0.054 mg/kg	1030	883	86	67-126	
Dibromochloromethane	ug/kg	<0.054 mg/kg	1030	832	81	66-135	
Dibromomethane	ug/kg	<0.054 mg/kg	1030	911	89	68-132	
Dichlorodifluoromethane	ug/kg	<0.22 mg/kg	1030	869	85	30-138	
Dichlorofluoromethane	ug/kg	<0.54 mg/kg	1030	1030	100	30-150	
Diethyl ether (Ethyl ether)	ug/kg	<0.22 mg/kg	1030	765	74	56-135	
Ethylbenzene	ug/kg	<0.054 mg/kg	1030	894	87	69-126	
Hexachloro-1,3-butadiene	ug/kg	<0.27 mg/kg	1030	996	97	50-150	
Isopropylbenzene (Cumene)	ug/kg	<0.22 mg/kg	1030	842	82	65-135	
Methyl-tert-butyl ether	ug/kg	<0.054 mg/kg	1030	864	84	66-129	
Methylene Chloride	ug/kg	<0.22 mg/kg	1030	904	88	64-125	
n-Butylbenzene	ug/kg	<0.22 mg/kg	1030	839	82	62-141	
n-Propylbenzene	ug/kg	<0.054 mg/kg	1030	887	86	65-135	
Naphthalene	ug/kg	<0.54 mg/kg	1030	935	91	62-150	
p-Isopropyltoluene	ug/kg	<0.22 mg/kg	1030	846	82	62-139	
sec-Butylbenzene	ug/kg	<0.054 mg/kg	1030	865	84	64-137	
Styrene	ug/kg	<0.22 mg/kg	1030	845	82	70-132	
tert-Butylbenzene	ug/kg	<0.054 mg/kg	1030	924	90	65-136	
Tetrachloroethene	ug/kg	<0.054 mg/kg	1030	855	81	61-142	
Tetrahydrofuran	ug/kg	<2.2 mg/kg	10300	8820	86	68-138	
Toluene	ug/kg	<0.054 mg/kg	1030	885	86	66-128	
trans-1,2-Dichloroethene	ug/kg	<0.054 mg/kg	1030	888	86	63-129	
trans-1,3-Dichloropropene	ug/kg	<0.054 mg/kg	1030	948	92	67-132	
Trichloroethene	ug/kg	<0.054 mg/kg	1030	860	84	52-150	
Trichlorofluoromethane	ug/kg	<0.22 mg/kg	1030	1210	118	39-150	
Vinyl chloride	ug/kg	<0.022 mg/kg	1030	889	86	50-125	
Xylene (Total)	ug/kg	<0.33 mg/kg	3080	2660	86	70-130	
1,2-Dichloroethane-d4 (S)	%.				98	55-150	
4-Bromofluorobenzene (S)	%.				102	54-131	
Toluene-d8 (S)	%.				102	61-125	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

SAMPLE DUPLICATE: 2053800

Parameter	Units	10318399006 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	<0.056 mg/kg	ND		30	
1,1,1-Trichloroethane	ug/kg	<0.056 mg/kg	ND		30	
1,1,2,2-Tetrachloroethane	ug/kg	<0.056 mg/kg	ND		30	
1,1,2-Trichloroethane	ug/kg	<0.056 mg/kg	ND		30	
1,1,2-Trichlorotrifluoroethane	ug/kg	<0.22 mg/kg	ND		30	
1,1-Dichloroethane	ug/kg	<0.056 mg/kg	ND		30	
1,1-Dichloroethene	ug/kg	<0.056 mg/kg	ND		30	
1,1-Dichloropropene	ug/kg	<0.056 mg/kg	ND		30	
1,2,3-Trichlorobenzene	ug/kg	<0.056 mg/kg	ND		30	
1,2,3-Trichloropropane	ug/kg	<0.22 mg/kg	ND		30	
1,2,4-Trichlorobenzene	ug/kg	<0.22 mg/kg	ND		30	
1,2,4-Trimethylbenzene	ug/kg	<0.22 mg/kg	ND		30	
1,2-Dibromo-3-chloropropane	ug/kg	<0.56 mg/kg	ND		30	
1,2-Dibromoethane (EDB)	ug/kg	<0.056 mg/kg	ND		30	
1,2-Dichlorobenzene	ug/kg	<0.056 mg/kg	ND		30	
1,2-Dichloroethane	ug/kg	<0.056 mg/kg	ND		30	
1,2-Dichloropropane	ug/kg	<0.056 mg/kg	ND		30	
1,3,5-Trimethylbenzene	ug/kg	<0.22 mg/kg	ND		30	
1,3-Dichlorobenzene	ug/kg	<0.056 mg/kg	ND		30	
1,3-Dichloropropane	ug/kg	<0.056 mg/kg	ND		30	
1,4-Dichlorobenzene	ug/kg	<0.056 mg/kg	ND		30	
2,2-Dichloropropane	ug/kg	<0.22 mg/kg	ND		30	
2-Butanone (MEK)	ug/kg	<0.28 mg/kg	ND		30	
2-Chlorotoluene	ug/kg	<0.056 mg/kg	ND		30	
4-Chlorotoluene	ug/kg	<0.056 mg/kg	ND		30	
4-Methyl-2-pentanone (MIBK)	ug/kg	<1.1 mg/kg	ND		30	
Acetone	ug/kg	<1.1 mg/kg	ND		30	
Allyl chloride	ug/kg	<0.22 mg/kg	ND		30	
Benzene	ug/kg	<0.022 mg/kg	ND		30	
Bromobenzene	ug/kg	<0.056 mg/kg	ND		30	
Bromochloromethane	ug/kg	<0.056 mg/kg	ND		30	
Bromodichloromethane	ug/kg	<0.056 mg/kg	ND		30	
Bromoform	ug/kg	<0.22 mg/kg	ND		30	
Bromomethane	ug/kg	<0.56 mg/kg	ND		30	
Carbon tetrachloride	ug/kg	<0.056 mg/kg	ND		30	
Chlorobenzene	ug/kg	<0.056 mg/kg	ND		30	
Chloroethane	ug/kg	<0.56 mg/kg	ND		30	
Chloroform	ug/kg	<0.056 mg/kg	ND		30	
Chloromethane	ug/kg	<0.22 mg/kg	ND		30	
cis-1,2-Dichloroethene	ug/kg	<0.056 mg/kg	ND		30	
cis-1,3-Dichloropropene	ug/kg	<0.056 mg/kg	ND		30	
Dibromochloromethane	ug/kg	<0.056 mg/kg	ND		30	
Dibromomethane	ug/kg	<0.056 mg/kg	ND		30	
Dichlorodifluoromethane	ug/kg	<0.22 mg/kg	ND		30	
Dichlorofluoromethane	ug/kg	<0.56 mg/kg	ND		30	
Diethyl ether (Ethyl ether)	ug/kg	<0.22 mg/kg	ND		30	
Ethylbenzene	ug/kg	<0.056 mg/kg	ND		30	

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(612)607-1700

QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

SAMPLE DUPLICATE: 2053800

Parameter	Units	10318399006 Result	Dup Result	RPD	Max RPD	Qualifiers
Hexachloro-1,3-butadiene	ug/kg	<0.28 mg/kg	ND		30	
Isopropylbenzene (Cumene)	ug/kg	<0.22 mg/kg	ND		30	
Methyl-tert-butyl ether	ug/kg	<0.056 mg/kg	ND		30	
Methylene Chloride	ug/kg	<0.22 mg/kg	ND		30	
n-Butylbenzene	ug/kg	<0.22 mg/kg	ND		30	
n-Propylbenzene	ug/kg	<0.056 mg/kg	ND		30	
Naphthalene	ug/kg	<0.56 mg/kg	ND		30	
p-Isopropyltoluene	ug/kg	<0.22 mg/kg	ND		30	
sec-Butylbenzene	ug/kg	<0.056 mg/kg	ND		30	
Styrene	ug/kg	<0.22 mg/kg	ND		30	
tert-Butylbenzene	ug/kg	<0.056 mg/kg	ND		30	
Tetrachloroethene	ug/kg	<0.056 mg/kg	ND		30	
Tetrahydrofuran	ug/kg	<2.2 mg/kg	ND		30	
Toluene	ug/kg	<0.056 mg/kg	ND		30	
trans-1,2-Dichloroethene	ug/kg	<0.056 mg/kg	ND		30	
trans-1,3-Dichloropropene	ug/kg	<0.056 mg/kg	ND		30	
Trichloroethene	ug/kg	<0.056 mg/kg	ND		30	
Trichlorofluoromethane	ug/kg	<0.22 mg/kg	ND		30	
Vinyl chloride	ug/kg	<0.022 mg/kg	ND		30	
Xylene (Total)	ug/kg	<0.34 mg/kg	ND		30	
1,2-Dichloroethane-d4 (S)	%.	116	115	2		
4-Bromofluorobenzene (S)	%.	101	103	0		
Toluene-d8 (S)	%.	100	102	0		

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QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

QC Batch: MSV/32882
QC Batch Method: EPA 5035/5030B
Analysis Method: EPA 8260B
Analysis Description: 8260B MSV 5030 Med Level
Associated Lab Samples: 10318251006

METHOD BLANK: 2057920
Matrix: Solid
Associated Lab Samples: 10318251006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	ND	50.0	08/24/15 16:17	
1,1,1-Trichloroethane	ug/kg	ND	50.0	08/24/15 16:17	
1,1,2,2-Tetrachloroethane	ug/kg	ND	50.0	08/24/15 16:17	
1,1,2-Trichloroethane	ug/kg	ND	50.0	08/24/15 16:17	
1,1,2-Trichlorotrifluoroethane	ug/kg	ND	200	08/24/15 16:17	
1,1-Dichloroethane	ug/kg	ND	50.0	08/24/15 16:17	
1,1-Dichloroethene	ug/kg	ND	50.0	08/24/15 16:17	
1,1-Dichloropropene	ug/kg	ND	50.0	08/24/15 16:17	
1,2,3-Trichlorobenzene	ug/kg	ND	50.0	08/24/15 16:17	
1,2,3-Trichloropropane	ug/kg	ND	200	08/24/15 16:17	
1,2,4-Trichlorobenzene	ug/kg	ND	200	08/24/15 16:17	
1,2,4-Trimethylbenzene	ug/kg	ND	200	08/24/15 16:17	
1,2-Dibromo-3-chloropropane	ug/kg	ND	500	08/24/15 16:17	
1,2-Dibromoethane (EDB)	ug/kg	ND	50.0	08/24/15 16:17	
1,2-Dichlorobenzene	ug/kg	ND	50.0	08/24/15 16:17	
1,2-Dichloroethane	ug/kg	ND	50.0	08/24/15 16:17	
1,2-Dichloropropane	ug/kg	ND	50.0	08/24/15 16:17	
1,3,5-Trimethylbenzene	ug/kg	ND	200	08/24/15 16:17	
1,3-Dichlorobenzene	ug/kg	ND	50.0	08/24/15 16:17	
1,3-Dichloropropane	ug/kg	ND	50.0	08/24/15 16:17	
1,4-Dichlorobenzene	ug/kg	ND	50.0	08/24/15 16:17	
2,2-Dichloropropane	ug/kg	ND	200	08/24/15 16:17	
2-Butanone (MEK)	ug/kg	ND	250	08/24/15 16:17	
2-Chlorotoluene	ug/kg	ND	50.0	08/24/15 16:17	
4-Chlorotoluene	ug/kg	ND	50.0	08/24/15 16:17	
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	1000	08/24/15 16:17	
Acetone	ug/kg	ND	1000	08/24/15 16:17	
Allyl chloride	ug/kg	ND	200	08/24/15 16:17	
Benzene	ug/kg	ND	20.0	08/24/15 16:17	
Bromobenzene	ug/kg	ND	50.0	08/24/15 16:17	
Bromochloromethane	ug/kg	ND	50.0	08/24/15 16:17	
Bromodichloromethane	ug/kg	ND	50.0	08/24/15 16:17	
Bromoform	ug/kg	ND	200	08/24/15 16:17	
Bromomethane	ug/kg	ND	500	08/24/15 16:17	
Carbon tetrachloride	ug/kg	ND	50.0	08/24/15 16:17	
Chlorobenzene	ug/kg	ND	50.0	08/24/15 16:17	
Chloroethane	ug/kg	ND	500	08/24/15 16:17	
Chloroform	ug/kg	ND	50.0	08/24/15 16:17	
Chloromethane	ug/kg	ND	200	08/24/15 16:17	
cis-1,2-Dichloroethene	ug/kg	ND	50.0	08/24/15 16:17	
cis-1,3-Dichloropropene	ug/kg	ND	50.0	08/24/15 16:17	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

METHOD BLANK: 2057920 Matrix: Solid
Associated Lab Samples: 10318251006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Dibromochloromethane	ug/kg	ND	50.0	08/24/15 16:17	
Dibromomethane	ug/kg	ND	50.0	08/24/15 16:17	
Dichlorodifluoromethane	ug/kg	ND	200	08/24/15 16:17	
Dichlorofluoromethane	ug/kg	ND	500	08/24/15 16:17	
Diethyl ether (Ethyl ether)	ug/kg	ND	200	08/24/15 16:17	
Ethylbenzene	ug/kg	ND	50.0	08/24/15 16:17	
Hexachloro-1,3-butadiene	ug/kg	ND	250	08/24/15 16:17	
Isopropylbenzene (Cumene)	ug/kg	ND	200	08/24/15 16:17	
Methyl-tert-butyl ether	ug/kg	ND	50.0	08/24/15 16:17	
Methylene Chloride	ug/kg	ND	200	08/24/15 16:17	
n-Butylbenzene	ug/kg	ND	200	08/24/15 16:17	
n-Propylbenzene	ug/kg	ND	50.0	08/24/15 16:17	
Naphthalene	ug/kg	ND	500	08/24/15 16:17	
p-Isopropyltoluene	ug/kg	ND	200	08/24/15 16:17	
sec-Butylbenzene	ug/kg	ND	50.0	08/24/15 16:17	
Styrene	ug/kg	ND	200	08/24/15 16:17	
tert-Butylbenzene	ug/kg	ND	50.0	08/24/15 16:17	
Tetrachloroethene	ug/kg	ND	50.0	08/24/15 16:17	
Tetrahydrofuran	ug/kg	ND	2000	08/24/15 16:17	
Toluene	ug/kg	ND	50.0	08/24/15 16:17	
trans-1,2-Dichloroethene	ug/kg	ND	50.0	08/24/15 16:17	
trans-1,3-Dichloropropene	ug/kg	ND	50.0	08/24/15 16:17	
Trichloroethene	ug/kg	ND	50.0	08/24/15 16:17	
Trichlorofluoromethane	ug/kg	ND	200	08/24/15 16:17	
Vinyl chloride	ug/kg	ND	20.0	08/24/15 16:17	
Xylene (Total)	ug/kg	ND	300	08/24/15 16:17	
1,2-Dichloroethane-d4 (S)	%.	111	55-150	08/24/15 16:17	
4-Bromofluorobenzene (S)	%.	105	54-131	08/24/15 16:17	
Toluene-d8 (S)	%.	100	61-125	08/24/15 16:17	

LABORATORY CONTROL SAMPLE: 2057921

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	1000	1010	101	75-125	
1,1,1-Trichloroethane	ug/kg	1000	1060	106	66-125	
1,1,2,2-Tetrachloroethane	ug/kg	1000	925	93	69-125	
1,1,2-Trichloroethane	ug/kg	1000	1020	102	75-125	
1,1,2-Trichlorotrifluoroethane	ug/kg	1000	1030	103	55-125	
1,1-Dichloroethane	ug/kg	1000	984	98	67-125	
1,1-Dichloroethene	ug/kg	1000	907	91	62-125	
1,1-Dichloropropene	ug/kg	1000	1020	102	65-125	
1,2,3-Trichlorobenzene	ug/kg	1000	758	76	58-132	
1,2,3-Trichloropropane	ug/kg	1000	905	91	71-125	
1,2,4-Trichlorobenzene	ug/kg	1000	818	82	63-128	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

LABORATORY CONTROL SAMPLE: 2057921

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/kg	1000	964	96	74-125	
1,2-Dibromo-3-chloropropane	ug/kg	2500	2350	94	55-142	
1,2-Dibromoethane (EDB)	ug/kg	1000	1050	105	75-125	
1,2-Dichlorobenzene	ug/kg	1000	997	100	75-125	
1,2-Dichloroethane	ug/kg	1000	971	97	71-125	
1,2-Dichloropropane	ug/kg	1000	1000	100	74-125	
1,3,5-Trimethylbenzene	ug/kg	1000	927	93	72-125	
1,3-Dichlorobenzene	ug/kg	1000	969	97	75-125	
1,3-Dichloropropane	ug/kg	1000	978	98	75-125	
1,4-Dichlorobenzene	ug/kg	1000	912	91	75-125	
2,2-Dichloropropane	ug/kg	1000	1070	107	45-125	
2-Butanone (MEK)	ug/kg	5000	4650	93	39-136	
2-Chlorotoluene	ug/kg	1000	1070	107	73-125	
4-Chlorotoluene	ug/kg	1000	1040	104	74-125	
4-Methyl-2-pentanone (MIBK)	ug/kg	5000	4640	93	55-132	
Acetone	ug/kg	5000	4670	93	55-131	
Allyl chloride	ug/kg	1000	907	91	53-125	
Benzene	ug/kg	1000	946	95	69-125	
Bromobenzene	ug/kg	1000	1020	102	75-125	
Bromochloromethane	ug/kg	1000	954	95	75-125	
Bromodichloromethane	ug/kg	1000	1020	102	75-125	
Bromoform	ug/kg	1000	1010	101	71-125	
Bromomethane	ug/kg	1000	970	97	42-150	
Carbon tetrachloride	ug/kg	1000	1060	106	62-125	
Chlorobenzene	ug/kg	1000	965	97	75-125	
Chloroethane	ug/kg	1000	883	88	41-150	
Chloroform	ug/kg	1000	985	99	72-125	
Chloromethane	ug/kg	1000	778	78	50-125	
cis-1,2-Dichloroethene	ug/kg	1000	1000	100	73-125	
cis-1,3-Dichloropropene	ug/kg	1000	1100	110	74-125	
Dibromochloromethane	ug/kg	1000	1000	100	75-125	
Dibromomethane	ug/kg	1000	961	96	75-125	
Dichlorodifluoromethane	ug/kg	1000	810	81	30-125	
Dichlorofluoromethane	ug/kg	1000	927	93	30-150	
Diethyl ether (Ethyl ether)	ug/kg	1000	898	90	58-125	
Ethylbenzene	ug/kg	1000	981	98	72-125	
Hexachloro-1,3-butadiene	ug/kg	1000	976	98	59-138	
Isopropylbenzene (Cumene)	ug/kg	1000	936	94	72-125	
Methyl-tert-butyl ether	ug/kg	1000	1010	101	72-125	
Methylene Chloride	ug/kg	1000	961	96	71-125	
n-Butylbenzene	ug/kg	1000	940	94	65-125	
n-Propylbenzene	ug/kg	1000	983	98	71-125	
Naphthalene	ug/kg	1000	875	87	55-139	
p-Isopropyltoluene	ug/kg	1000	920	92	69-125	
sec-Butylbenzene	ug/kg	1000	914	91	68-125	
Styrene	ug/kg	1000	940	94	75-125	
tert-Butylbenzene	ug/kg	1000	1030	103	70-125	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

LABORATORY CONTROL SAMPLE: 2057921

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	ug/kg	1000	931	93	69-125	
Tetrahydrofuran	ug/kg	10000	10800	108	62-129	
Toluene	ug/kg	1000	965	96	72-125	
trans-1,2-Dichloroethene	ug/kg	1000	991	99	68-125	
trans-1,3-Dichloropropene	ug/kg	1000	1090	109	74-125	
Trichloroethene	ug/kg	1000	991	99	72-125	
Trichlorofluoromethane	ug/kg	1000	1110	111	30-150	
Vinyl chloride	ug/kg	1000	829	83	53-125	
Xylene (Total)	ug/kg	3000	2990	100	74-125	
1,2-Dichloroethane-d4 (S)	%.			103	55-150	
4-Bromofluorobenzene (S)	%.			103	54-131	
Toluene-d8 (S)	%.			100	61-125	

MATRIX SPIKE SAMPLE: 2057922

Parameter	Units	10319099002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	ND	1070	1090	103	62-150	
1,1,1-Trichloroethane	ug/kg	ND	1070	1070	101	58-150	
1,1,2,2-Tetrachloroethane	ug/kg	ND	1070	1000	94	30-150	
1,1,2-Trichloroethane	ug/kg	ND	1070	1090	103	61-149	
1,1,2-Trichlorotrifluoroethane	ug/kg	ND	1070	1110	105	45-150	
1,1-Dichloroethane	ug/kg	ND	1070	1020	96	56-150	
1,1-Dichloroethene	ug/kg	ND	1070	968	91	48-150	
1,1-Dichloropropene	ug/kg	ND	1070	1050	99	58-150	
1,2,3-Trichlorobenzene	ug/kg	ND	1070	1020	96	55-150	
1,2,3-Trichloropropane	ug/kg	ND	1070	1020	96	57-148	
1,2,4-Trichlorobenzene	ug/kg	ND	1070	1010	95	61-150	
1,2,4-Trimethylbenzene	ug/kg	ND	1070	1000	94	64-150	
1,2-Dibromo-3-chloropropane	ug/kg	ND	2650	2730	103	40-150	
1,2-Dibromoethane (EDB)	ug/kg	ND	1070	1100	104	62-147	
1,2-Dichlorobenzene	ug/kg	ND	1070	1070	100	73-133	
1,2-Dichloroethane	ug/kg	ND	1070	1020	96	63-132	
1,2-Dichloropropane	ug/kg	ND	1070	1080	102	69-127	
1,3,5-Trimethylbenzene	ug/kg	ND	1070	974	92	63-137	
1,3-Dichlorobenzene	ug/kg	ND	1070	1030	97	69-133	
1,3-Dichloropropane	ug/kg	ND	1070	1060	100	70-130	
1,4-Dichlorobenzene	ug/kg	ND	1070	990	93	69-130	
2,2-Dichloropropane	ug/kg	ND	1070	1130	107	54-135	
2-Butanone (MEK)	ug/kg	ND	5310	5120	96	49-145	
2-Chlorotoluene	ug/kg	ND	1070	1100	104	68-129	
4-Chlorotoluene	ug/kg	ND	1070	1090	103	67-134	
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	5310	5100	96	60-150	
Acetone	ug/kg	ND	5310	4820	91	65-135	
Allyl chloride	ug/kg	ND	1070	1110	104	55-126	
Benzene	ug/kg	ND	1070	1010	95	63-126	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

MATRIX SPIKE SAMPLE: 2057922

Parameter	Units	10319099002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Bromobenzene	ug/kg	ND	1070	1070	100	68-133	
Bromochloromethane	ug/kg	ND	1070	983	93	66-130	
Bromodichloromethane	ug/kg	ND	1070	1110	104	68-129	
Bromoform	ug/kg	ND	1070	1080	102	63-135	
Bromomethane	ug/kg	ND	1070	806	76	30-150	
Carbon tetrachloride	ug/kg	ND	1070	1090	102	56-140	
Chlorobenzene	ug/kg	ND	1070	1050	99	69-130	
Chloroethane	ug/kg	ND	1070	612	58	46-150	
Chloroform	ug/kg	ND	1070	1020	96	70-127	
Chloromethane	ug/kg	ND	1070	569	54	51-125	
cis-1,2-Dichloroethene	ug/kg	ND	1070	1000	94	68-125	
cis-1,3-Dichloropropene	ug/kg	ND	1070	1180	111	67-126	
Dibromochloromethane	ug/kg	ND	1070	1090	103	66-135	
Dibromomethane	ug/kg	ND	1070	1060	100	68-132	
Dichlorodifluoromethane	ug/kg	ND	1070	499	47	30-138	
Dichlorofluoromethane	ug/kg	ND	1070	663	62	30-150	
Diethyl ether (Ethyl ether)	ug/kg	ND	1070	929	87	56-135	
Ethylbenzene	ug/kg	ND	1070	1070	100	69-126	
Hexachloro-1,3-butadiene	ug/kg	ND	1070	1160	109	50-150	
Isopropylbenzene (Cumene)	ug/kg	ND	1070	985	93	65-135	
Methyl-tert-butyl ether	ug/kg	ND	1070	1120	105	66-129	
Methylene Chloride	ug/kg	ND	1070	1020	96	64-125	
n-Butylbenzene	ug/kg	ND	1070	967	91	62-141	
n-Propylbenzene	ug/kg	ND	1070	1020	96	65-135	
Naphthalene	ug/kg	ND	1070	1040	98	62-150	
p-Isopropyltoluene	ug/kg	ND	1070	998	94	62-139	
sec-Butylbenzene	ug/kg	ND	1070	1000	94	64-137	
Styrene	ug/kg	ND	1070	1020	96	70-132	
tert-Butylbenzene	ug/kg	ND	1070	1060	100	65-136	
Tetrachloroethene	ug/kg	ND	1070	1040	98	61-142	
Tetrahydrofuran	ug/kg	ND	10700	10800	101	68-138	
Toluene	ug/kg	ND	1070	1010	95	66-128	
trans-1,2-Dichloroethene	ug/kg	ND	1070	971	91	63-129	
trans-1,3-Dichloropropene	ug/kg	ND	1070	1170	110	67-132	
Trichloroethene	ug/kg	ND	1070	1030	97	52-150	
Trichlorofluoromethane	ug/kg	ND	1070	741	70	39-150	
Vinyl chloride	ug/kg	ND	1070	572	54	50-125	
Xylene (Total)	ug/kg	ND	3190	3140	99	70-130	
1,2-Dichloroethane-d4 (S)	%.				102	55-150	
4-Bromofluorobenzene (S)	%.				100	54-131	
Toluene-d8 (S)	%.				100	61-125	

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

SAMPLE DUPLICATE: 2057923

Parameter	Units	10319099004 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	ND	ND		30	
1,1,1-Trichloroethane	ug/kg	ND	ND		30	
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND		30	
1,1,2-Trichloroethane	ug/kg	ND	ND		30	
1,1,2-Trichlorotrifluoroethane	ug/kg	ND	ND		30	
1,1-Dichloroethane	ug/kg	ND	ND		30	
1,1-Dichloroethene	ug/kg	ND	ND		30	
1,1-Dichloropropene	ug/kg	ND	ND		30	
1,2,3-Trichlorobenzene	ug/kg	ND	ND		30	
1,2,3-Trichloropropane	ug/kg	ND	ND		30	
1,2,4-Trichlorobenzene	ug/kg	ND	ND		30	
1,2,4-Trimethylbenzene	ug/kg	ND	ND		30	
1,2-Dibromo-3-chloropropane	ug/kg	ND	ND		30	
1,2-Dibromoethane (EDB)	ug/kg	ND	ND		30	
1,2-Dichlorobenzene	ug/kg	ND	ND		30	
1,2-Dichloroethane	ug/kg	ND	ND		30	
1,2-Dichloropropane	ug/kg	ND	ND		30	
1,3,5-Trimethylbenzene	ug/kg	ND	ND		30	
1,3-Dichlorobenzene	ug/kg	ND	ND		30	
1,3-Dichloropropane	ug/kg	ND	ND		30	
1,4-Dichlorobenzene	ug/kg	ND	ND		30	
2,2-Dichloropropane	ug/kg	ND	ND		30	
2-Butanone (MEK)	ug/kg	ND	ND		30	
2-Chlorotoluene	ug/kg	ND	ND		30	
4-Chlorotoluene	ug/kg	ND	ND		30	
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	ND		30	
Acetone	ug/kg	ND	ND		30	
Allyl chloride	ug/kg	ND	ND		30	
Benzene	ug/kg	ND	ND		30	
Bromobenzene	ug/kg	ND	ND		30	
Bromochloromethane	ug/kg	ND	ND		30	
Bromodichloromethane	ug/kg	ND	ND		30	
Bromoform	ug/kg	ND	ND		30	
Bromomethane	ug/kg	ND	ND		30	
Carbon tetrachloride	ug/kg	ND	ND		30	
Chlorobenzene	ug/kg	ND	ND		30	
Chloroethane	ug/kg	ND	ND		30	
Chloroform	ug/kg	ND	ND		30	
Chloromethane	ug/kg	ND	ND		30	
cis-1,2-Dichloroethene	ug/kg	ND	ND		30	
cis-1,3-Dichloropropene	ug/kg	ND	ND		30	
Dibromochloromethane	ug/kg	ND	ND		30	
Dibromomethane	ug/kg	ND	ND		30	
Dichlorodifluoromethane	ug/kg	ND	ND		30	
Dichlorofluoromethane	ug/kg	ND	ND		30	
Diethyl ether (Ethyl ether)	ug/kg	ND	ND		30	
Ethylbenzene	ug/kg	ND	ND		30	

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QUALITY CONTROL DATA

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

SAMPLE DUPLICATE: 2057923

Parameter	Units	10319099004 Result	Dup Result	RPD	Max RPD	Qualifiers
Hexachloro-1,3-butadiene	ug/kg	ND	ND		30	
Isopropylbenzene (Cumene)	ug/kg	ND	ND		30	
Methyl-tert-butyl ether	ug/kg	ND	ND		30	
Methylene Chloride	ug/kg	ND	ND		30	
n-Butylbenzene	ug/kg	ND	ND		30	
n-Propylbenzene	ug/kg	ND	ND		30	
Naphthalene	ug/kg	ND	ND		30	
p-Isopropyltoluene	ug/kg	ND	ND		30	
sec-Butylbenzene	ug/kg	ND	ND		30	
Styrene	ug/kg	ND	ND		30	
tert-Butylbenzene	ug/kg	ND	ND		30	
Tetrachloroethene	ug/kg	ND	ND		30	
Tetrahydrofuran	ug/kg	ND	ND		30	
Toluene	ug/kg	ND	ND		30	
trans-1,2-Dichloroethene	ug/kg	ND	ND		30	
trans-1,3-Dichloropropene	ug/kg	ND	ND		30	
Trichloroethene	ug/kg	ND	ND		30	
Trichlorofluoromethane	ug/kg	ND	ND		30	
Vinyl chloride	ug/kg	ND	ND		30	
Xylene (Total)	ug/kg	ND	ND		30	
1,2-Dichloroethane-d4 (S)	%.	114	116	7		
4-Bromofluorobenzene (S)	%.	105	103	4		
Toluene-d8 (S)	%.	100	99	4		

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QUALIFIERS

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

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 decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

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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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BNSF Mission Wye Revised
Pace Project No.: 10318251

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10318251001	**SBS-7D Till/08132015 (0-2ft)**	ASTM D2974	MPRP/57059		
10318251006	**SS-88d Till/08132015(0-2ft)**	ASTM D2974	MPRP/57098		
10318251001	**SBS-7D Till/08132015 (0-2ft)**	EPA 5035/5030B	MSV/32828	EPA 8260B	MSV/32851
10318251006	**SS-88d Till/08132015(0-2ft)**	EPA 5035/5030B	MSV/32882	EPA 8260B	MSV/32904

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

RUSH JM 8/14/15

1038751

Page: / of /

1924233

Section A Required Client Information:

Company: AECOM
Address: 207 N. Broadway, Ste. 315 Billings, MT 59101
Email To: shelly.young@aecom.com
Phone: 406-670-8571 Fax:
Requested Due Date/TAT: 5 day TAT

Section B Required Project Information:

Report To: Shelly Young
Copy To: Yueh Chiang (yueh.chiang@bnsf.com) Cole Grover (cole.grover@aecom.com)
Purchase Order No.:
Project Name: BNSF Mission Wye
Project Number:

Section C Invoice Information:

Attention: Shelly Young
Company Name: AECOM
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #: ~~35436~~ 32797 61

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER

Site Location STATE:

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N): Y/N

ITEM #	SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start Date	Composite Start Time	Composite End/Grab Date	Composite End/Grab Time	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test: VOCs (8260B)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	SBS-7D-C Till/08132015 (0-2 ft.)	SL	G			8/13/15	1345		1	X								X		001
2	SBS-7D-NW Till/08132015 (0-2 ft.)								1	X								X		002
3	SBS-7D-NE Till/08132015 (0-2 ft.)								1	X								X		003
4	SBS-7D-SW Till/08132015 (0-2 ft.)								1	X								X		004
5	SBS-7D-SE Till/08132015 (0-2 ft.)								1	X								X		005
6	SS-88d-C Till/08132015 (0-2 ft.)						1415		1	X								X		006
7	SS-88d-NW Till/08132015 (0-2 ft.)								1	X								X		007
8	SS-88d-NE Till/08132015 (0-2 ft.)								1	X								X		008
9	SS-88d-SW Till/08132015 (0-2 ft.)								1	X								X		009
10	SS-88d-SE Till/08132015 (0-2 ft.)								1	X								X		010
11																				
12																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
Composite all SBS-7D aliquot samples into:	Cole R. Grover / AECOM	8/13/15	1455	Pace	8/14/15	920	3.6	Y	Y	Y
SBS-7D Till/08132015 (0-2 ft.)										
Composite all 5 SS-88d aliquots into:										
SS-88d Till/08132015 (0-2 ft.)										

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Cole R. Grover

SIGNATURE of SAMPLER: Cole R. Grover

DATE Signed (MM/DD/YY): 08/13/2015

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 23Feb2015 Page 1 of 1
	Document No.: **F-MN-L-213-rev.13**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: AECOM

Project #: WO# : 10318251

10318251

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 1Z 1R9 A44 01 3581 8914

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

Thermometer Used: ☐ B88A9130516413 ☑ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.6 **Cooler Temp Corrected (°C):** 3.6 **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:** JM 8/14/15

USDA Regulated Soil (☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)? ☐ Yes ☑ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☑ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				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. 5-Day
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. Note if sediment is visible in the dissolved container
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: SL	☑ 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	
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☐ No	☑ N/A	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: 8-17-15

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).

Environment

Submitted to:
BNSF Railway Company
Mission Wye Site

Submitted by:
AECOM
Denver, CO
December 10, 2015

December 10, 2015

Organic and Inorganic Limited Data Validation Report

BNSF Mission Wye
Soil Samples
Pace Analytical Services, Inc. data

August, 2015 Sampling

Prepared By Anne Kakai
Validation Chemist/Database Manager

Overview

The samples analyzed for the BNSF Mission Wye Sampling event of July 2015 are listed in the Table of Samples Analyzed (page 3). Data validation was performed on four soil samples.

The samples were analyzed by Pace Analytical of Minneapolis, MN. Limited data validation was performed on the following analyses: Volatile Organic Compounds (VOCs) by SW-846 GC/MS Method 8260 and Percent Moisture by method ASTM D2974.

The Analytical Data Validation Checklist is presented as pages 4-9. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, October 2013 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008), and the *National Functional Guidelines for Inorganic Superfund Data Review*, USEPA OSRTI, document number EPA 540-R-013-001, October 2013 (with additional guidance from the *USEPA CLP National Functional Guidelines for Inorganic Superfund Data Review*, document number USEPA 540-R-10-011, January 2010) as applied to the reported methodology.

The following data components were reviewed during the data validation procedure

Submitted Deliverables
Chain-of-Custody form(s) and sample integrity
Case Narratives (including any laboratory flags)
Sample results, reporting detection limits, dilution factors
Holding times
Laboratory blank results
Trip blank results
Organic surrogate recoveries
LCS (blank spike) results
MS, MSD (matrix spike, matrix spike duplicate) results
Laboratory duplicate (or spiked duplicate) results
Electronic data deliverables (EDDs)

Data Validation Qualifiers Assigned During this Review

J estimated concentration

U evaluated to be undetected at the reporting limit/concentration, due to evidence of contamination (U validation qualifiers are not identical to U laboratory flags that identify initially undetected results)

UJ undetected, reporting limit is estimated

Assigned qualifiers are detailed in the Analytical Data Validation Checklist and are summarized in the Table of Qualified Analytical Results (page 10).

Overall Data Assessment

Field and laboratory precision, field and laboratory accuracy, method compliance, and data set completeness have been determined to be acceptable, based on the data submitted. No data were missing or rejected. All reported data are suitable for their intended use with the qualifications and clarifications noted.

Table of Samples Analyzed
BNSF Mission Wye Soil Samples
Pace Analytical of Minneapolis, MN
Laboratory SDG: 10318251 and 10317933
August, 2015 Sampling

Table 1

Matrix	Sample ID	Sample Date	Sample Time	Lab SDG	Lab ID	Sample Type
SO	SBS-7D Till/08112015 (0-2ft)	8/11/2015	11:30	10317933	10317933001	N
SO	SS-88d Till/08112015(0-2ft)	8/11/2015	12:30	10317933	10317933002	N
SO	SBS-7D Till/08132015 (0-2ft)	8/13/2015	13:45	10318251	10318251001	N
SO	SS-88d Till/08132015(0-2ft)	8/13/2015	14:15	10318251	10318251006	N

N = normal sample
SO = soil sample

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Project Name: BNSF Mission Wye	Laboratory: Pace Analytical of Minneapolis, MN
Project Reference: Soil Sampling	Sample Matrix: Soil
AECOM Project: 60333790	Sample Start Date: 08/11/2015
Validator/Date Validated: Anne Kakai 09/09/2015(completed) and updated 12/10/15	Sample End Date: 08/13/2015
Secondary Review by: Steve Szocik	Secondary Review Date: 9/10/2015 and 12/10/15
Samples Analyzed: Refer to the Table of Samples Analyzed (page 3).	
Parameters Validated: Volatile Organic Compounds (VOCs) by SW-846 GC/MS Method 8260 and Percent Moisture by method ASTM D2974.	
Laboratory Project IDs/Sample Delivery Groups (SDGs): 10317933 and 10318251	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision is determined by comparison of field duplicate sample results (where applicable). For this SDG, a field duplicate sample was not collected as it was not a project requirement. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits. Overall field and laboratory precision is acceptable since data does not require qualification and no data is rejected based on these measurements						
Accuracy:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Field accuracy, a measure of the sampling bias, typically would be determined by reviewing trip blank results for evidence of sample contamination stemming from sampling activities and/or sample transport/bottle contamination. Trip blank samples were not included in the shipment to the laboratory. Data usability was not impacted because target analytes were not detected in at least one sample in each shipment (except for methylene chloride which was negated based on the method blank detection) indicating that contamination was not introduced during sample collection and shipment. Laboratory accuracy is a measure of the system bias, and is measured by evaluating laboratory control sample/laboratory control sample duplicate (LCS/LCSD), matrix spike/matrix spike duplicate (MS/MSD), and organic system monitoring compounds (surrogate and internal standard) percent recoveries (%Rs). LCS/LCSD %Rs, which demonstrated the overall performance of the analytical procedure, were compared to published or recommended EPA QC limits. MS/MSD %Rs, which provided information on sample matrix interferences, were compared to EPA published QC limits or laboratory control charted limits. System monitoring compound or surrogate recoveries, which measured system performance and efficiency during organic analysis, were compared to EPA published QC limits. Overall field and laboratory precision is acceptable since data does not require qualification and no data is rejected based on these measurements. Accuracy measurements are reviewed in items 12, 14, 15, and 16.						
Method Compliance:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: For this sample set, method compliance was determined by evaluating sample integrity, holding time, laboratory blanks against method specified requirements, while applying EPA data validation guidelines. Although some data require qualification based on blank detections (see item 11) and estimated results (see item 6), overall method compliance is acceptable since a majority of the data are unqualified and no data are rejected based on these measurements. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20 and 22.						
Completeness:	**X**	Acceptable		Unacceptable	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and reporting limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and EQuIS electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23.

All of the reported data are usable, some with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.

VALIDATION CRITERIA CHECK

Data validation qualifiers assigned during this review:

J estimated concentration

U evaluated to be undetected at the reporting limit/concentration, due to evidence of contamination (U validation qualifiers are not identical to U laboratory flags that identify initially undetected results)

UJ undetected, reporting limit is estimated

The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary.

Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 10).

1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	AK	Initials

Explanation by laboratory:

Comments: A few laboratory control sample outliers, calibration outliers, and evidence of contamination were noted. All laboratory case narrative comments are included in the hardcopy (or pdf) laboratory report. All assigned laboratory flags were also reviewed during the limited validation procedure.

Data qualification, if any, related to the narrative comments and/or assigned laboratory flags contained in the analytical reports are discussed in the following sections.

2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	AK	Initials

Comments: The COC records from field to laboratory were complete. Custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt.

3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	AK	Initials

Comments: All requested analyses, as designated on the supplied COC forms and supporting project documentation, were completed and reported by the laboratory.

4. Were samples received in good condition and at the appropriate temperature?	**X**	Yes		No	AK	Initials

Comments: All samples were intact and received within acceptable cooler temperatures of 0-6°C as documented on the COC records.

5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	AK	Initials

Comments: Reported methods met those requested on the original COC or are compliant with the requested analytes and matrix.

6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Reported detection limits are achievable by the quoted methods, and are in compliance with the project requirements. All Methods - **Sample results reported at concentrations ≥ the method detection limit (MDL) but < the limit of quantitation (LOQ)/RL require J qualifiers to indicate estimated concentrations. The analyte cannot be accurately quantitated at this trace concentration level. Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 10).**						
7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	AK	Initials
Comments: The reported target analytes are in compliance with the constituents identified on the COC.						
8. Were sample holding times met?	**X**	Yes		No	AK	Initials
Comments: Sample preparation/extraction and analytical holding times were met for all samples and analyses.						
9. Were correct concentration units reported?	**X**	Yes		No	AK	Initials
Comments: Correct concentration units were reported for all constituents.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	AK	Initials
Comments: Data validation qualifiers override any assigned laboratory data flags.						
11. Were laboratory blank samples free of target analyte contamination?		Yes	**X**	No	AK	Initials
Comments: Laboratory blank samples were free of target analyte contamination with the exceptions of trace detections of methylene chloride (2050817BLANK-10317933 – 56.9 ug/kg) and 1,2,4-Trichlorobenzene (2053797BLANK-10318251 – 98.9 ug/kg). Method 8260 (1,2,4-Trichlorobenzene) - Trace Blank; Sample </= RL – Detection of 1,2,4-Trichlorobenzene did not affect the associated investigative samples results because they were non-detect and data qualification is not required. Method 8260 (methylene chloride) - Trace Blank; Sample </= RL – Current guidance states that if a blank result is associated with a trace sample concentration, then the sample result should be considered as being undetected at the reporting limit due to evidence of contamination and false positive detection below the RL. For these results, the initial concentrations reported as positive hits by the laboratory were re-evaluated to be non-detects (detect_flag field was changed from Y to N in the EDD/database), and the initial result was maintained in the result_comment field of the EDD/database for informational purposes only. Applying this guidance, the following qualifiers were assigned: **A trace amount of methylene chloride (56.9 ug/kg) was reported in the preparation blank, 50817BLANK-10317933. The trace methylene chloride results in associated samples SS-88d Till/08112015 (0-2ft) and SBS-7D Till/08112015 (0-2ft) have been corrected to read < RL U in both the EDD and in the Table of Qualified Analytical Results to show that the analyte has been evaluated to be undetected at the RL due to evidence of laboratory contamination and false positive detection below the RL.** The initial concentration reported is maintained in the result_comment field of the EDD/database for informational purposes only. **Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 10).**						

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?	**NA**	Yes	**NA**	No	AK	Initials
Comments: No trip blank, field blank and/or equipment rinse samples were collected for the data evaluated in this DVR.						
13. Were instrument calibrations within method or data validation control limits?		Yes	**X**	No	AK	Initials
Comments: For this level of limited data validation, instrument calibrations were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that instrument calibrations met acceptance criteria. The laboratory's narrative did not identify any outliers; with the exceptions discussed below: <u>Method 8260:</u> Bromomethane was recovered in the secondary source check standard outside QC limits. All associated samples were non-detect and the associated LCS and MS %Rs were within acceptance limits. Bromomethane results were UJ qualified based on the laboratory narrative. . **Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 10).**						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Surrogate %Rs for organic analyses were within laboratory control-charted QC limits (as allowed for SW-846 methods) for all project samples and associated laboratory QC samples.						
15. Were laboratory control sample recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Submitted LCS %Rs were within laboratory control-charted QC limits for organic target analytes as allowed for SW-846 organic methods and also general chemistry.						
16. Were matrix spike recoveries and % RPDs within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: No project specific MS, MSD were analyzed for the data set evaluated in this DVR.						
17. Were serial dilution %Ds within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: *Serial Dilution %Ds: Not applicable for the methods reviewed.*						
18. Were organic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
19. Were internal standards within method criteria for GC/MS sample analyses?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
20. Were inorganic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: For this level of limited data validation, inorganic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that inorganic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**NA**	Yes	**NA**	No	AK	Initials
Comments: Field duplicate RPDs were not collected for the data evaluated in this DVR.						
22. Were qualitative criteria for organic target analyte identification met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: Not applicable for this level of limited data validation – chromatograms, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review. There were no analyte qualitative flags assigned by the laboratory.						
23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	AK	Initials
Comments: The EDD entries were resolved with the hardcopy data results and corrected as necessary. According to validation protocol, the hardcopy data report was accepted as the correct reference. Qualifiers and reason codes were added to the EDD files for all reportable data. The four EQuIS EDD files were formatted for upload once data validation secondary review was completed. Additional edits made to the EDD files by the Database Manager prior to data upload are listed below. Per project requirements, non-detect results will be reported at the MDL while tables are being generated. Data will be entered into the database by the data validator as presented by the laboratory with non-detects reported at the RL. Unique sys_loc_codes were assigned to all samples. In order to upload multiple SDGs under one EDD, SDG numbers were appended to all laboratory QC data and dates were appended to trip blank samples in order to keep them unique. Parent sample designations were made for all LCS/LCSD and field duplicate samples. MS/MSD and laboratory duplicate samples already had pre-assigned parent sample designations which were verified using the hard copy laboratory report. The result_comment field was updated from <PQL to <LOQ and the interpreted_qualifier field was updated accordingly. Where methylene chloride results, were re-evaluated to be non-detects (detect_flag field was changed from Y to N in the EDD/database), and the initial result was maintained in the result_comment field of the EDD/database for informational purposes only. A task_code field was assigned, "MWye_SO_Aug2015". The QC_level and collection_quarter fields were verified as populated appropriately.						

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

24. General Comments: The Analytical Data Validation Checklist is presented as pages 3-9. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, October 2013 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008), and the *National Functional Guidelines for Inorganic Superfund Data Review*, USEPA OSRTI, document number EPA 540-R-013-001, October 2013 (with additional guidance from the *USEPA CLP National Functional Guidelines for Inorganic Superfund Data Review*, document number USEPA 540-R-10-011, January 2010) as applied to the reported methodology.

Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 10).

Table of Qualified Analytical Results
BNSF Mission Wye Soil Samples
Pace Analytical of Minneapolis, MN
Laboratory SDG: 10318251 and 10317933
August, 2015 Sampling

SDG	Sample ID	Method	DF	Analysis	Analyte	Conc	Unit	Qualifier	Reason Code
10317933	SBS-7D Till/08112015 (0-2ft)	8260B	1	INITIAL	Methylene Chloride	< 213	ug/kg	U	MB (Previous result, 75.9 ug/kg)
10317933	SS-88d Till/08112015 (0-2ft)	8260B	1	INITIAL	Methylene Chloride	< 205	ug/kg	U	MB (Previous result, 62.6 ug/kg)
10317933	SBS-7D Till/08112015 (0-2ft)	8260B	1	INITIAL	Bromomethane	< 532	ug/kg	UJ	CCV
10317933	SS-88d Till/08112015 (0-2ft)	8260B	1	INITIAL	Bromomethane	<513	ug/kg	UJ	CCV
10318251	SBS-7D Till/08132015 (0-2ft)	8260B	1	INITIAL	Tetrachloroethene	46.7	ug/kg	J	<LOQ

Conc – concentration
DF - dilution factor
ID - identification
SDG – sample delivery group
Per project requirements, non-detect results will be reported at the MDL while tables are being generated. Data will be entered into the database by the data validator as presented by the laboratory with non-detects reported at the RL.

Reason Codes:

< LOQ - concentration reported is >/= the method detection limit but is < the limit of quantitation/reporting limit
CCV – The continuing calibration verification percent difference was greater than the upper method specification limit.
MB - analyte was also detected in the associated method blank at a comparable concentration; evidence of laboratory contamination.

From: Ricard, Sarah
To: Young, Shelly
Cc: Chuang, Yueh (Yueh.Chuang@BNSF.com); Grover, Cole; Zebley, Margaret; James Hageman; Haque-Hausrath, Katherine; Martin, Denise
Subject: RE: Mission Wye - Soil Tilling Results
Date: Thursday, March 03, 2016 8:21:57 AM

Shelly,

Thank you for submitting the revised December 10, 2015 Organic and Inorganic Limited Data Validation Report on January 25, 2016, for the soil tilling Feasibility Study pilot test conducted in August 2015. This report was submitted on behalf of BNSF Railway Company for the Mission Wye CECRA facility. DEQ has reviewed the report, along with your August 26, 2015 email and determined that the soil tilling objective outlined in section 4.2 of the approved Feasibility Study Pilot Test Work Plan has been met. The soil results for tetrachloroethylene are below 0.13 milligrams per kilogram (mg/kg) – the site-specific leaching to groundwater cleanup level, and below 0.10 mg/kg – site-specific leaching to groundwater cleanup level for trichloroethylene. At this time, DEQ does not find it necessary for BNSF to conduct an additional soil tilling event. As discussed in Section 11 of the Pilot Test Work Plan, please include these data and a discussion within the revised Feasibility Study Report.

Regards,

Sarah Ricard
Project Officer
Remediation Division/DEQ
(406) 444-6745
SRicard@mt.gov

From: Young, Shelly [mailto:Shelly.Young@aecom.com]
Sent: Wednesday, January 20, 2016 5:13 PM
To: Ricard, Sarah
Cc: Chuang, Yueh (Yueh.Chuang@BNSF.com); Grover, Cole; Zebley, Margaret
Subject: Mission Wye - Soil Tilling Results

Hi Sarah,

Attached is a PDF with the soil tilling lab reports and revised DVR.

Shelly Young
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Environment
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Please consider the environment before printing this email.

Appendix D

SVE Operations Summary

SVE Operations Summary

This Soil Vapor Extraction (SVE) Operations summary supplements information provided in the Feasibility Study (FS) Report and is not intended to be a stand-alone document.

1.0 SVE Pilot Test Implementation

Soil Vapor Extraction (SVE) Pilot test implementation activities, including installation of eight SVE extraction wells and three additional vapor monitoring points (VMPs), were initiated by AECOM Technical Services, Inc. (AECOM) on behalf of BNSF Railway Company (BNSF) in October 2014. The activities were implemented after receiving Montana Department of Environmental Quality (MDEQ) conditional approval (MDEQ 2014) for portions of the Feasibility Study (FS) Pilot Test Work Plan (AECOM 2015a). Additional SVE system installation activities, including SVE system shed placement and manifold and extraction system construction, were initiated on August 10, 2015 following full MDEQ approval of the FS Pilot Test Work Plan (MDEQ 2015). During operations, soil vapor was extracted from each of the SVE wells and conveyed from the wells to the SVE system shed (**Figure 10** of the FS Report).

SVE system start-up began on September 29, 2015, after remaining equipment was installed. Final winterization efforts, including the addition of heat trace to aboveground portions of the SVE piping and the placement of an electric space heater inside the adjacent auxiliary shed housing the treatment vessel were conducted in early February 2016.

MDEQ approved completion of the SVE pilot test in September 2016 (MDEQ 2016). Although the pilot test was determined to be complete, the SVE system continued to operate and this summary document includes results obtained through July 2017.

1.1 SVE Well and VMP Construction Details

Direct push and air rotary methods were used in 2014 to install the SVE wells (SVE-1 through SVE-8) and three additional VMPs (VMP-3, VMP-4, and VMP-5). Nested VMP-1S/VMP-1D and VMP-2S/VMP-2D were installed in 2013 as part of a vapor intrusion evaluation included in the FS Work Plan (AECOM 2013) using a direct-push rig. The eight SVE wells (SVE-1 through SVE-8) and VMP-3 through VMP-5 were installed in 2014 following the procedures outlined in the FS Pilot Test Work Plan (AECOM 2015a). Per the work plan, the wells and VMPs were installed using an air rotary rig, due to the large cobbles located in the subsurface. Surface completion of the SVE wells and VMPs occurred in 2015 when the SVE lines were installed. A brief summary of installation procedures is presented below.

- The two nested VMP sets (VMP-1S/VMP-1D and VMP-2S/VMP-2D) were installed and completed as reported in the 2013 VMP Report (AECOM 2014a) using a direct-push drill rig. They were constructed with 0.25-inch outer diameter tubing and were equipped with a 6-inch stainless steel wire screen and were left, at the time, as temporary installations protected by orange construction cones. Surface protection of the VMP-1S/VMP-1D and VMP-2S/VMP-2D was done in 2015 when they were completed above grade with a protective casing in the same manner as VMP-3, VMP-4, and VMP-5.
- SVE wells and VMP-3, VMP-4, and VMP-5 were installed at a total depth of approximately 18 feet below ground surface (bgs) with the screened intervals from 8 to 18 feet bgs (**Figure D-1**). The top of the screen was installed above the historical high groundwater elevation. The following bullets provide construction details.

- The SVE wells and VMP-3 through VMP-5 were constructed with 2-inch-diameter Schedule 40 polyvinyl chloride (PVC) casing and 0.020-inch factory-slotted screen.
- A sand pack was installed from the bottom of the boreholes to a minimum of two feet above the top of the screen.
- A layer of bentonite chips was placed above the sand pack. The bentonite chips were hydrated with potable water and allowed to seal the borehole annulus.
- A bentonite grout was placed on top of the bentonite seal to approximately two feet bgs.
- A non-shrink concrete grout was then placed above the bentonite grout. In the SVE wells, this grout was installed up to approximately three feet bgs; for the VMPs, the depth was approximately one foot bgs (**Figure D-1**).
- A PVC tee was installed in the PVC casing above the concrete grout to allow for connection to the SVE line described in Section 1.2.
- The SVE wells were finished in November 2015 with vaults constructed of landscape-quality sprinkler boxes as shown in the construction detail on **Figure D-1**. The vaults were set into the ground so that the lids of the sprinkler boxes were several inches above the existing surface elevation at each vault location. Locking J-plugs were placed at the top of each SVE well, allowing access for gauging and monitoring activities.
- The VMPs were completed above grade with a protective steel casing set into a concrete collar as shown on **Figure D-1**.

1.2 SVE Pilot Test System Infrastructure

A total of eight lines of piping were connected from the individual SVE wellheads to a manifold in the SVE system shed. Each SVE wellhead was connected to the manifold via piping, which was buried to a depth of approximately three feet bgs. Each line was labeled at the manifold with the name of the SVE point it services (SVE-1 through SVE-8). Air flow from each well passes through the manifold, followed by a knock-out drum prior to entering the blower, heat exchanger, and vapor treatment vessels, all located within the system shed. A sampling port and an air flow control ball valve were installed in the PVC piping at the SVE manifold. The SVE pilot system components are further detailed below and are shown on **Figure 11** of the FS Report.

- SVE system shed. A wood-frame building staged near the center of the pilot test area. **Figure 11** of the FS Report provides a schematic of the final installed pilot test equipment.
- SVE lines. Separate lines from each SVE well to the treatment shed consisting of 2-inch-diameter high-density polyethylene. The Standard Dimension Ratio 17 pipe used can handle a vacuum of up to 20 inches of mercury (in. Hg). SVE piping was initially installed aboveground. Following system operation through October 2015, ice accumulation caused by freezing of SVE condensate in the aboveground lines was observed during routine operation and maintenance activities. In an effort to reduce ice accumulation, the SVE lines were buried to a minimum of three feet bgs. Trenching and burying of the SVE lines was completed on November 9, 2015, and included covering the buried piping with insulating foam board prior to backfilling. This modification was performed per AECOM's email dated October 26, 2015 (AECOM 2015b) following verbal approval of MDEQ and Trihydro Corporation (Trihydro).
- Manifold for SVE wells. A manifold was installed to combine the eight separate SVE lines into one line prior to the vacuum blower. Manifold piping initially consisted of 1-inch-diameter PVC piping and included a manual ball valve, a solenoid, a vacuum gauge, and a rotameter on each SVE line. Initial system and induced vacuum readings during dry-run startup testing in September 2015 indicated manifold restrictions in the lines caused by 1-inch-diameter piping and additional instrumentation were negatively impacting SVE performance. The restrictions caused electrical fail-safes on the blower to trip. As a result, the 1-inch-diameter manifold and

instrumentation was replaced with 2-inch-diameter PVC manifold piping, hand-operated ball valves, and a single sample port in each SVE line to allow the measurement of flow and vacuum, and allow sample collection. This modification was performed per AECOM email dated October 1, 2015 (AECOM 2015c) following receipt of MDEQ affirmation on October 2, 2015, and with verbal approval of MDEQ and Trihydro.

- Particulate coalescing filter. A particulate coalescing filter (i.e., knockout drum) was installed to remove water that may condense in the recovered soil vapors.
- Blower. A Gast Manufacturing, Inc. R7100R-50 regenerative blower with piping, valves, and gauges. The initial blower was replaced in September 2015 following an electrical failure during system safety and electrical testing.
- Heat Exchanger. A heat exchanger (i.e., air cooled after cooler) was installed after the blower to cool the vapor stream prior to off-gas treatment.
- Potassium permanganate-impregnated zeolite vapor treatment vessels. The off-gas treatment utilized 2,000 pounds of Hydrosil HS 600 potassium permanganate-impregnated zeolite media. Initially, two partially filled Hydrosil treatment vessels were in use; however, based on the size of the treatment vessels and the required treatment media contact time for the effluent vapors, the treatment media was consolidated into a single treatment vessel December 1, 2015, at the recommendation of Hydrosil, the treatment media manufacturer. This modification was performed with verbal approval of MDEQ and Trihydro. The potassium permanganate-impregnated zeolite has a manufacturer-specified minimum operating temperature of 33 degrees Fahrenheit, necessitating the use of a heated, insulated auxiliary shed around the treatment vessel.
- Granular Activated Carbon (GAC). Although off-gas concentrations were less than the change-out requirements discussed in Section 1.3.2, the zeolite was replaced at MDEQ's request. The single vessel of potassium permanganate impregnated zeolite was replaced with two GAC vessels on November 8, 2016, following the completion of the pilot test. The second GAC vessel is housed in a separate insulated shed and is connected via piping to the first vessel. This current configuration is shown on **Figure 11** of the FS Report.

1.3 SVE Pilot Test Operation

This section details SVE system start-up and Operation, Maintenance, and Monitoring (OM&M) activities performed during the pilot test operation (October 2015 through September 2016) and data collected during pilot test and post-pilot test operation.

1.3.1 SVE System Start-up

Following system construction and dry-run tests completed on September 4, 8, and 9, 2015, the SVE pilot test system was fully started on September 29, 2015. Samples were collected at start-up as discussed in Section 2.2 and initial operational data was measured and recorded. The initial 1-inch manifold piping size and instrumentation (including solenoids, rotameters, and ball valves) resulted in restricted flow and, thus, resulted in a reduced induced SVE well vacuum. Data collected following start-up, with all SVE wells fully open, indicated a total system flow rate of 106 cubic feet per minute (cfm) at an applied vacuum of -9.0 in. Hg. Due to the restricted flow through the manifold, the vacuum applied to the system was insufficient to calculate a radius of influence (ROI) due to the low observed vacuum measured at surrounding monitoring points. Although the ROI could not be calculated due the low vacuum applied to the monitoring points, the readings signified that the ROI was less than the 50-foot design radius.

System performance optimization consisting of manifold reconfiguration (e.g., 2-inch manifold piping with ball valves and a single sample port in each SVE line) occurred on October 1, 2015. After system modifications were complete, the system was restarted on October 2, 2015. Increased system flow rates, induced wellhead vacuum, and ROI were all observed with total system flow increasing to

greater than 300 cfm (the maximum flow rate measured by the available hot-wire anemometer) at an applied vacuum of -1.5 in. Hg. **Figure 11** of the FS Report provides a schematic of the final SVE system.

1.3.2 SVE Operations and Maintenance

Following SVE system startup on October 2, 2015, the system was run nearly continuously from October 2015 through September 2016 as part of the monthly monitoring pilot test period and with full vacuum and flow from the eight SVE wells (i.e., each well is running 100 percent open). Although the pilot test was determined to be complete in September 2016, the SVE system operation continued and monitoring occurred quarterly through September in 2017.

During the scheduled OM&M visits, each SVE line was isolated and the total system vacuum applied to remove condensate, if present, from the SVE lines by drawing it into the knock-out drum. If condensate transfer was required, the system was temporarily shut down to transfer the condensate water into a separate 55-gallon knock-out drum and was then restarted to conduct the scheduled monitoring and sampling procedures. System readings, including SVE flow rates, and measurements of vacuum and temperature data, were recorded in accordance with the procedures established in the FS Pilot Test Work Plan (AECOM 2015a).

Step testing was performed during the March 2016 quarterly monitoring event to evaluate ROI at varying applied vacuums. Step testing is done to evaluate the optimum vacuum to achieve the greatest ROI for maximum mass removal. The step testing included measuring induced vacuum at selected monitoring points in the vicinity of SVE-6 and SVE-7 under varying total system applied vacuums. All eight SVE wells were operating at 100 percent open during the step testing. Step testing is further discussed in Section 3.0.

A pulsing test was performed with SVE wells SVE-4, SVE-5, SVE-6, and SVE-7 temporarily shut down on May 26, 2016, then turned back on July 8, 2016, to assess the potential for vapor concentration rebound and enhanced recovery. These four SVE wells were evaluated during the pulsing test as they consistently exhibited the lowest effluent vapor concentrations of PCE and trichloroethylene (TCE). The pilot test continued through September 2016. The system continued operating after the completion of the pilot test till September 2017.

Per the OM&M plan presented in the FS Pilot Test Work Plan (AECOM 2015a), treatment media change-out during the SVE pilot test was required when the Occupational Safety and Health Administration-established permissible exposure limit of 100 parts per million (ppm) for PCE and/or TCE is detected during exhaust discharge monitoring. The maximum concentrations from the treatment vessel exhaust during the pilot test period were on October 16, 2015 at 1.4 ppm for PCE (9,300 microgram per cubic meter [$\mu g/m^3$]), and 0.082 ppm (440 $\mu g/m^3$) for TCE; therefore, change-out of the treatment media was not required and was not conducted during the duration of the pilot test. Note that the media change-out criteria was modified for post-pilot test SVE operations and is outlined in the SVE System OM&M Plan submitted to MDEQ in May 2017 (AECOM 2017). The treatment media (carbon) has not required change-out during the post-pilot test operation through July 2017.

2.0 SVE System Data Collection and Analysis

SVE system performance monitoring was conducted according to the schedule outlined in the FS Pilot Test Work Plan (AECOM 2015a). **Table D-1** summarizes the performance sampling schedule during the pilot test. Additional performance monitoring, conducted after the pilot test period, was performed per the SVE System OM&M Plan (AECOM 2017), as discussed in the FS Report. The laboratory reports for soil vapor (VWP wells), SVE effluent vapor (individual SVE lines), vapor at various stages of treatment within the system (SVE-CEV, SVE-PHX, SVE-Mid, and SVE-EV), and groundwater analyses are included in **Attachment 1**. The associated data validation reports are included in **Attachment 2**.

The following bullets summarize the procedures for collecting and methodology for vaporand groundwater samples collected for laboratory analysis.

- Soil vapor, SVE effluent, and treatment system vapor samples
  - Vapor samples were collected following procedures consistent with MDEQ's Montana Vapor Intrusion Guide (MDEQ 2011) using Summa® canisters.
    - Soil vapor samples were collected by attaching Teflon™-lined polyethylene tubing to the sample port at the top of the VMP. A piston pump was used to purge three volumes of air from the tubing. Once the three volumes were removed, the Summa® canisters were connected in place of the piston pump and the samples were collected.
    - SVE effluent vapor samples were collected at the manifold by attaching Teflon™-lined polyethylene tubing to the sample port for each individual SVE line while the system was operating; SVE vapor sample locations are illustrated on **Figure 11** of the FS Report.
    - Treatment system samples were collected in the same manner as the effluent samples. These samples were taken at various points throughout the system to assess the efficacy of the system. A combined effluent sample (CEV) taken at the confluence of the manifold as a representation of pre-treatment levels, a post heat exchanger (PHX) sample was taken directly after the heat exchanger before entering the treatment vessels to assess the effects of the heat exchanger on constituent concentrations. a mid-treatment sample (Mid) was taken between the two treatment vessels while two were in use (this sample was no longer taken once the system was switched to a single treatment vessel), and an exhaust vapor (EV) sample was taken as a representation of post treatment levels being vented out of the system.
  - Summa® canisters were analyzed at ALS Environmental Laboratory in Simi Valley, California, for volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method TO-15 and for fixed gases (oxygen, carbon dioxide, methane, hydrogen, and nitrogen) by American Society of Testing Materials (ASTM) Method D1946.
  - Per the MDEQ approved FS Pilot Test Work Plan, only the constituents of potential concern identified for vapor intrusion at Mission Wye (for indoor air of hypothetical future buildings) in the 2014 *Human Health Risk Assessment Amendment* (HHRA Amendment) (AECOM 2014b) were reported by the laboratory. These constituents included PCE, TCE, trans-1,2- dichloroethylene, and 1,2,4-trimethylbenzene.
  - Vapor samples collected from the exhaust of the treatment vessels were analyzed only for VOCs by USEPA Method TO-15.
- Groundwater

- Groundwater samples were collected using procedures outlined in the approved 2007 Groundwater Sampling and Analyses Plan (Remediation Technologies, Inc. [RETEC] 2007).
- Groundwater samples were analyzed at Pace Analytical Laboratory in Minneapolis, Minnesota, for VOCs by USEPA Method 8260.

2.1 Baseline Monitoring

Baseline and start-up groundwater, soil vapor, and SVE effluent vapor sampling was conducted to evaluate initial conditions, allowing the effects of the SVE system to be properly assessed.

- The July 2015 annual groundwater monitoring event, conducted on July 23, 2015, served as the baseline groundwater monitoring event for the FS Pilot Test. In particular, VOCs concentrations measured by USEPA Method 8260 from monitoring wells MW-1 (background), MW-3, MW-4, MW-9, and MW-22 were included in the pilot test evaluation. Analytical results for the July 2015 annual groundwater monitoring event were presented and discussed in detail in the 2015 Annual Groundwater Monitoring Report (AECOM 2016a). PCE and TCE results from this event are included in **Table 4** of the FS Report.
- Prior to SVE system start-up, baseline soil vapor samples were collected on August 25-26, 2015, from each of the nested points at VMP-1 and VMP-2 and from VMP-3 through VMP-5, and were analyzed for VOCs by USEPA Method TO-15 and for fixed gases by ASTM Method D1946. The purge volume consisted of three times the volume of the tubing or PVC casing, plus three volumes of the annulus space around the sample point. Purging was accomplished using a portable electric pump. Vapor samples for laboratory analysis were collected using a Summa® canister in accordance with MDEQ guidance (MDEQ 2011). A summary of the analytical results are shown in **Table D-2**.
- A “blank” sample (SVE-EB/09092015) was collected on September 9, 2015, after a “dry run” of the SVE system following manifold construction, to evaluate the chemical composition of the primer, solvent, and glue utilized in assembling the SVE manifold. This “dry run” was accomplished by opening the J-plug at each SVE wellhead to allow the intake of atmospheric air while minimizing extraction from the SVE wells. A summary of the analytical results are shown in **Table D-2**.

2.2 Start-up Monitoring

SVE effluent vapor samples were collected during system start-up on September 29, 2015, from SVE wells (SVE-1 through SVE-8). Two treatment system samples also were taken, the CEV sample was taken at the system manifold and the EV sample was taken after the final potassium permanganate-impregnated zeolite vessel. Samples were collected according to the criteria described in the FS Pilot Test Work Plan (AECOM 2015a) using a Summa® canister in accordance with MDEQ guidance (MDEQ 2011). The Summa® canisters were submitted for laboratory analysis for VOCs by USEPA Method TO-15 and fixed gasses by ASTM Method D1946.

In addition to laboratory sample collection, vapors were field screened for VOC concentrations utilizing a photoionization detector (PID) and PCE-specific sorbent tubes. The PID utilized for field measurements was fitted with an 11.7 electron volt lamp, which is most suitable for detecting chemical compounds with higher ionization energies, such as PCE and TCE. The applied vacuum, measured vacuum, and flow rate also were measured during system start-up activities (**Table D-3**).

2.3 SVE Pilot Test Performance Monitoring

Performance monitoring was conducted throughout the SVE pilot test period to evaluate system operation. The following sections discuss SVE effluent and groundwater monitoring data collected to evaluate system performance.

2.3.1 SVE Effluent

Performance monitoring was conducted twice-monthly for the first two months of pilot test operation and then monthly through August 2016. **Table D-2** provides a summary of the vapor monitoring analytical results during pilot test operation. System readings, including applied vacuum, measured vacuum, and flow rate were recorded during routine OM&M visits in accordance with the procedures established in the FS Pilot Test Work Plan (**Table D-3**).

A digital humidity meter was used during OM&M visits starting on December 2, 2015 to ensure that vapors contained sufficient moisture to hydrate the treatment media. According to manufacturer recommendations, optimal potassium permanganate-impregnated zeolite functionality requires a minimum of 30 percent relative humidity in the vapor stream. Relative humidity measurements measured during the pilot test period are summarized with other SVE system operational data in **Table D-3**.

Performance monitoring included collection of individual SVE line effluent samples as well as CEV, and EV samples for laboratory analysis and field measurements using PID and PCE-specific sorbent tubes. Vapor samples also were were collected from a sampling port located between the treatment vessels in October and November 2016, when two treatment vessels were still in use. A summary of the analytical results are shown in **Table D-2**.

Monthly monitoring events included collection of CEV vapor samples for TO-15 laboratory analysis. PID and PCE-specific sorbent tubes were used to collect field measurements from individual SVE lines, as well as the CEV and EV ports during the monthly event. Vapor samples also were collected for TO-15 laboratory analysis from a sampling port located after the heat exchanger (designated SVE-PHX) in February and April 2016 to assess any effects that the knock-out drum, blower, and heat exchanger may have on constituent of concern (COC) concentrations. The quarterly monitoring events conducted in December 2015, March 2016, and June 2016 also included TO-15 laboratory analysis from vapor samples collected from individual SVE line effluent as well as the CEV and EV sample ports. A summary of the analytical results are shown in **Table D-2**.

2.3.2 Groundwater

Groundwater samples were collected, in addition to vapor samples, to evaluate the effect SVE system operation had on dissolved PCE and TCE concentrations in groundwater. Collected groundwater samples were analyzed for VOCs by USEPA Method 8260 and the purge water from each well was monitored for field parameters (dissolved oxygen, oxidation-reduction potential, conductivity, pH, and temperature). A summary of the groundwater events is provided in the following bullets.

- Groundwater monitoring was conducted on December 1 and 2, 2015, after approximately two months of operation to represent the groundwater conditions following the first quarter of system operation. Monitoring wells MW-1 (background) and MW-22 could not be sampled in December 2015 due to an insufficient water depth (less than one foot) for purging and sampling with a bladder pump. Groundwater analytical results for PCE and TCE are summarized in **Table 4** of the FS Report.
- Groundwater monitoring was conducted on March 15, 2016, to represent the groundwater conditions following two quarters of system operation. Monitoring wells MW-1 (background) and MW-22 could not be sampled in March 2016 due to an insufficient water depth (less than one foot) for purging and sampling with a bladder pump. Groundwater analytical results for PCE and TCE are summarized in **Table 4** of the FS Report.
- Groundwater monitoring was conducted on June 30, 2016, to represent groundwater conditions following three quarters of system operation. Groundwater analytical results for PCE and TCE are summarized in **Table 4** of the FS Report.
- Site-wide groundwater monitoring was conducted on July 6, 2016 as part of the annual groundwater monitoring event (AECOM 2016b). Groundwater samples used in SVE

performance monitoring evaluation were collected from monitoring wells MW-1, MW-3, MW-4, MW-9 and MW-22. Groundwater analytical results for PCE and TCE are summarized in **Table 4** of the FS Report.

2.4 SVE Pilot Test Results

2.4.1 Soil Vapor Analytical Results

Baseline soil vapor samples collected in August 2015 from VMPs indicate that PCE and TCE varied in concentration throughout the pilot test study area, with PCE concentrations ranging from 650 µg/m^3 in the sample from VMP-5 to 12,000 µg/m^3 in the sample from VMP-1D. Similarly, TCE concentrations ranged from 64 µg/m^3 in the sample from VMP-5 to 3,800 µg/m^3 in the sample from VMP-1D. As shown in **Table D-2**, baseline concentrations of both PCE and TCE were highest in the vicinities of the VMP-1 and VMP-2 nests, with concentrations of both analytes greatest in the deeper VMP completed in each nested pair.

A summary of SVE effluent samples collected during the pilot test period from startup in September 2015 through July 2016 are presented in **Table D-2**. As shown on **Figure D-2**, the combined effluent vapor samples indicate that both PCE and TCE concentrations during SVE pilot test operation initially exhibited an increase, followed by an overall decline in concentrations. While fluctuations in concentrations for both PCE and TCE were observed, the overall trend is a decline for both compounds. Measured fixed atmospheric gas concentrations were generally comparable across baseline and performance monitoring events (**Table D-2**), and are not discussed further.

SVE effluent performance monitoring laboratory analytical results from individual SVE lines are summarized in **Table D-2**. A comparison of laboratory results to field measurements made with a PID and PCE-specific sorbent tubes are summarized in **Table D-4.**

2.4.2 Groundwater Analytical Results

Groundwater analytical results from samples collected during the SVE pilot test are summarized in **Table 4** of the FS Report. Historically, groundwater concentrations have been highest in samples collected during high water elevations generally observed each year in July (AECOM 2016b). **Figure 13** of the FS Report shows the groundwater elevation hydrograph for monitoring well MW-3, which is within the SVE treatment area and has been selected as being representative of the overall groundwater elevation fluctuations at Mission Wye over time. Groundwater performance monitoring results are summarized below.

- PCE and TCE concentrations were lower in the groundwater samples collected during the monitoring event performed on December 2, 2015 than in samples collected during the baseline monitoring event performed on July 23, 2015. None of the groundwater samples collected during the December 2015 performance monitoring event exhibited PCE or TCE at concentrations exceeding their respective water quality standards (MDEQ 2017, 2016).
- PCE and TCE concentrations were lower in samples collected during the March 15, 2016 monitoring event than in samples collected during the baseline monitoring event on July 23, 2015 and the quarterly monitoring event on December 2, 2015. For example, PCE concentrations in monitoring well MW-3, which exhibited the highest concentration during the July 2015 baseline monitoring event, decreased from 67.4 µg/L in July 2015 to non-detect (<0.19 micrograms per liter [µg/L]) in December 2015 and March 2016. As with the December 2015 monitoring event, neither PCE nor TCE were detected at concentrations exceeding their respective water quality standards (MDEQ 2017, 2016) during the March 2016 monitoring event.
- Groundwater samples collected from all monitoring wells during the June 30, 2016 monitoring event were below the DEQ-7 Standard of 5 µg/L for TCE. Only one groundwater sample collected during this event (from monitoring well MW-3) exhibited PCE at a concentration that

exceeded the DEQ-7 Standard of 5 µg/L (MDEQ 2017, 2016), with a reported concentration of 5.2 µg/L and 5.5 µg/L (duplicate sample) at MW-3.

- Results for groundwater samples collected during the July 2016 annual high-water monitoring event were below the DEQ-7 Standards (MDEQ 2016, 2017) for PCE and TCE with one exception: the sample collected from monitoring well MW-3 exceeded the DEQ-7 Standard of 5 µg/L for PCE with a reported concentration of 6.4 µg/L (AECOM 2016b).

2.5 SVE Post-Pilot Test Monitoring Results

SVE system operation continued with MDEQ approval following the pilot test period and continued performance monitoring was conducted per the SVE System OM&M Plan (AECOM 2017). SVE vapor monitoring was conducted on a quarterly basis and groundwater sampling continued on an annual basis, as discussed in the following subsections.

2.5.1 Soil Vapor Analytical Results

A summary of SVE effluent samples collected during the post-pilot test period are presented in **Table D-5**. As mentioned in Section 1.2, the single vessel of potassium permanganate impregnated zeolite was replaced with two GAC vessels on November 8, 2016. Baseline soil vapor samples were collected on November 10, 2016 to evaluate performance of the GAC units. Soil vapor sampling was conducted quarterly during the post-pilot test period (January 2017, March 2017, and June 2017). Effluent concentrations from the last GAC unit in the series (SVE-EV) indicate GAC is an effective treatment media for the extracted soil vapors. As shown on **Figure D-2**, the combined effluent vapor samples indicate that both PCE and TCE concentrations continued to show a decline during post-pilot test operation.

2.5.2 Groundwater Analytical Results

Groundwater analytical results from samples collected after the pilot test are included in **Table 4** of the FS Report. Groundwater samples were collected in relation to continued SVE system operation on June 19, 2017. Additionally, the routine site-wide annual groundwater monitoring event was conducted in July 2017. PCE and TCE concentrations continued to decline in the post-pilot test period and were measured at concentrations below the DEQ-7 Standard of 5 µg/L during both monitoring events.

3.0 SVE System Performance Evaluation

Conclusions from the SVE pilot test, including how the collected data addressed the pilot test objective, are presented in Section 5.4 of the FS Report. This section focuses on the ROI evaluation and mass removal of PCE and TCE through the system.

Data was collected to calculate the ROI during the October 2015, August 2016, March 2017, and June 2017 monitoring events. At Mission Wye, monitoring wells, VMPs, and other SVE wells were used to collect vacuum measurements. During the data collection events, induced vacuum measurements for individual SVE wells were made after ensuring that no residual vacuum was influencing the monitoring points. This was done by confirming that the applied vacuum at the SVE system was 0.00 in. Hg prior to proceeding with additional induced vacuum measurements.

SVE wells with only monitoring well vacuum measurements below 0.1 inches of H_2O were removed from ROI evaluation. However, well vacuum measurements which were exactly at 0.10 inches of H_2O were retained as the limit of ROI. This change only affected wells SVE-8 and SVE Systemin October 2015, none of the SVE wells in August 2016, none of the SVE wells in March 2017, and none of the SVE wells in June 2017. None of the ROI measurements for well SVE-8 and SVE Systemin October 2015 were above 0.1 inches of H_2O, so it is not possible to determine the ROI for those at that time. Those two tests were removed from the ROI evaluation. However, those wells had adequate vacuum ROI measurements at or above 0.1 inch of H_2O in August 2016, and March and June 2017. Overall, the average ROI for all SVE wells is above the design ROI of 50 feet so there is adequate SVE coverage of the site.

Overall, the measured ROI during the SVE Pilot Test exceeded the 50-foot design basis in the FS Pilot Test Work Plan for spacing of the SVE wells. The induced vacuum over distance from each of the SVE wells is graphically displayed in the semi-log graphs with an exponential line of best fit (Bass 1993) on **Figure D-3** (October 2015), **Figure D-4** (August 2016), **Figure D-5** (March 2017), and **Figure D-6** (June 2017). The ROI measured at individual wells is shown on the site layout on **Figures D-7** through **D-10**.

Suthersan (1999) stipulated that the cut-off detected measurable vacuum level to define the ROI for a monitoring well is equal to -0.1 inch of water observed vacuum. This cut-off was used to calculate the ROI presented on **Figures D-3** through **D-10**. SVE-1 and SVE-2 wells were located in areas with fewer ROI monitoring points. Individual ROIs could not be calculated for these two extraction wells using field measurements because the distance between the SVE well that is being measured (e.g., SVE-1) to the closest monitoring points resulted in vacuum measurements less than the cut-off level. ROIs for SVE-1 and SVE-2 for each monitoring event were inferred based on the average of the calculated ROIs for the other wellheads. .

Vacuum also was measured at select SVE wells and VMPs during the March 2016 quarterly performance monitoring event to evaluate ROI at varying applied vacuums in accordance with the FS Pilot Test Work Plan (AECOM 2015a). In general, greater induced vacuum measurements correlated with greater applied vacuum; therefore, the system was operated with full vacuum applied. Data from this step testing is presented in **Table D-6**.

Based on system flow rates and the combined influent versus effluent concentrations for PCE and TCE, 25.93 pounds of PCE and 3.53 pounds of TCE were removed through August 2016 during the SVE pilot test operation. The total PCE and TCE amounts removed through SVE operation through July 2017 was approximately 30.48 pounds of PCE and 3.94 pounds of TCE. These numbers are conservative removal estimates, and actual mass removed may be greater. **Table D-7** shows the formula utilized in deriving these estimated minimum volumes removed.

4.0 References

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Attachments

Attachment 1 Laboratory Analytical Reports
Attachment 2 Data Validation Reports
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Tables

Table D-1 SVE Pilot Test Performance Sampling Schedule
BNSF Mission Wye, Livingston, Montana

	Baseline (See Below)	SVE Start-Up 9/29/15	Performance Monitoring									
			10/16/15	10/30/15	11/13/15	12/02/15	03/15/16	04/26/16	06/30/16	07/07/16	07/22/16	07/27/16
Groundwater Monitoring	X (7/23/15)					X	X		X	X		
Soil Vapor (Vapor Monitoring Points)	X (8/25-26/15)											
Individual SVE Wells (SVE-1 - SVE-8)												
PID Readings		X	X	X	X							
Sorbent Tube Samples		X	X	X	X							
Laboratory Samples		X				X	X					
SVE Combined Effluent (Pre-Treatment; CEV)												
PID Readings			X	X	X	X	X	X	X	X	X	X
Sorbent Tube Samples			X	X	X							
Laboratory Samples			X	X	X	X	X	X	X	X		X
Effluent From Each Treatment Vessel (Pre-Treament, Mid-Treatment)												
PID Readings			X	X	X						X	X
Sorbent Tube Samples			X	X	X							
Effluent From Last Treatment Vessel (SVE-EV)												
Laboratory Samples		X				X	X	X	X	X		

Notes:

During the period of pilot test operation, a single treatment vessel was in use from December 1, 2016 through the end of the pilot test.
PID = Photoionization Detector

Shaded rows are quarterly sampling events.

SVE = Soil Vapor Extraction, 1-8 designates SVE well discharge line sample was collected from.

SVE-CEV = SVE Combined effluent vapor.

SVE-EV = SVE Exhaust Vapor

Table D-2 SVE Pilot Test Vapor Monitoring Analytical Results
BNSF Mission Wye, Livingston, Montana

	Baseline Soil Vapor Sampling								Piping Baseline
Sample Location:	**VMP-1S**	**VMP-1D**	**VMP-2S**	**VMP-2D**	**Duplicate**	**VMP-3**	**VMP-4**	**VMP-5**	**SVE-EB(1)**
Sample Date:	**8/25/2015**	**8/25/2015**	**8/25/2015**	**8/25/2015**	**8/25/2015**	**8/26/2015**	**8/26/2015**	**8/26/2015**	**9/9/2015**
USEPA Method TO-15 (µg/m³)									
1,2,4-Trimethylbenzene	< 9.6	< 17	< 0.96	< 2.5	< 2.5	< 1.3	< 1.3	< 0.49	< 2.8
Tetrachloroethene	**8,900**	**12,000**	**1,400**	**3,500**	**3,500**	**1,700**	**1,900**	**650**	**1,700**
trans-1,2-Dichloroethene	**22 J**	**49 J**	< 1.2	**3.6 J**	**3.6 J**	**1.6 J**	< 1.7	< 0.62	**5.4 J**
Trichloroethene	**2,400**	**3,800**	**120**	**340**	**320**	**150**	**170**	**64**	**270**
ASTM D1946 (ppmv)									
Carbon Dioxide	**7,400**	**9,820**	**7,530**	**9,370**	**9,390**	**9,310**	**11,000**	**11,700**	NA
Methane	< 1,900	< 2,000	<1,900	< 2,000	< 1,900	< 2,000	<2,100	<1,900	NA
Nitrogen	**777,000**	**778,000**	**776,000**	**776,000**	**776,000**	**774,000**	**775,000**	**775,000**	NA
Oxygen + Argon(2)	**216,000**	**212,000**	**217,000**	**215,000**	**214,000**	**216,000**	**214,000**	**214,000**	NA

	SVE Startup Sampling									
Sample Location:	**SVE-1**	**SVE-2**	**SVE-3**	**SVE-4**	**SVE-5**	**SVE-6**	**SVE-7**	**SVE-7**	**SVE-8**	**SVE-EV**
Sample Date:	**9/29/2015**	**9/29/2015**	**9/29/2015**	**9/29/2015**	**9/29/2015**	**9/29/2015**	**9/29/2015**	**9/29/2015**	**9/29/2015**	**9/29/2015**
USEPA Method TO-15 (µg/m³)										
1,2,4-Trimethylbenzene	< 2.7	< 7.2	< 8.3	**1.1 J**	< 4.2	< 3.7	< 6.8	< 6.7	< 34	**10 J**
Tetrachloroethene	**1,700**	**3,900**	**4,700**	**650**	**2,500**	**2,300**	**870**	**950**	**19,000**	**5,300**
trans-1,2-Dichloroethene	< 3.4	< 9.1	**20 J**	< 1.3	< 5.3	< 4.7	< 8.6	< 8.5	< 43	< 12
Trichloroethene	**110**	**660**	**1,000**	**230**	**200**	**170**	**69**	**73**	**1,300**	**29 J**
ASTM D1946 (ppmv)										
Carbon Dioxide	< 1,800	< 1,700	< 2,200	**4,180**	**6,250**	**7,840**	< 1,600	< 1,800	**16,100**	**10,200**
Methane	< 1,800	< 1,700	< 2,200	< 1,700	< 1,700	< 1,700	< 1,600	< 1,800	< 1,700	< 1,800
Nitrogen	**778,000**	**778,000**	**779,000**	**778,000**	**776,000**	**776,000**	**777,000**	**777,000**	**782,000**	**780,000**
Oxygen + Argon(2)	**221,000**	**221,000**	**220,000**	**218,000**	**217,000**	**217,000**	**221,000**	**221,000**	**202,000**	**209,000**

	Bi-Weekly Combined SVE Effluent Performance Monitoring Sampling - October, November, and December 2015							Additional Treatment Evaluation Sampling		
Sample Location:	**SVE-CEV**	**SVE-CEV**	**SVE-CEV**	**SVE-CEV**	**SVE-CEV**	**SVE-CEV**	**SVE-CEV**	**Pre-**	**Mid-**	**SVE-EV**
Sample Date:	**10/16/2015**	**10/16/2015**	**10/30/2015**	**10/30/2015**	**11/13/2015**	**11/13/2015**	**12/2/2015**	**10/16/2015**	**10/16/2015**	**10/16/2015**
USEPA Method TO-15 (µg/m³)										
1,2,4-Trimethylbenzene	< 8.4	< 8.8	< 14	< 16	< 15	< 15	< 4.6	< 21	< 17	< 14
Tetrachloroethene	**2,600**	**2,700**	**8,700**	**8,700**	**8,000**	**9,500**	**2,600**	**7,600**	**8,300**	**9,300**
trans-1,2-Dichloroethene	< 11	< 11	< 18	< 20	< 19	< 19	< 5.8	< 27	< 22	< 18
Trichloroethene	**490**	**480**	**1,200**	**1,200**	**1,100**	**1,200**	**410**	**1,300**	**630**	**440**
ASTM D1946 (ppmv)										
Hydrogen	< 2,000	< 2,100	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Dioxide	**1,490 J**	< 2,100	**2,730**	**2,730**	**2,430**	**2,500**	**1,940**	NA	NA	NA
Methane	< 2,000	< 2,100	< 1,900	< 1,900	< 2,100	< 2,500	< 1,700	NA	NA	NA
Nitrogen	**778,000**	**777,000**	**777,000**	**777,000**	**777,000**	**777,000**	**778,000**	NA	NA	NA
Oxygen + Argon(2)	**221,000**	**221,000**	**220,000**	**220,000**	**220,000**	**221,000**	**220,000**	NA	NA	NA

	1st Quarterly SVE Performance Monitoring Sampling - Individual SVE Lines and Treatment System Effluent									
Sample Location:	**SVE-1**	**SVE-2**	**SVE-3**	**SVE-4**	**SVE-5**	**SVE-6**	**SVE-7**	**SVE-8**	**SVE-8 Duplicate**	**SVE-EV**
Sample Date:	**12/2/2015**	**12/2/2015**	**12/2/2015**	**12/2/2015**	**12/2/2015**	**12/2/2015**	**12/2/2015**	**12/2/2015**	**12/2/2015**	**12/2/2015**
USEPA Method TO-15 (µg/m³)										
1,2,4-Trimethylbenzene	< 1.7	< 30	< 27	< 0.64	< 0.78	< 0.23	< 4.6	< 5.5	< 4.7	< 5.2
Tetrachloroethene	**970**	**14,000**	**10,000**	**270**	**430**	**34**	**2,500**	**3,000**	**2,700**	**3,100**
trans-1,2-Dichloroethene	< 2.2	< 38	**36 J**	**2.4**	**3.3**	< 0.29	**7.3 J**	< 6.9	< 5.9	< 6.5
Trichloroethene	**64**	**2,300**	**2,100**	**84**	**85**	**7.9**	**480**	**170**	**160**	**270**
ASTM D1946 (ppmv)										
Carbon Dioxide	< 1,700	**2,280**	**4,060**	**1,910**	< 2,600	**2,000**	**1,750**	**2,620**	< 2,700	NA
Methane	< 1,700	< 2,000	< 3,600	< 1,700	< 2,600	< 1,500	< 1,500	< 1,800	< 2,700	NA
Nitrogen	**777,000**	**778,000**	**778,000**	**777,000**	**777,000**	**777,000**	**778,000**	**777,000**	**777,000**	NA
Oxygen + Argon(2)	**222,000**	**220,000**	**218,000**	**221,000**	**221,000**	**221,000**	**221,000**	**220,000**	**220,000**	NA

	Monthly Combined SVE Effluent Performance Monitoring Sampling - January, February, and March 2016						
Sample Location:	**SVE-CEV**	**SVE-CEV**	**SVE-CEV**	**SVE-CEV**	**SVE-PHX**	**SVE-CEV**	**SVE-CEV**
Sample Date:	**1/11/2016**	**1/11/2016**	**2/12/2016**	**2/12/2016**	**2/12/2016**	**3/15/2016**	**3/15/2016**
USEPA Method TO-15 (µg/m³)							
1,2,4-Trimethylbenzene	< 4.2	< 4.7	< 0.76	< 1.3	< 2.5	< 5.3	< 5.0
Tetrachloroethene	**4,200 D**	**4,300 D**	**710 D**	**760 D**	**1,200 D**	**2,900**	**3,100 D**
trans-1,2-Dichloroethene	< 5.3	< 5.9	**2.7**	**2.7**	**3.6**	< 6.7	< 6.4
Trichloroethene	**490**	**500**	**160**	**180**	**240**	**290 J**	**390 J**
ASTM D1946 (ppmv)							
Carbon Dioxide	**1,810**	< 1,800	< 1,400	< 1,400	**1,680**	< 2,000	< 1,900
Methane	< 1,600	< 1,800	< 1,400	< 1,400	< 1,400	< 2,000	< 1,900
Nitrogen	**777,000**	**777,000**	**778,000**	**778,000**	**778,000**	**778,000**	**778,000**
Oxygen + Argon(2)	**221,000**	**221,000**	**220,000**	**220,000**	**220,000**	**221,000**	**221,000**

	2nd Quarterly SVE Performance Monitoring Sampling - Individual SVE Lines and Treatment System Effluent								
Sample Location:	**SVE-1**	**SVE-2**	**SVE-3**	**SVE-4**	**SVE-5**	**SVE-6**	**SVE-7**	**SVE-8**	**SVE-EV**
Sample Date:	**3/15/2016**	**3/15/2016**	**3/15/2016**	**3/15/2016**	**3/15/2016**	**3/15/2016**	**3/15/2016**	**3/15/2016**	**3/15/2016**
USEPA Method TO-15 (µg/m³)									
1,2,4-Trimethylbenzene	< 1.3	< 27	< 7.7	< 0.28	< 0.28	< 0.31	< 0.28	< 3.1	< 2.3
Tetrachloroethene	**890 D**	**16,000**	**4,800**	**180**	**160**	**59**	**39**	**2,300 D**	**1,300**
trans-1,2-Dichloroethene	< 1.6	< 34	**11 J**	< 0.36	< 0.36	< 0.39	< 0.36	< 4.0	< 2.9
Trichloroethene	**42**	**1,500**	**770**	**24**	**15**	**6.5**	**6.3**	**88**	**16**
ASTM D1946 (ppmv)									
Carbon Dioxide	< 1,900	< 1,800	**2,180**	< 1,900	< 1,900	< 2,000	< 1,900	**2,280**	**1,630**
Methane	< 1,900	< 1,800	< 1,800	< 1,900	< 1,900	< 2,000	< 1,900	< 1,900	< 1,500
Nitrogen	**778,000**	**778,000**	**778,000**	**778,000**	**777,000**	**777,000**	**778,000**	**778,000**	**778,000**
Oxygen + Argon(2)	**221,000**	**220,000**	**220,000**	**221,000**	**221,000**	**221,000**	**221,000**	**220,000**	**220,000**

	Monthly Combined SVE Effluent Performance Monitoring Sampling - April, May, June, and July 2016								
Sample Location:	**SVE-CEV**	**SVE-CEV**	**SVE-PHX**	**SVE-CEV**	**SVE-CEV**	**SVE-CEV**	**SVE-CEV**	**SVE-CEV**	**SVE-CEV**
Sample Date:	**4/26/2016**	**4/26/2016**	**4/26/2016**	**5/26/2016**	**5/26/2016**	**6/30/2016**	**6/30/2016**	**7/27/2016**	**7/27/2016**
USEPA Method TO-15 (µg/m³)									
1,2,4-Trimethylbenzene	< 1.6	<1.3	< 2.2	< 4.4	<4.2	< 2.3	< 2.3	< 0.81	< 1.1
Tetrachloroethene	**1,900 D**	**2,100 D**	**2,700 D**	**2,800 D**	**2,800 D**	**1,100**	**1,100**	**1,800 D**	**1,000 D**
trans-1,2-Dichloroethene	< 2.2	< 1.6	< 2.8	< 5.5	< 5.3	< 2.9	< 2.9	1.1	< 1.4
Trichloroethene	210	220	280	320	310	**160**	**160**	290	190
ASTM D1946 (ppmv)									
Carbon Dioxide	< 1,600	**1,710**	**2,390**	**2,460**	**2,360**	< 1,500	< 1,500	< 1,900	< 1,500
Methane	< 1,600	< 1,400	< 1500	< 1,700	< 1,600	< 1,500	< 1,500	< 1,900	< 1,500
Nitrogen	**778,000**	**778,000**	**778,000**	**778,000**	**778,000**	**778,000**	**778,000**	**778,000**	**778,000**
Oxygen + Argon(2)	**220,000**	**220,000**	**219,000**	**219,000**	**219,000**	**221,000**	**221,000**	**220,000**	**220,000**

	3rd Quarterly SVE Performance Monitoring Sampling - Individual SVE Lines and Treatment System Effluent								
Sample Location:	**SVE-1**	**SVE-2**	**SVE-3**	**SVE-4**	**SVE-5**	**SVE-6**	**SVE-7**	**SVE-8**	**SVE-EV**
Sample Date:	**6/30/2016**	**6/30/2016**	**6/30/2016**	**6/30/2016**	**6/30/2016**	**6/30/2016**	**6/30/2016**	**6/30/2016**	**6/30/2016**
USEPA Method TO-15 (µg/m³)									
1,2,4-Trimethylbenzene	< 0.81	< 21	< 6.4	< 0.25	< 0.29	< 0.30	< 0.28	< 0.93	< 8.0
Tetrachloroethene	**570**	**9,700**	**4,000**	**51**	**88**	**81**	**140**	**580**	**4,100**
trans-1,2-Dichloroethene	< 1.0	< 27	< 8.1	< 0.31	< 0.36	< 0.38	< 0.35	< 1.2	< 10
Trichloroethene	**67**	**970**	**970**	**30**	**13**	**9.0**	**31**	**57**	**340**
ASTM D1946 (ppmv)									
Carbon Dioxide	< 1,900	< 1,900	< 1,700	**3,660**	**4,970**	**6,620**	**3,810**	**2,060**	< 1,600
Methane	< 1,900	< 1,900	< 1,700	< 1,700	< 1,900	< 2,000	< 1,800	< 1,700	< 1,600
Nitrogen	**778,000**	**778,000**	**778,000**	**778,000**	**778,000**	**779,000**	**778,000**	**778,000**	**778,000**
Oxygen + Argon(2)	**221,000**	**221,000**	**220,000**	**218,000**	**217,000**	**214,000**	**218,000**	**220,000**	**220,000**

Notes:

SVE = Soil Vapor Extraction, 1-8 designates SVE well discharge line sample was collected from.
SVE-CEV = SVE Combined effluent vapor.
SVE-EV = SVE Exhaust Vapor
SVE-PHX = SVE Vapor - Post-Heat Exchanger
VMP = Vapor Monitoring Point, 1 = Sample Number, S = Shallow, D = Deep.
(1) = Equipment Blank (EB) sample was collected from combined SVE flow after startup but before individual SVE lines were open. Not a traditional equipment blank sample, instead intended to evaluate VOC impacts from glues used to assemble equipment.
(2) = Oxygen result may be due to argon coelution. Ambient air contains 0.93% argon.

µg/m³ = micrograms per cubic meter.
ppmv = parts per million by volume.
< = analyte not detected above the method detection limit (MDL).
J = Estimated value.
NA = Not analyzed.
D = The reported result is from a dilution.
Bolded values indicate detected results.

Table D-3 Soil Pilot Test Vapor Extraction System Operational Data
BNSF Mission Wye, Livingston, Montana

Date	Monitoring Point	Applied Vacuum (in. Hg)	Measured Vacuum (in. H_2O)	Flow Rate (cfm)	Exhaust Humidity (%)
9/30/2015	Individual SVE Wells	-9.0	NM	NM	NM
	Combined		-122	106	
	Exhaust		--	NM	
10/2/2015	Individual SVE Wells	-1.5	NM	NM	NM
	Combined		-20	> 300	
	Exhaust		--	NM	
10/16/2015	SVE-1	-4.0	-23	52	NM
	SVE-2		-21	48	
	SVE-3		-28	63	
	SVE-4		-32	67	
	SVE-5		-38	80	
	SVE-6		-20	63	
	SVE-7		-28	61	
	SVE-8		-46	96	
	Combined		NM	> 300	
	Exhaust		--	> 300	
10/30/2015	SVE-1	-1.5	NM	27	NM
	SVE-2		NM	24	
	SVE-3		NM	26	
	SVE-4		NM	34	
	SVE-5		NM	42	
	SVE-6		NM	33	
	SVE-7		NM	22	
	SVE-8		NM	46	
	Combined		NM	> 300	
	Exhaust		--	> 300	
11/13/2015	SVE-1	-1.5	NM	26	NM
	SVE-2		NM	25	
	SVE-3		NM	32	
	SVE-4		NM	28	
	SVE-5		NM	40	
	SVE-6		NM	30	
	SVE-7		NM	28	
	SVE-8		NM	48	
	Combined		NM	> 300	
	Exhaust		--	> 300	
11/17/2015	SVE-1	-1.5	NM	22	NM
	SVE-2		NM	30	
	SVE-3		NM	37	
	SVE-4		NM	40	
	SVE-5		NM	48	
	SVE-6		NM	46	
	SVE-7		NM	27	
	SVE-8		NM	49	
	Combined		NM	> 300	
	Exhaust		--	160	
12/2/2015	SVE-1	-1.5	-10	36	95.4
	SVE-2		-10	20	
	SVE-3		-10	56	
	SVE-4		-10	44	
	SVE-5		-10	90	
	SVE-6		-10	40	
	SVE-7		-10	31	
	SVE-8		-10	107	
	Combined		-15	> 300	
	Exhaust		--	> 300	
1/11/2016	SVE-1	-1.5	NM	30	50
	SVE-2		NM	24	
	SVE-3		NM	35	
	SVE-4		NM	36	
	SVE-5		NM	42	
	SVE-6		NM	34	
	SVE-7		NM	28	
	SVE-8		NM	47	
	Combined		NM	NM	
	Exhaust		--	NM	
1/25/2016	SVE-1	-1.5	NM	44	60
	SVE-2		NM	30	
	SVE-3		NM	32	
	SVE-4		NM	30	
	SVE-5		NM	79	
	SVE-6		NM	26	
	SVE-7		NM	26	
	SVE-8		NM	95	
	Combined		NM	> 300	
	Exhaust		--	NM	
2/12/2016	SVE-1	-1.5	NM	20	60
	SVE-2		NM	19	
	SVE-3		NM	40	
	SVE-4		NM	41	
	SVE-5		NM	52	
	SVE-6		NM	41	
	SVE-7		NM	36	
	SVE-8		NM	60	
	Combined		NM	> 300	
	Exhaust		--	75	
3/15/2016	SVE-1	-3.0	-5.0	> 300	20.4
	SVE-2		-5.0	> 300	
	SVE-3		-5.5	> 300	
	SVE-4		-5.5	> 300	
	SVE-5		-5.5	> 300	
	SVE-6		-6.0	> 300	
	SVE-7		-6.5	> 300	
	SVE-8		-7.0	> 300	
	Combined		-3.0	> 300	
	Exhaust		--	214.8	
4/26/2016	SVE-1	-3.0	NM	27.22	36.3
	SVE-2		NM	24.65	
	SVE-3		NM	35.35	
	SVE-4		NM	34.35	
	SVE-5		NM	42.88	
	SVE-6		NM	32.18	
	SVE-7		NM	28.90	
	SVE-8		NM	51.34	
	Combined		NM	<300	
	Exhaust		NM	278.5	
5/26/2016	SVE-1	NM	NM	23.0	32
	SVE-2		NM	20.4	
	SVE-3		NM	27.6	
	SVE-4		NM	28.0	
	SVE-5		NM	36.2	
	SVE-6		NM	26.4	
	SVE-7		NM	22.1	
	SVE-8		NM	41.9	
	Combined		NM	<300	
	Exhaust		NM	NM	
6/30/2016	SVE-1	-4.2	NM	52	43
	SVE-2		NM	54	
	SVE-3		NM	66	
	SVE-4		NM	OFF	
	SVE-5		NM	OFF	
	SVE-6		NM	OFF	
	SVE-7		NM	OFF	
	SVE-8		NM	80	
	Combined		NM	270	
	Exhaust		NM	NM	
7/22/2016	SVE-1	NM	NM	25	37
	SVE-2		NM	21	
	SVE-3		NM	28	
	SVE-4		NM	29	
	SVE-5		NM	38	
	SVE-6		NM	27	
	SVE-7		NM	22	
	SVE-8		NM	44	
	Combined		NM	282	
	Exhaust		NM	204	
7/27/2016	SVE-1	NM	NM	24	48
	SVE-2		NM	20	
	SVE-3		NM	29	
	SVE-4		NM	29	
	SVE-5		NM	39	
	SVE-6		NM	27	
	SVE-7		NM	23	
	SVE-8		NM	43	
	Combined		NM	285	
	Exhaust		NM	198	

Notes:
NM = Not measured.
> = greater than.
-- = Parameter not applicable.
1.0 in. H_2O = 0.0735 in. Hg.
cfm = Cubic feet per minute.
in. H_2O = Inches of water.
in. Hg = Inches of mercury.

Table D-4 SVE Pilot Test Vapor Data Comparison - Laboratory vs. Field Measurements
BNSF Mission Wye, Livingston, Montana

Location	SVE-1						
Measurement Type	Field		Laboratory Analytical Data				
	PID	Sorbent Tube[2]	PCE Concentration			TCE Concentration	
Date	ppm	ppm	µg/m³	ppm[1]	ppbv	µg/m³	ppbv
9/29/2015	0.6	0.6	1,700	0.24	240	110	21
10/16/2015	1.4	0.0	NR	NR	NR	NR	NR
10/30/2015	0.0	0.0	NR	NR	NR	NR	NR
11/13/2015	0.0	0.0	NR	NR	NR	NR	NR
12/2/2015	1.0	0.0	970	0.14	140	64	12
1/11/2016	0.0	0.0	NR	NR	NR	NR	NR
1/25/2016	0.4	0.2	NR	NR	NR	NR	NR
2/12/2016	0.5	0.0	NR	NR	NR	NR	NR
3/15/2016	0.0	0.0	890 D	0.13 D	130 D	42	8
4/26/2016	0.5	0.0	NR	NR	NR	NR	NR
5/26/2016	4.1	0.0	NR	NR	NR	NR	NR
6/30/2016	4.3	0.0	570 D	0.084 D	84 D	67	12
7/22/2016	0.6	NR	NR	NR	NR	NR	NR
7/27/2016	0.0	0.0	NR	NR	NR	NR	NR

Location	SVE-2						
Measurement Type	Field		Laboratory Analytical Data				
	PID	Sorbent Tube[2]	PCE Concentration			TCE Concentration	
Date	ppm	ppm	µg/m³	ppm[1]	ppbv	µg/m³	ppbv
9/29/2015	1.9	3.0	3,900	0.58	580	660	120
10/16/2015	5.7	2.5	NR	NR	NR	NR	NR
10/30/2015	3.4	3.0	NR	NR	NR	NR	NR
11/13/2015	0.9	3.6	NR	NR	NR	NR	NR
12/2/2015	0.8	1.0	14,000	2.1	2,100	2300	430
1/11/2016	0.0	2.2	NR	NR	NR	NR	NR
1/25/2016	2.4	2.5	NR	NR	NR	NR	NR
2/12/2016	1.9	1.0	NR	NR	NR	NR	NR
3/15/2016	0.0	0.5	16,000	2.4	2,400	1,500	290
4/26/2016	0.5	0.5	NR	NR	NR	NR	NR
5/26/2016	7.6	1.5	NR	NR	NR	NR	NR
6/30/2016	7.9	1.3	9,700	1.4	1400	970	18
7/22/2016	1.5	NR	NR	NR	NR	NR	NR
7/27/2016	0.3	2.0	NR	NR	NR	NR	NR

Location	SVE-3						
Measurement Type	Field		Laboratory Analytical Data				
	PID	Sorbent Tube[2]	PCE Concentration			TCE Concentration	
Date	ppm	ppm	µg/m³	ppm[1]	ppbv	µg/m³	ppbv
9/29/2015	2.9	2.0	4,700	0.69	690	1000	190
10/16/2015	1.9	1.75	NR	NR	NR	NR	NR
10/30/2015	1.0	1.75	NR	NR	NR	NR	NR
11/13/2015	0.2	0.1	NR	NR	NR	NR	NR
12/2/2015	0.3	0.4	10,000	1.5	1500	2100	390
1/11/2016	0.0	3.6	NR	NR	NR	NR	NR
1/25/2016	1.6	1.0	NR	NR	NR	NR	NR
2/12/2016	1.0	0.5	NR	NR	NR	NR	NR
3/15/2016	0.0	0.3	4,800	0.7	700	770	140
4/26/2016	0.2	0.4	NR	NR	NR	NR	NR
5/26/2016	5.1	0.2	NR	NR	NR	NR	NR
6/30/2016	4.0	0.5	4,000	0.59	590	970	180
7/22/2016	0.7	NR	NR	NR	NR	NR	NR
7/27/2016	0.0	0.5	NR	NR	NR	NR	NR

Location	SVE-4						
Measurement Type	Field		Laboratory Analytical Data				
	PID	Sorbent Tube[2]	PCE Concentration			TCE Concentration	
Date	ppm	ppm	µg/m³	ppm[1]	ppbv	µg/m³	ppbv
9/29/2015	0.0	0.0	650	0.096	96	230	42
10/16/2015	0.1	0.1	NR	NR	NR	NR	NR
10/30/2015	0.0	0.0	NR	NR	NR	NR	NR
11/13/2015	0.0	0.0	NR	NR	NR	NR	NR
12/2/2015	0.0	0.0	270	0.04	40	84	16
1/11/2016	0.0	0.0	NR	NR	NR	NR	NR
1/25/2016	0.6	0.0	NR	NR	NR	NR	NR
2/12/2016	0.4	0.0	NR	NR	NR	NR	NR
3/15/2016	0.0	0.0	180	0.027	27	24	4
4/26/2016	0.0	0.0	NR	NR	NR	NR	NR
5/26/2016	2.7	0.0	NR	NR	NR	NR	NR
6/30/2016	2.6	0.0	51	0.0075	7.5	30	5.6
7/22/2016	0.6	NR	NR	NR	NR	NR	NR
7/27/2016	0.1	0.0	NR	NR	NR	NR	NR

Location	SVE-5						
Measurement Type	Field		Laboratory Analytical Data				
	PID	Sorbent Tube[2]	PCE Concentration			TCE Concentration	
Date	ppm	ppm	µg/m³	ppm[1]	ppbv	µg/m³	ppbv
9/29/2015	0.2	0.2	2,500	0.37	370	200	36
10/16/2015	0.2	0.1	NR	NR	NR	NR	NR
10/30/2015	0.0	0.0	NR	NR	NR	NR	NR
11/13/2015	0.0	0.0	NR	NR	NR	NR	NR
12/2/2015	0.0	0.0	430	0.064	64	85	16
1/11/2016	0.0	0.0	NR	NR	NR	NR	NR
1/25/2016	0.2	0.0	NR	NR	NR	NR	NR
2/12/2016	0.2	0.0	NR	NR	NR	NR	NR
3/15/2016	0.0	0.0	160	0.024	24	15	2.9
4/26/2016	0.0	0.0	NR	NR	NR	NR	NR
5/26/2016	3.4	0.0	NR	NR	NR	NR	NR
6/30/2016	3.8	0.0	88	0.013	13	13	2.4
7/22/2016	0.6	NR	NR	NR	NR	NR	NR
7/27/2016	0.0	0.0	NR	NR	NR	NR	NR

Location	SVE-6						
Measurement Type	Field		Laboratory Analytical Data				
	PID	Sorbent Tube[2]	PCE Concentration			TCE Concentration	
Date	ppm	ppm	µg/m³	ppm[1]	ppbv	µg/m³	ppbv
9/29/2015	0.2	0.2	2,300	0.34	340	170	31
10/16/2015	0.3	0.0	NR	NR	NR	NR	NR
10/30/2015	0.0	0.0	NR	NR	NR	NR	NR
11/13/2015	0.0	0.0	NR	NR	NR	NR	NR
12/2/2015	0.0	0.0	34	0.005	5	7.9	1.5
1/11/2016	0.0	0.0	NR	NR	NR	NR	NR
1/25/2016	0.1	0.0	NR	NR	NR	NR	NR
2/12/2016	0.1	0.0	NR	NR	NR	NR	NR
3/15/2016	0.1	0.0	59	0.0088	8.8	6.5	1.2
4/26/2016	0.0	0.0	NR	NR	NR	NR	NR
5/26/2016	3.2	0.0	NR	NR	NR	NR	NR
6/30/2016	3.4	0.0	81	0.012	12	9	1.7
7/22/2016	0.7	NR	NR	NR	NR	NR	NR
7/27/2016	0.0	0.0	NR	NR	NR	NR	NR

Location	SVE-7						
Measurement Type	Field		Laboratory Analytical Data				
	PID	Sorbent Tube[2]	PCE Concentration			TCE Concentration	
Date	ppm	ppm	µg/m³	ppm[1]	ppbv	µg/m³	ppbv
9/29/2015	0.2	0.2	870	0.13	130	69	13
9/29/2015 (dup.)	0.2	0.2	950	0.14	140	73	14
10/16/2015	0.0	0.0	NR	NR	NR	NR	NR
10/30/2015	0.0	0.0	NR	NR	NR	NR	NR
11/13/2015	0.0	0.0	NR	NR	NR	NR	NR
12/2/2015	0.0	0.0	2,500	0.37	370	480	90
1/11/2016	0.0	0.0	NR	NR	NR	NR	NR
1/25/2016	0.0	0.0	NR	NR	NR	NR	NR
2/12/2016	0.1	0.0	NR	NR	NR	NR	NR
3/15/2016	0.2	0.0	39	0.0058	5.8	6.3	1.2
4/26/2016	0.0	0.0	NR	NR	NR	NR	NR
5/26/2016	3.3	0.0	NR	NR	NR	NR	NR
6/30/2016	3.5	0.0	140	0.02	20	31	5.8
7/22/2016	0.6	NR	NR	NR	NR	NR	NR
7/27/2016	0.0	0.0	NR	NR	NR	NR	NR

Location	SVE-8						
Measurement Type	Field		Laboratory Analytical Data				
	PID	Sorbent Tube[2]	PCE Concentration			TCE Concentration	
Date	ppm	ppm	µg/m³	ppm[1]	ppbv	µg/m³	ppbv
9/29/2015	2.2	1.5	19,000	2.8	2800	1300	230
10/16/2015	0.4	0.3	NR	NR	NR	NR	NR
10/30/2015	0.0	0.0	NR	NR	NR	NR	NR
11/13/2015	0.0	0.0	NR	NR	NR	NR	NR
12/2/2015	0.0	0.0	3,000	0.44	440	170	32
12/2/2015 (dup.)	0.0	0.0	2,700	0.40	400	160	30
1/11/2016	0.0	0.0	NR	NR	NR	NR	NR
1/25/2016	0.0	0.0	NR	NR	NR	NR	NR
2/12/2016	0.0	0.0	NR	NR	NR	NR	NR
3/15/2016	0.2	0.2	2300 D	0.34	340 D	88	16
4/26/2016	0.0	0.0	NR	NR	NR	NR	NR
5/26/2016	3.9	0.0	NR	NR	NR	NR	NR
6/30/2016	3.6	0.0	580	0.09	86	57	11
7/22/2016	0.7	NR	NR	NR	NR	NR	NR
7/27/2016	0.0	0.0	NR	NR	NR	NR	NR

Location	Combined Effluent Vapor (CEV)						
Measurement Type	Field		Laboratory Analytical Data				
	PID	Sorbent Tube[2]	PCE Concentration			TCE Concentration	
Date	ppm	ppm	µg/m³	ppm[1]	ppbv	µg/m³	ppbv
10/16/2015	0.4	0.3	2,600	0.39	390	490	90
10/16/2015 (dup.)	0.4	0.3	2,700	0.4	400	480	89
10/30/2015	0.4	0.4	8,700	1.3	1300	1200	220
10/30/2015 (dup.)	0.4	0.4	8,700	1.3	1300	1200	220
11/13/2015	0.5	0.4	8,000	1.2	1200	1100	210
11/13/2015 (dup.)	0.5	0.4	9,500	1.4	1400	1200	220
12/2/2015	0.0	0.0	2,600	0.39	390	410	76
1/11/2016	0.0	0.0	4200 D	0.62 D	620 D	490	92
1/11/2016 (dup.)	0.0	0.0	4300 D	0.64 D	640 D	500	93
1/25/2016	0.2	0.4	NR	NR	NR	NR	NR
2/12/2016	0.4	0.5	710 D	0.1 D	100 D	160	30
2/12/2016 (dup.)	0.4	0.5	760 D	0.11 D	110 D	180	33
3/15/2016	0.1	0.0	2,900	0.43	430	290 J	55 J
3/15/2016 (dup.)	0.1	0.0	3100 D	0.46 D	460 D	390	72
4/26/2016	0.0	0.2	1900 D	0.28 D	280 D	210	39
4/26/2016 (dup.)	0.0	0.2	2100 D	0.31 D	310 D	220	41
5/26/2016	3.5	0.0	2800 D	0.42 D	420 D	320	59
5/26/2016 (dup.)	3.5	0.0	2800 D	0.42 D	420 D	310	58
6/30/2016	4.1	0.5	1100	0.17	170	160	29
6/30/2016 (dup.)	4.1	0.5	1100	0.17	170	160	29
7/27/2016	0.0	0.0	1800 D	0.27 D	270 D	290	54
7/27/2016 (dup.)	0.0	0.0	1000 D	0.15 D	150 D	190	35

Location	Exhaust Vapor (EV)						
Measurement Type	Field		Laboratory Analytical Data				
	PID	Sorbent Tube[2]	PCE Concentration			TCE Concentration	
Date	ppm	ppm	µg/m³	ppm[1]	ppbv	µg/m³	ppbv
9/29/2015	0.1	0.2	5,300	0.78	780	29 J	5.4 J
10/16/2015	0.0	0.5	9,300	1.4	1400	440	82
10/30/2015	0.1	NA	NR	NR	NR	NR	NR
11/13/2015	0.0	NA	NR	NR	NR	NR	NR
12/2/2015	0.0	0.0	3,100	0.46	460	270	51
1/11/2016	0.0	0.0	NR	NR	NR	NR	NR
1/25/2016	NR	NR	NR	NR	NR	NR	NR
2/12/2016	0.0	NR	NR	NR	NR	NR	NR
3/15/2016	0.1	0.2	1,300	0.2	200	16	3
4/26/2016	0.0	0.2	NR	NR	NR	NR	NR
5/26/2016	0.1	NR	NR	NR	NR	NR	NR
6/30/2016	2.8	NR	4,100	0.61	610	340	63
7/22/2016	0.0	NR	NR	NR	NR	NR	NR
7/27/2016	0.0	NR	NR	NR	NR	NR	NR

Notes:

PCE = Tetrachloroethene (tetrachloroethylene; perchloroethylene)
TCE = Trichloroethene (trichloroethene)
PID = Photoionization detector
1 = ppm calculated from ppbv analytical result.
2 = Sorbent tubes are PCE-specific.
NR - Not required

dup. = duplicate sample
ppm = parts per million
ppbv = parts per billion by volume
µg/m³ = micrograms per cubic meter
J = Estimated value.
D = Reported result is from a dilution.

Table D-5 SVE Post-Pilot Test Vapor Monitoring Analytical Results
BNSF Mission Wye, Livingston, Montana

Post Pilot Test SVE Effluent Performance Monitoring Sampling - November 2016, January, March, and June 2017																
Event	**Baseline Post-GAC**				**1st Quarterly Performance Monitoring**				**2nd Quarterly Performance Monitoring**				**3rd Quarterly Performance Monitoring**			
Sample Location:	**SVE-CEV**	**SVE-CEV**	**SVE Mid-T**	**SVE-EV**	**SVE-CEV**	**SVE-CEV**	**SVE Mid-T**	**SVE-EV**	**SVE-CEV**	**SVE-CEV**	**SVE Mid-T**	**SVE-EV**	**SVE-CEV**	**SVE Mid-T**	**SVE Mid-T**	**SVE-EV**
Sample Date:	**11/10/2016**	**11/10/2016**	**11/10/2016**	**11/10/2016**	**1/3/2017**	**1/3/2017**	**1/3/2017**	**1/3/2017**	**3/21/2017**	**3/21/2017**	**3/21/2017**	**3/21/2017**	**6/19/2017**	**6/19/2017**	**6/19/2017**	**6/19/2017**
USEPA Method TO-15 (µg/m^3)																
1,2,4-Trimethylbenzene	< 0.60	< 0.66	< 2.5	< 0.24	< 0.21	< 0.21	< 0.21	< 0.20	< 0.22	< 0.24	< 0.26	< 0.23	< 0.28	< 0.26	< 0.28	< 0.28
Tetrachloroethene	**520 D**	**580 D**	**1,900 D**	**0.86**	**330 D**	**400 D**	**0.26 J**	< 0.19	**960 D**	**960 D**	**1,300 D**	**0.39 J**	**630 D**	< 0.25	< 0.26	< 0.26
trans-1,2-Dichloroethene	< 0.76	< 0.84	< 3.2	< 0.30	**0.29 J**	**0.30 J**	< 0.27	< 0.26	**0.45 J**	**0.46 J**	**0.64 J**	< 0.29	< 0.36	< 0.33	< 0.35	< 0.35
Trichloroethene	**60**	**67**	**220**	< 0.22	**49**	**52**	< 0.21	< 0.19	**97**	**97**	**140**	< 0.21	**94**	< 0.25	< 0.26	< 0.26
ASTM D1946 (ppmv)																
Carbon Dioxide	NA	NA	NA	NA	< 1,600	< 1,600	**2,050**	**1,910**	NA	NA	NA	NA	NA	NA	NA	NA
Methane	NA	NA	NA	NA	< 1,600	< 1,600	< 1,600	< 1,600	NA	NA	NA	NA	NA	NA	NA	NA
Nitrogen	NA	NA	NA	NA	**778,000**	**778,000**	**778,000**	**778,000**	NA	NA	NA	NA	NA	NA	NA	NA
Oxygen + Argon(2)	NA	NA	NA	NA	**220,000**	**221,000**	**221,000**	**221,000**	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

SVE = Soil Vapor Extraction, 1-8 designates SVE well discharge line sample was collected from.
SVE-CEV = SVE Combined effluent vapor.
SVE-EV = SVE Exhaust Vapor
SVE-PHX = SVE Vapor - Post-Heat Exchanger
VMP = Vapor Monitoring Point, 1 = Sample Number, S = Shallow, D = Deep.
(1) = Equipment Blank (EB) sample was collected from combined SVE flow after startup but before individual SVE lines were open. Not a traditional equipment blank sample, instead intended to evaluate VOC impacts from glues used to assemble equipment.
(2) = Oxygen result may be due to argon coelution. Ambient air contains 0.93% argon.

µg/m^3 = micrograms per cubic meter.
ppmv = parts per million by volume.
< = analyte not detected above the method detection limit (MDL).
J = Estimated value.
NA = Not analyzed.
D = The reported result is from a dilution.
Bolded values indicate detected results.
* = Data have not been validated.

Table D-6 Limited SVE Step Testing Data - March 2016
BNSF Mission Wye, Livingston, Montana

Project Name: BNSF Mission Wye			
Date: 03/15/2016			
Vapor Extraction Well ID:	All wells running		
Vacuum Applied:	-3.5 in. Hg		
Monitoring Point	**Vacuum (in. H_2O)**	**Distance from SVE-6 (ft.)**	**Distance from SVE-7 (ft.)**
SVE-6 wellhead	-1.50	0	100
SVE-7 wellhead	-1.00	100	0
MW-3	-0.01	80	25
MW-22	-0.05	70	20
VMP-2S	-0.01	60	30
VMP-2D	-0.01	60	30
VMP-4	-0.10	20	70
VMP-3	-0.05	40	45

Project Name: BNSF Mission Wye			
Date: 03/15/2016			
Vapor Extraction Well ID:	All wells running		
Vacuum Applied:	-2.0 in. Hg		
Monitoring Point	**Vacuum (in. H_2O)**	**Distance from SVE-6 (ft.)**	**Distance from SVE-7 (ft.)**
SVE-6 wellhead	-1.00	0	100
SVE-7 wellhead	-0.15	100	0
MW-3	-0.01	80	25
MW-22	-0.05	70	20
VMP-2S	0.00	60	30
VMP-2D	-0.01	60	30
VMP-4	-0.10	20	70
VMP-3	-0.01	40	45

Notes:

in. Hg - Inches of mercury 1.0 in. H_2O = 0.0735 in. Hg.

in. H_2O - inches of water

Table D-7 Soil Vapor Extraction System Mass Removal Calculations
BNSF Mission Wye, Livingston, Montana

Mass Removal Formula:Mass Removed = T x Q x C

Where: M = incrememntal mass removed (lbs)
T = time (minutes)
Q = flow rate (ft3/min)
C = concentration (µg/m3)
Conversion = (1440 minute/day)*(1 pound/453,592,000 µg)*(1 m^3/35.31 ft^3)

Example calculation: PCE from September-October 2015:
Mass (pounds) = (22 days)*(1440 minute/day)*(300 ft^3/min)*(1 m^3/35.31 ft^3)*(2600 µg/m^3)*(1 pound/453,592,000 µg) = 1.54 pounds

Data Collected During SVE Operation

September 29, 2015 - October 20, 2015		Minimum Flow Rate = 300 cfm		**Total Cumulative Removal**	
PCE Concentration =	2600 µg/m^3	PCE Removed (lbs) =	1.54		
TCE Concentration =	490 µg/m^3	TCE Removed (lbs) =	0.29	September-October 2015	
October 21, 2015 - October 31, 2015		Minimum Flow Rate = 300 cfm		4.12	
PCE Concentration =	8700 µg/m^3	PCE Removed (lbs) =	2.58	0.65	
TCE Concentration =	1200 µg/m^3	TCE Removed (lbs) =	0.36		
November 1, 2015 - November 30, 2015		Minimum Flow Rate = 300 cfm		November 2015	
PCE Concentration =	8000 µg/m^3	PCE Removed (lbs) =	6.47	10.60	
TCE Concentration =	1100 µg/m^3	TCE Removed (lbs) =	0.89	1.54	
December 1, 2015 - December 31, 2015		Minimum Flow Rate = 300 cfm		December 2015	
PCE Concentration =	2600 µg/m^3	PCE Removed (lbs) =	2.17	12.77	
TCE Concentration =	410 µg/m^3	TCE Removed (lbs) =	0.34	1.88	
January 1, 2016 - January 31, 2016		Minimum Flow Rate = 300 cfm		January 2016	
PCE Concentration =	4200 µg/m^3	PCE Removed (lbs) =	3.51	16.28	
TCE Concentration =	490 µg/m^3	TCE Removed (lbs) =	0.41	2.29	
February 1, 2016 - February 29, 2016		Minimum Flow Rate = 300 cfm		February 2016	**SVE Pilot Test Period**
PCE Concentration =	710 µg/m^3	PCE Removed (lbs) =	0.56	16.84	
TCE Concentration =	160 µg/m^3	TCE Removed (lbs) =	0.13	2.41	
March 1, 2016 - March 31, 2016		Minimum Flow Rate = 300 cfm		March 2016	
PCE Concentration =	2900 µg/m^3	PCE Removed (lbs) =	2.42	19.26	
TCE Concentration =	290 µg/m^3	TCE Removed (lbs) =	0.24	2.66	
April 1, 2016 - April 30, 2016		Minimum Flow Rate = 300 cfm		April 2016	
PCE Concentration =	1900 µg/m^3	PCE Removed (lbs) =	1.54	20.80	
TCE Concentration =	210 µg/m^3	TCE Removed (lbs) =	0.17	2.83	
May 1, 2016 - May 31, 2016		Minimum Flow Rate = 300 cfm		May 2016	
PCE Concentration =	2800 µg/m^3	PCE Removed (lbs) =	2.34	23.14	
TCE Concentration =	320 µg/m^3	TCE Removed (lbs) =	0.27	3.09	
June 1, 2016 - June 30, 2016		Flow Rate = 270 cfm		June 2016	
PCE Concentration =	1100 µg/m^3	PCE Removed (lbs) =	0.80	23.94	
TCE Concentration =	160 µg/m^3	TCE Removed (lbs) =	0.12	3.21	
July 1, 2016 - August 31, 2016		Flow Rate = 198 cfm		July-August 2016	
PCE Concentration =	1800 µg/m^3	PCE Removed (lbs) =	1.99	25.93	**Minimum PCE Removed through August 2016 (lbs) = 25.93**
TCE Concentration =	290 µg/m^3	TCE Removed (lbs) =	0.32	3.53	**Minimum TCE Removed through August 2016 (lbs) = 3.53**
September 1, 2016 - November 30, 2016		Flow Rate = 232 cfm		September-November 2016	
PCE Concentration =	520 µg/m^3	PCE Removed (lbs) =	0.99	26.92	
TCE Concentration =	60 µg/m^3	TCE Removed (lbs) =	0.11	3.65	
December 1, 2016 - February 28, 2017		Flow Rate = 200 cfm		December 2016-February 2017	
PCE Concentration =	330 µg/m^3	PCE Removed (lbs) =	0.53	27.45	**Post-SVE Pilot Test Period**
TCE Concentration =	49 µg/m^3	TCE Removed (lbs) =	0.08	3.72	
March 1, 2017 - May 31, 2017		Flow Rate = 268 cfm		March-May 2017	
PCE Concentration =	960 µg/m^3	PCE Removed (lbs) =	2.13	29.58	
TCE Concentration =	97 µg/m^3	TCE Removed (lbs) =	0.22	3.94	
June 1, 2017 - July 31, 2017		Flow Rate = 261 cfm		June-July 2017	
PCE Concentration =	630 µg/m^3	PCE Removed (lbs) =	0.90	30.48	**Total Minimum PCE Removed through July 2017 (lbs) = 30.48**
TCE Concentration =	0 µg/m^3	TCE Removed (lbs) =	0.00	3.94	**Total Minimum TCE Removed through July 2017 (lbs) = 3.94**

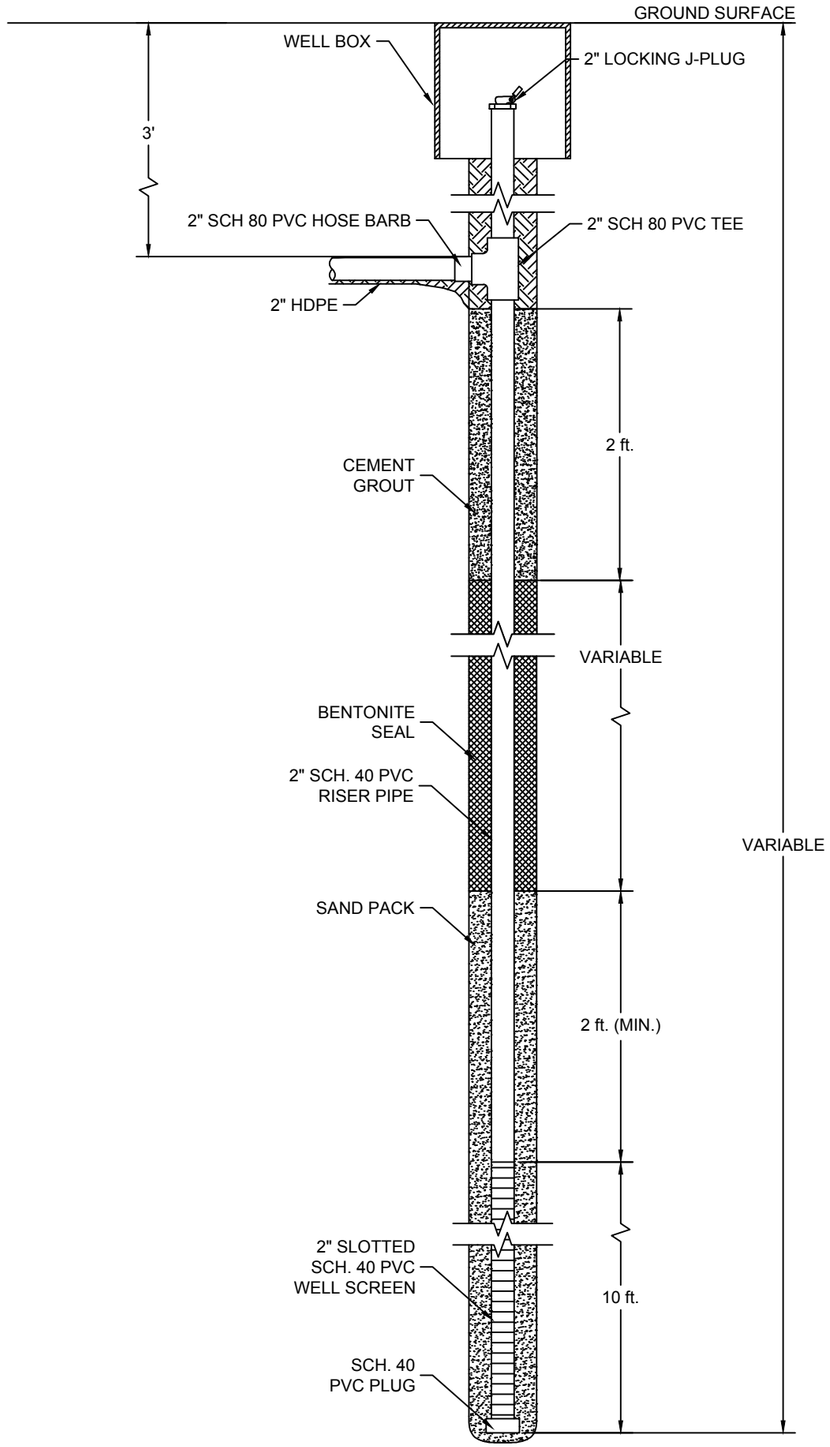
Notes:

µg/m^3 = micrograms per cubic meter
cfm = cubic feet per minute
ft^3 = cubic feet

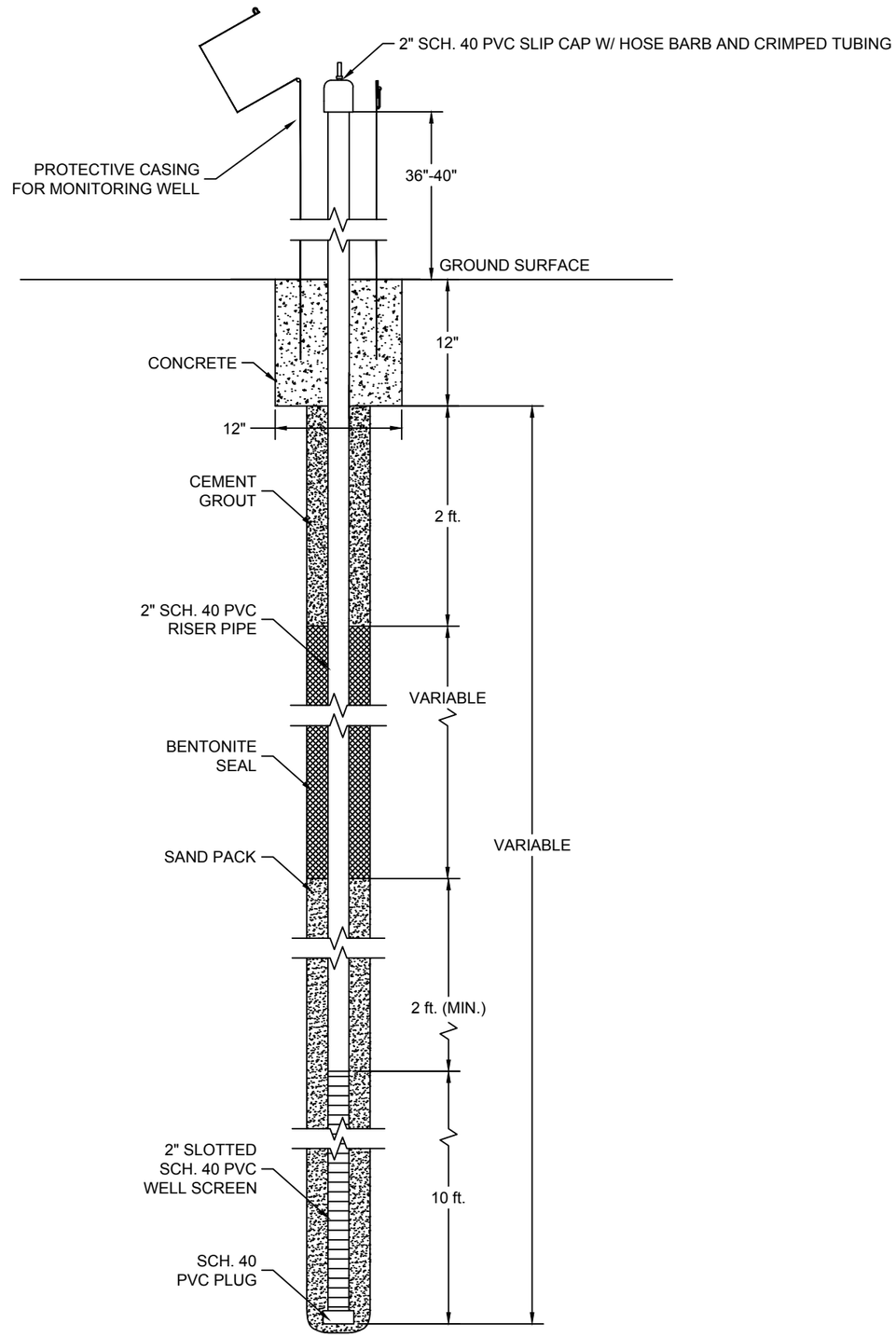
PCE = Tetrachloroethylene
SVE = Soil Vapor Extraction
TCE = Trichloroethylene

The mass removal value calculated reflects the minimum mass removed as the system flow rate measured between September 29, 2015 and May 31, 2016 exceeded the 300 cfm maximum flow rate measured by the hot-wire anemometer.

Figures



1 --- SVE WELL CONSTRUCTION DETAIL N.T.S.



2 --- VAPOR MONITORING WELL CONSTRUCTION DETAIL N.T.S.

AECOM

Figure: D-1

2014 SVE AND VMP
WELL CONSTRUCTION DETAILS

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: 08/31/17

Project Management Initials: Designer: ____ Checked: ____ Approved: ____ ANSI B 11" x 17"

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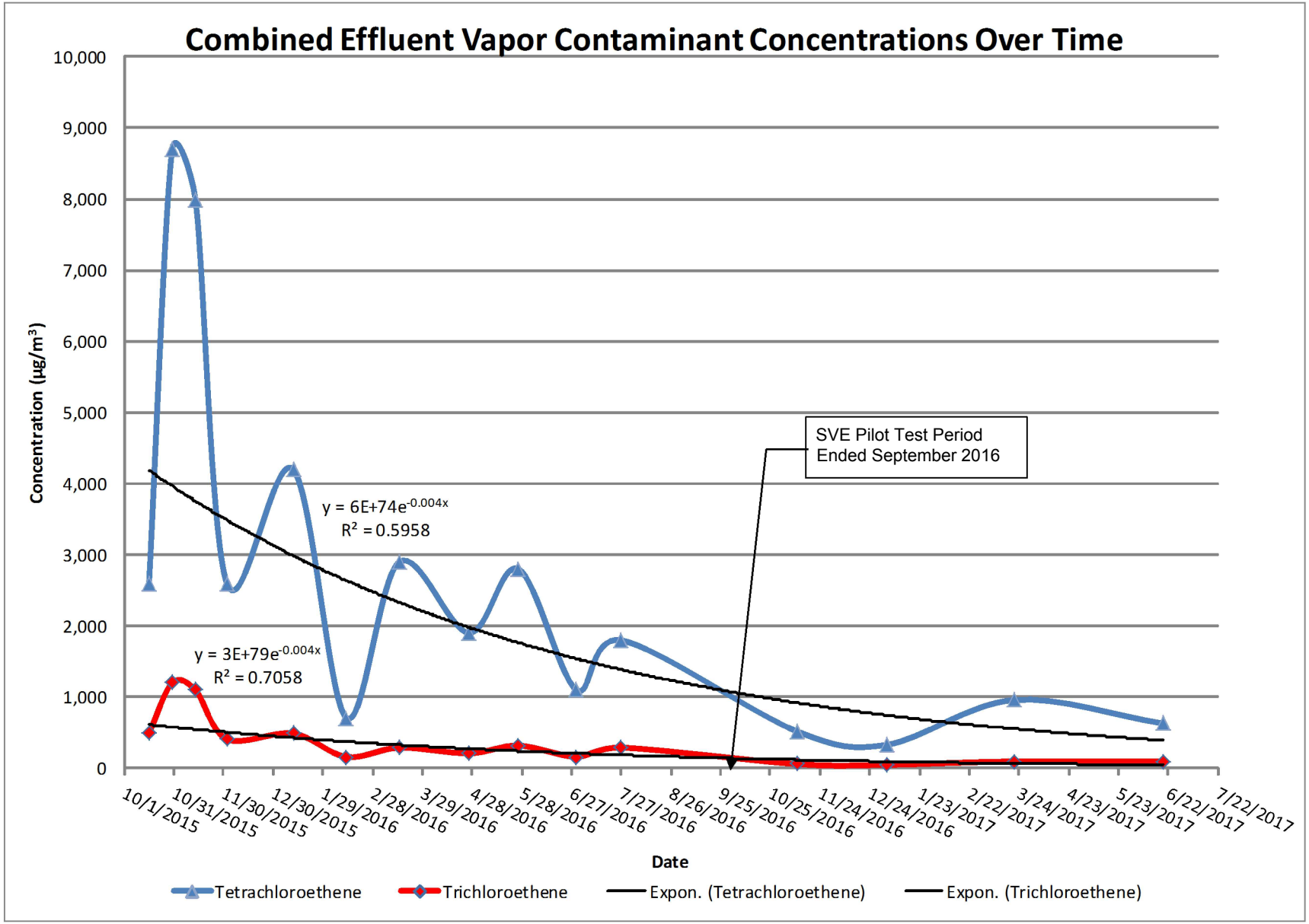


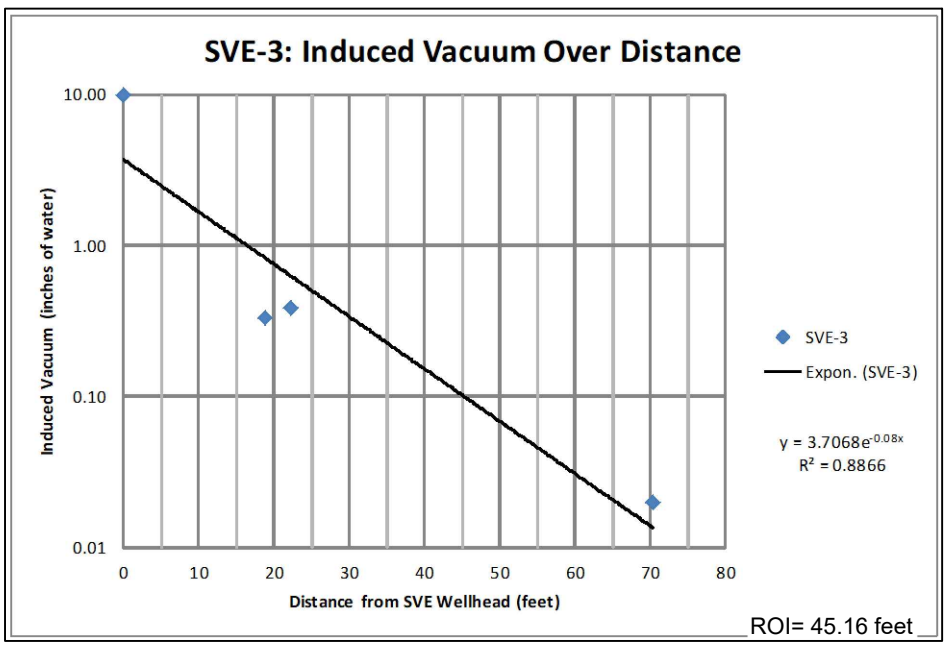
Feasibility Study Report Rev 3

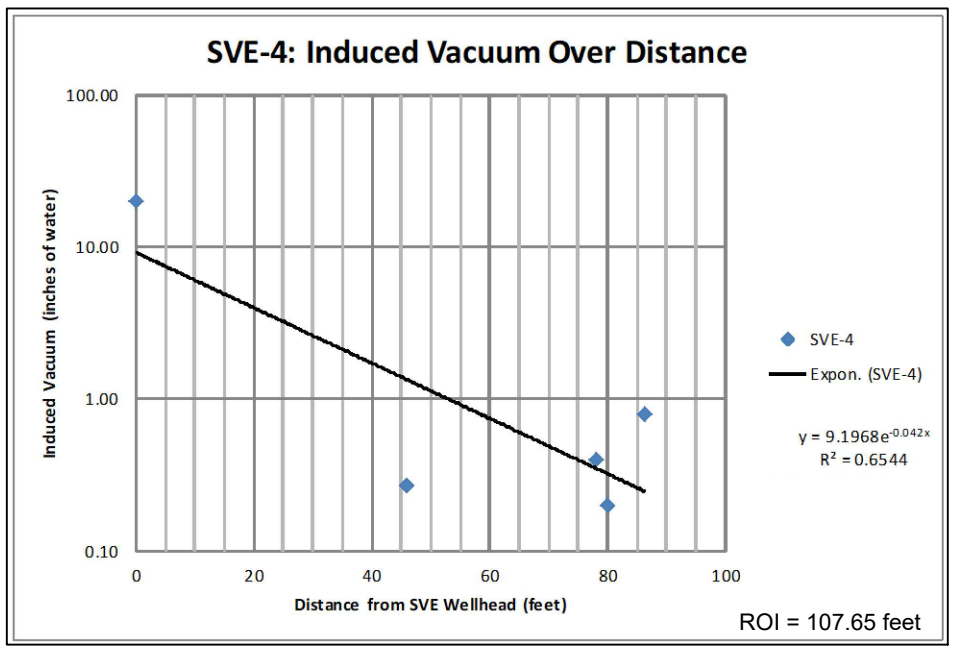
BNSF, Mission Wye, Montana
Project No.: 60517242 Date: 08/31/17

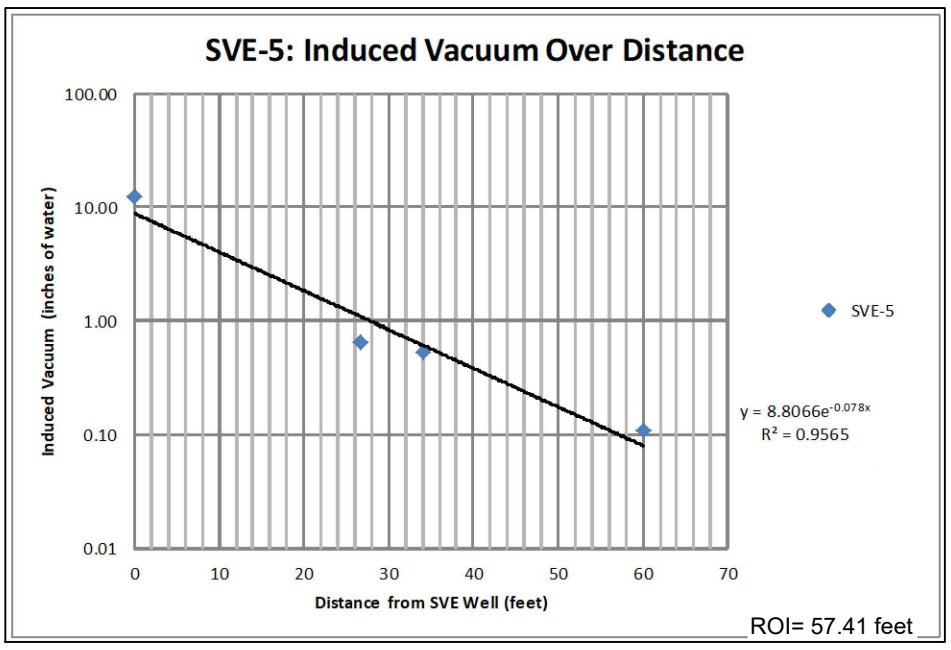
PCE AND TCE COMBINED VAPOR SAMPLE CONCENTRATIONS OVER TIME

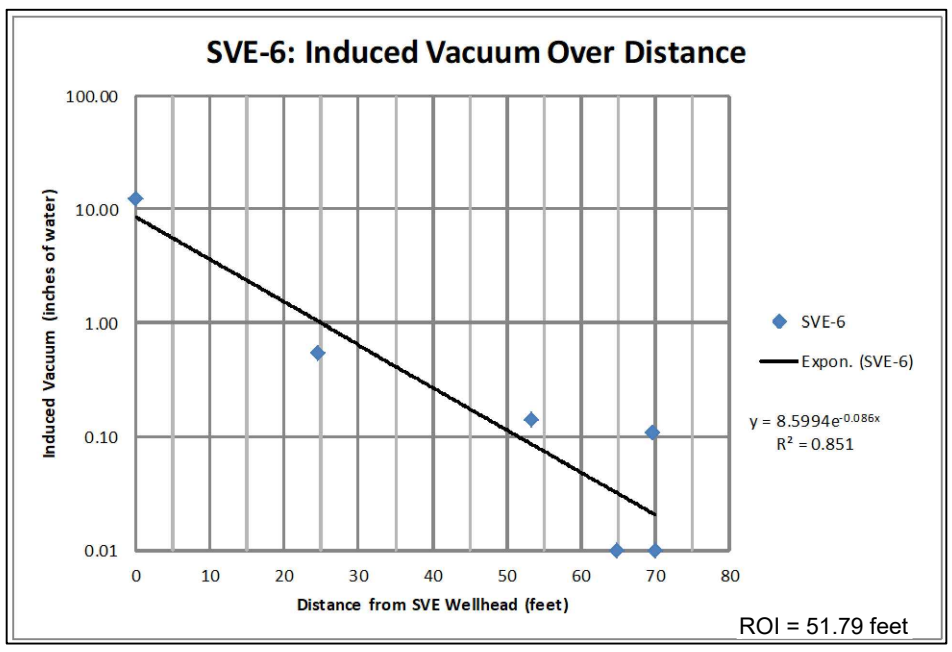
AECOM

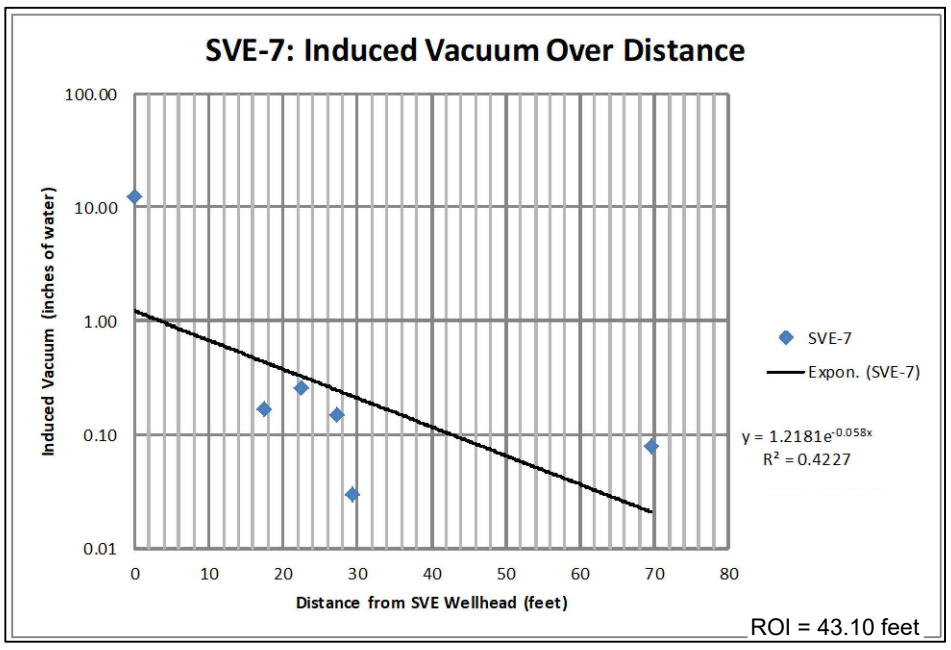
Figure: D-2

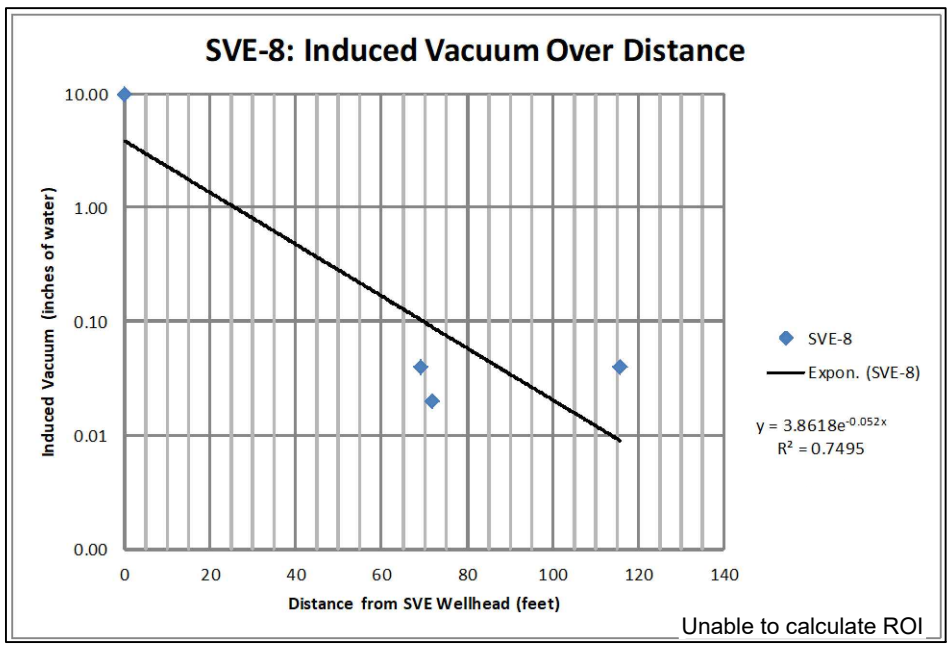


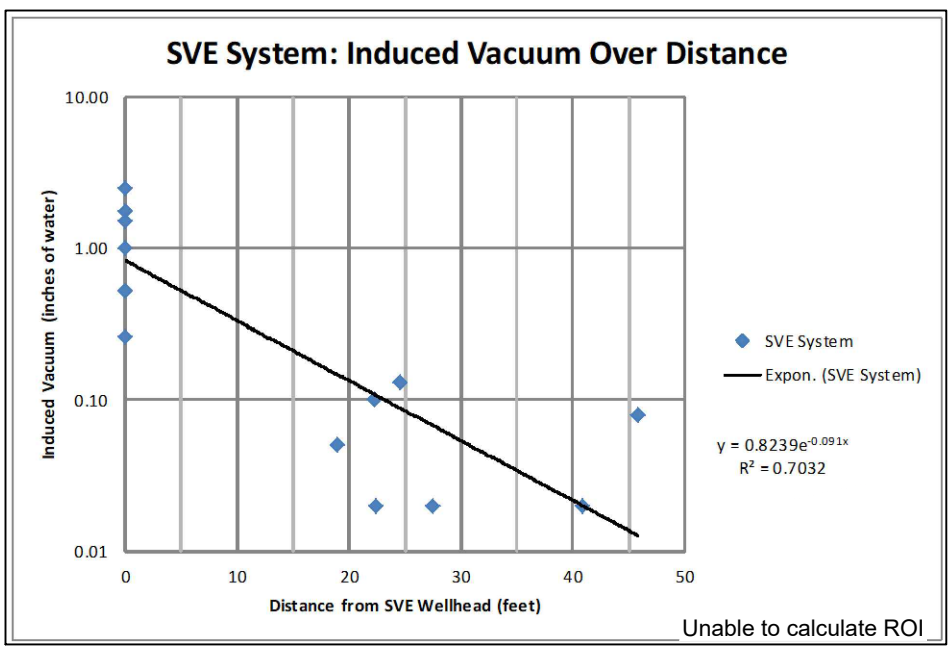


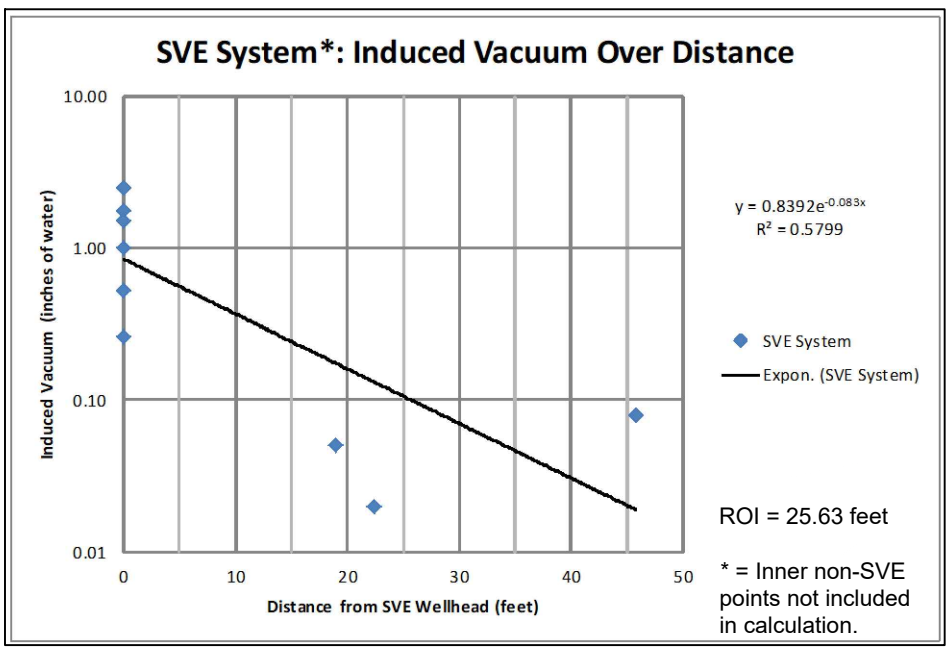




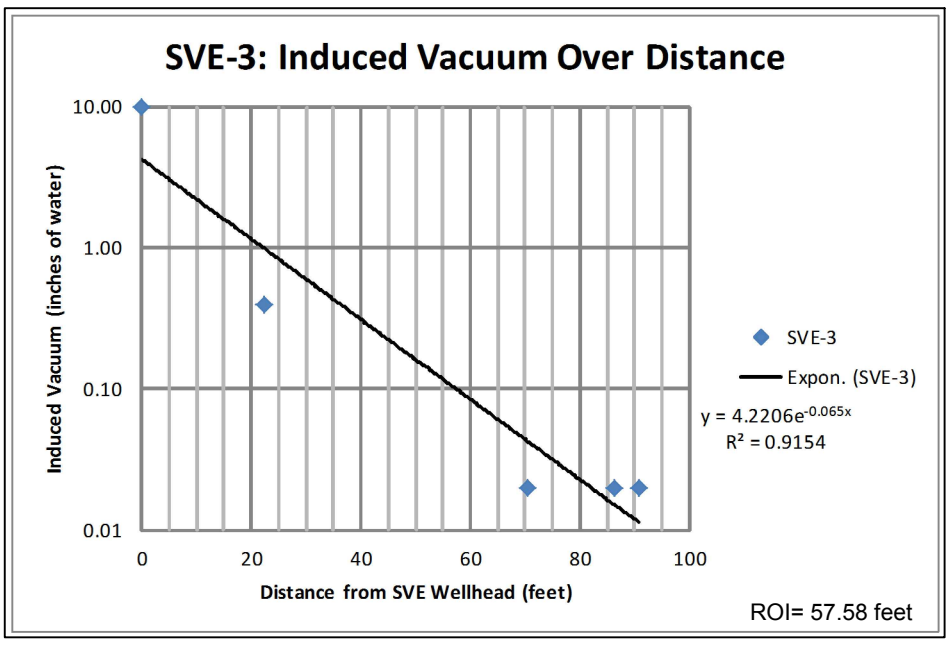


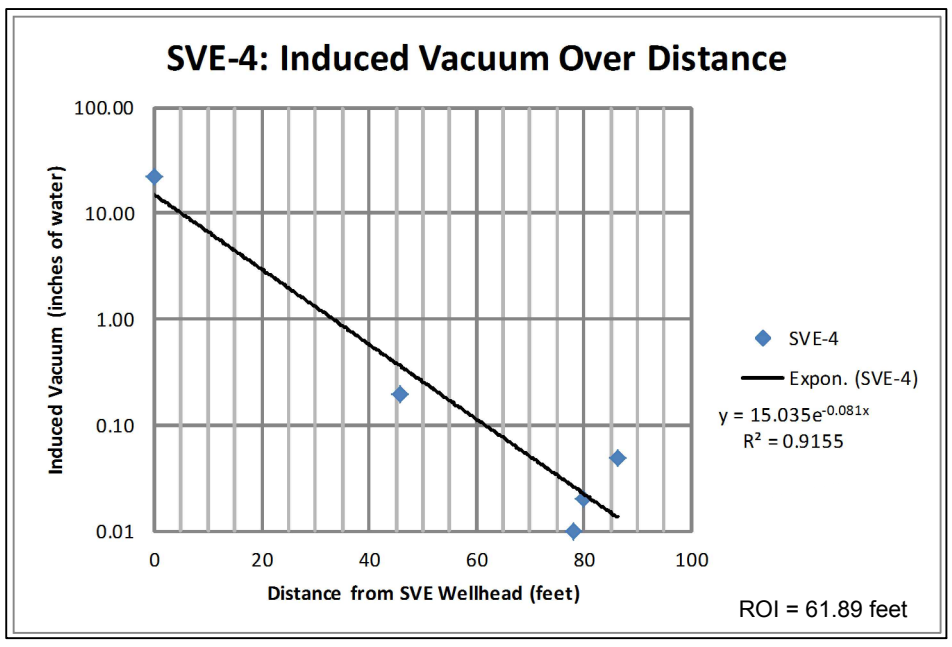


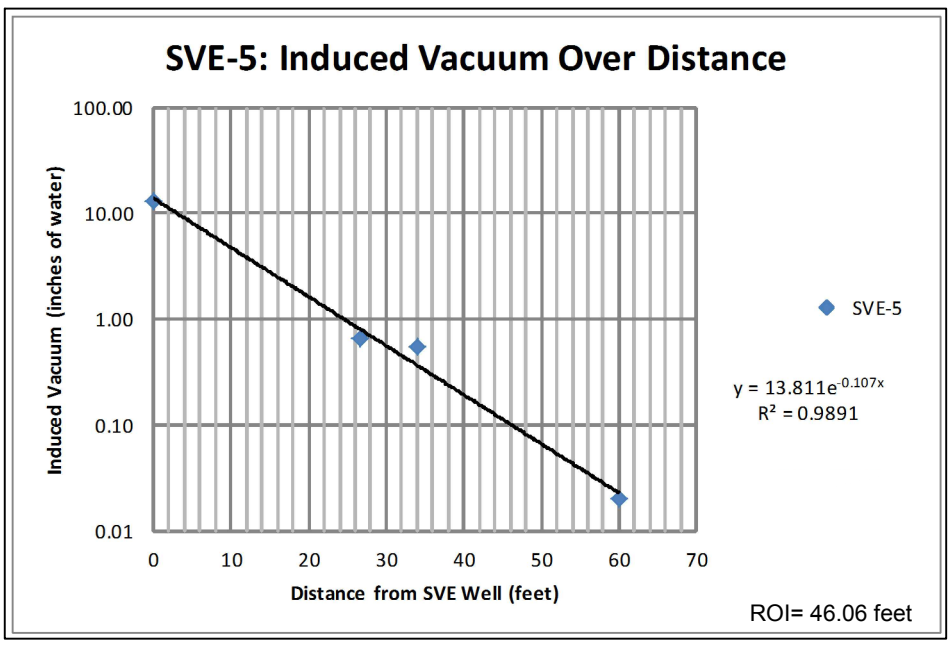


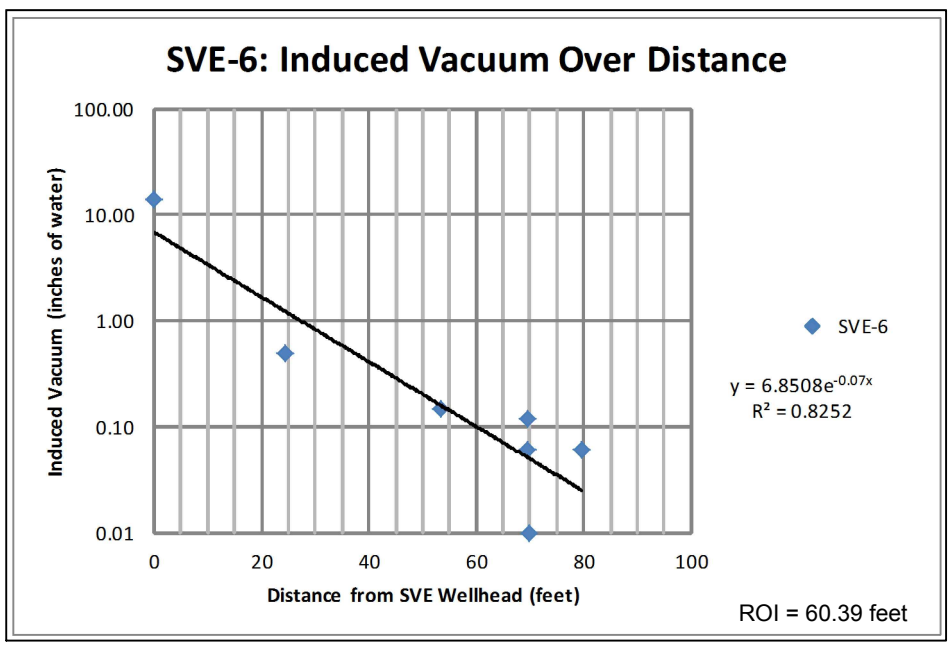


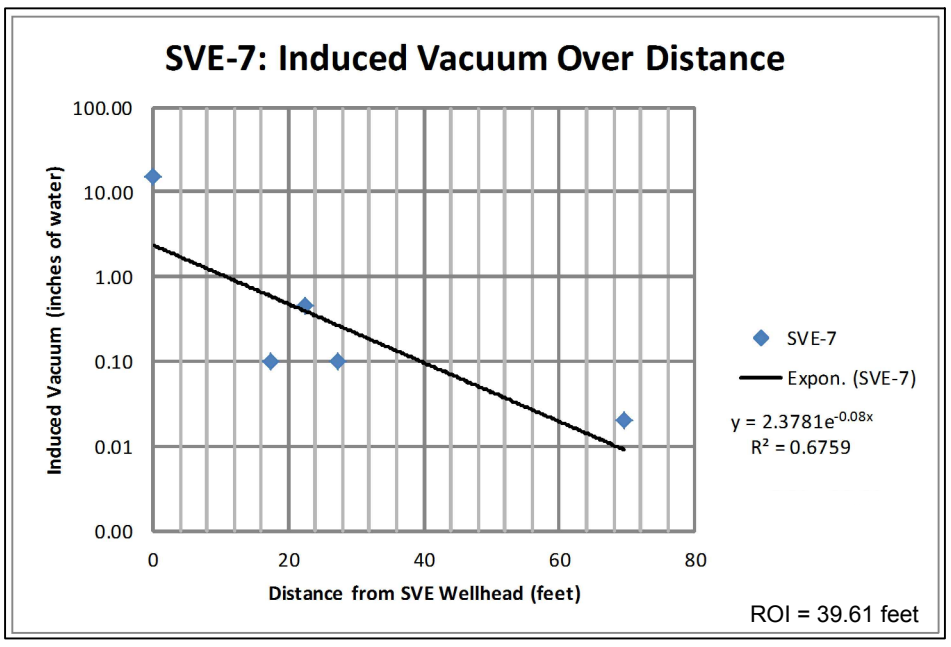
NOTE:
1. ROI = Radius of Influence
2. SVE = Soil Vapor Extraction
3. Average ROI calculated at wells SVE-3 through SVE-8 was 62.56 feet.

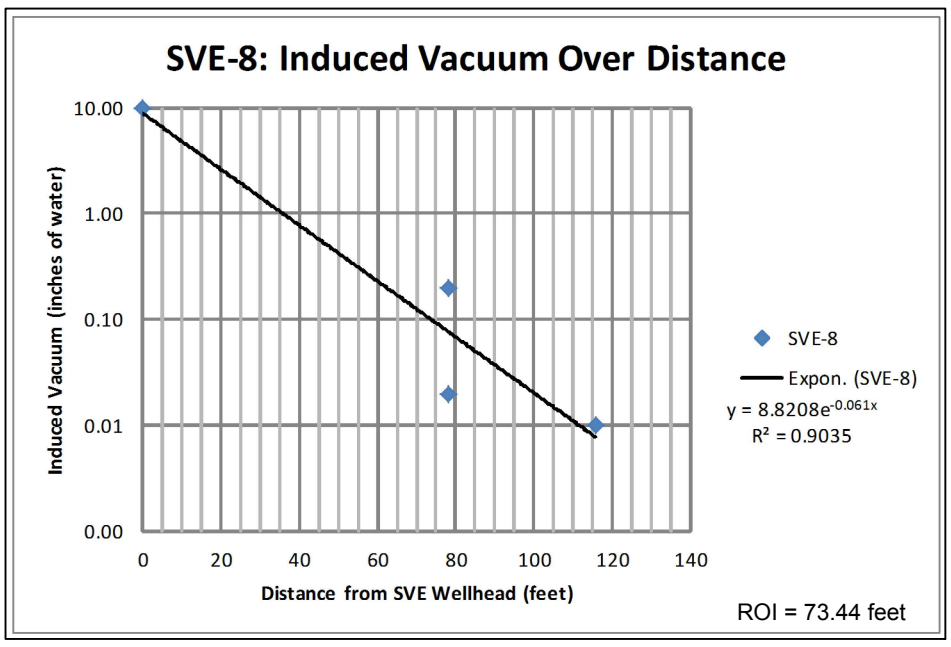


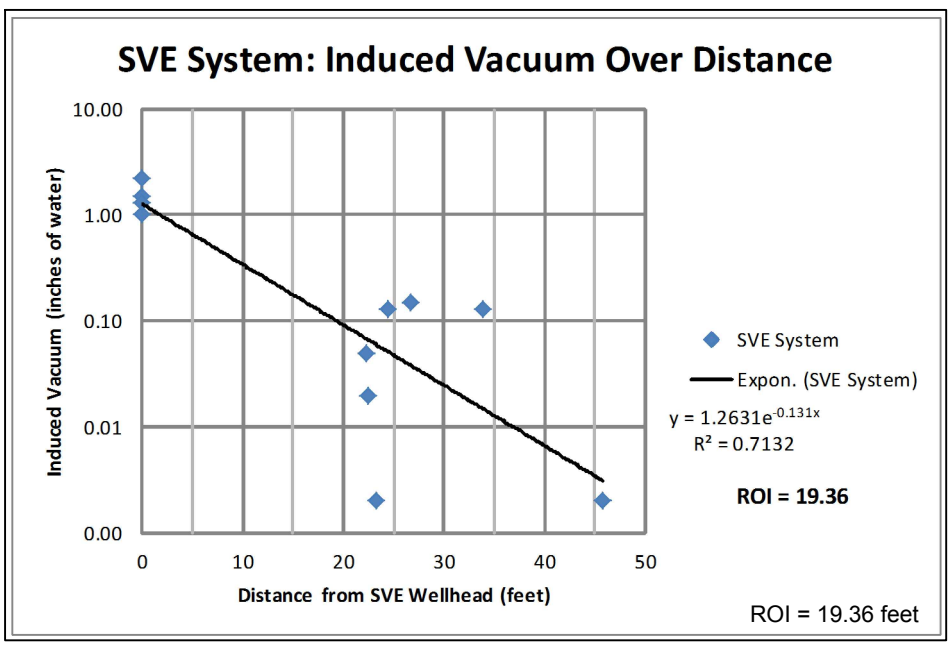


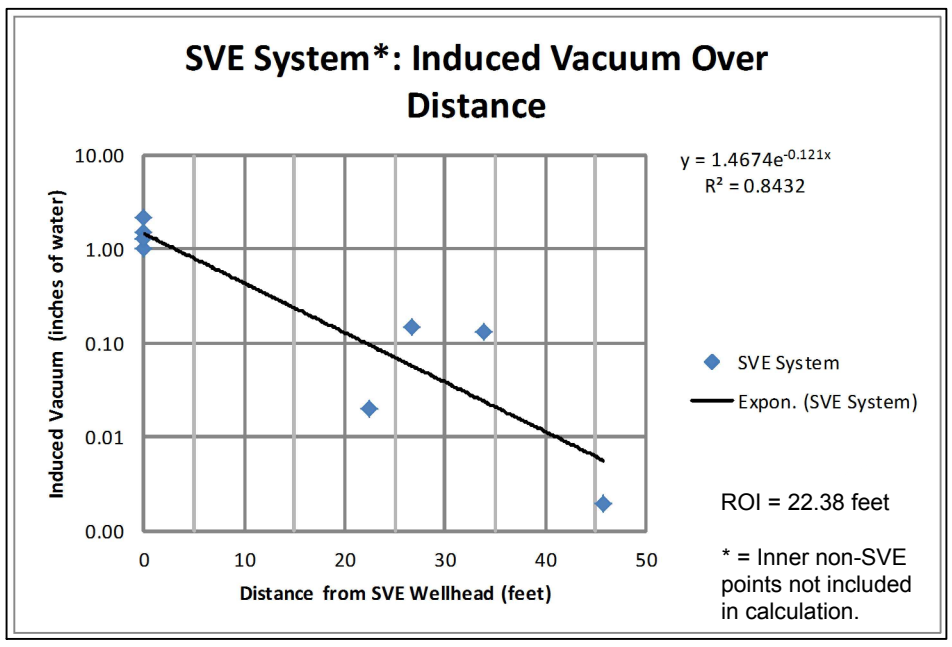




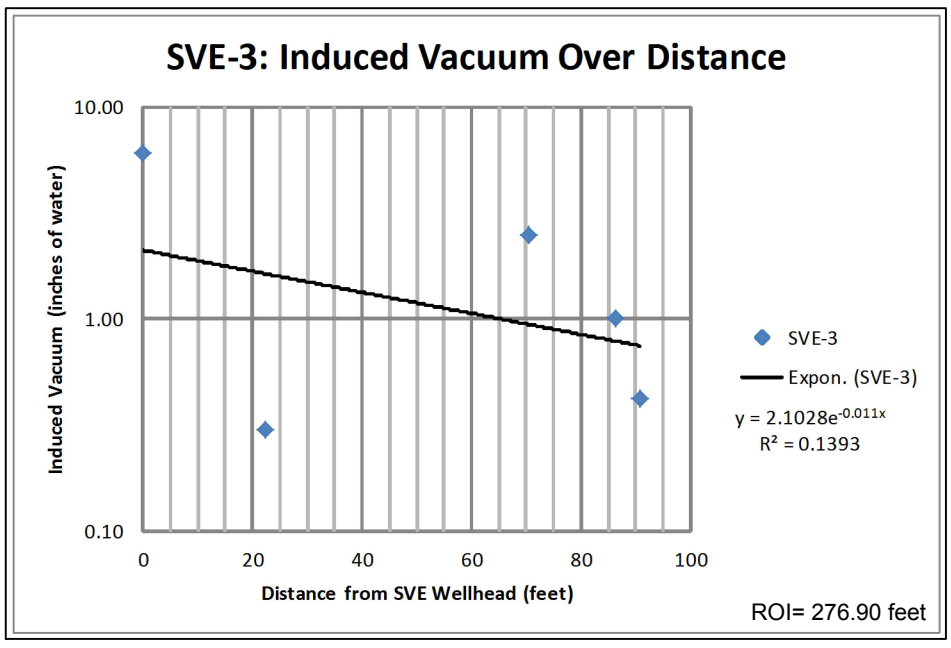


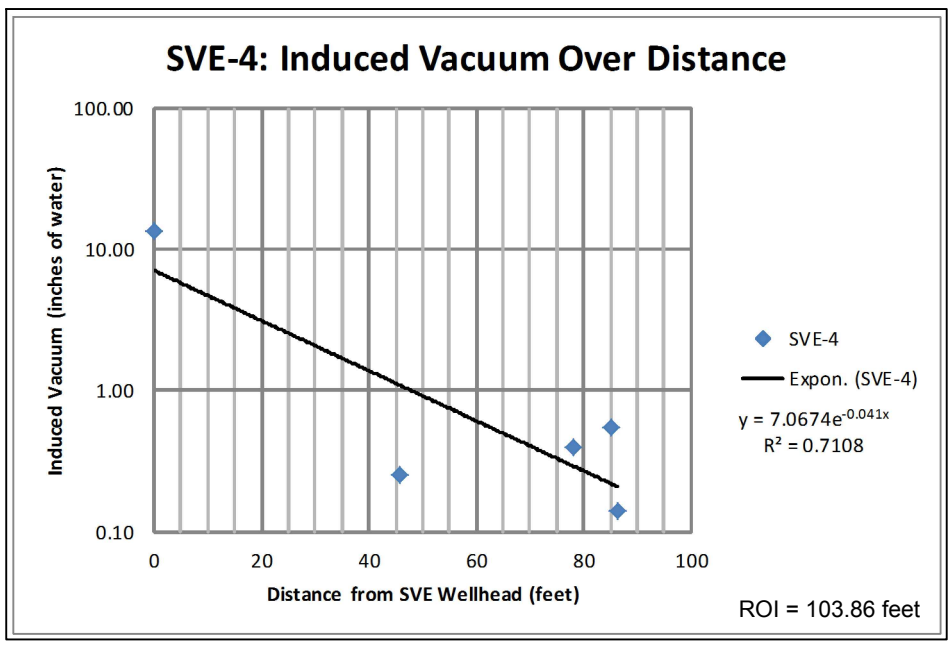


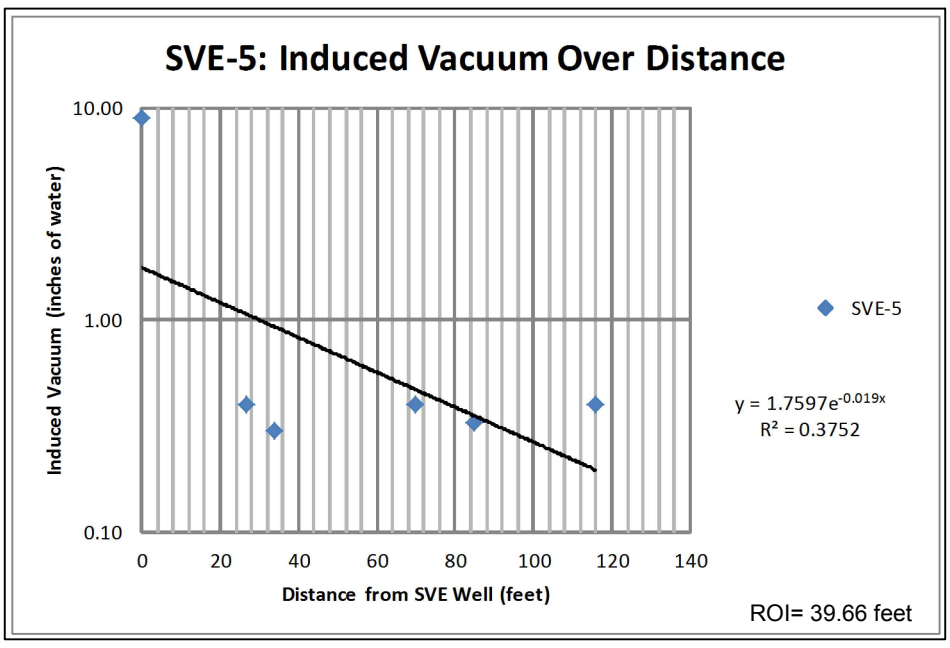


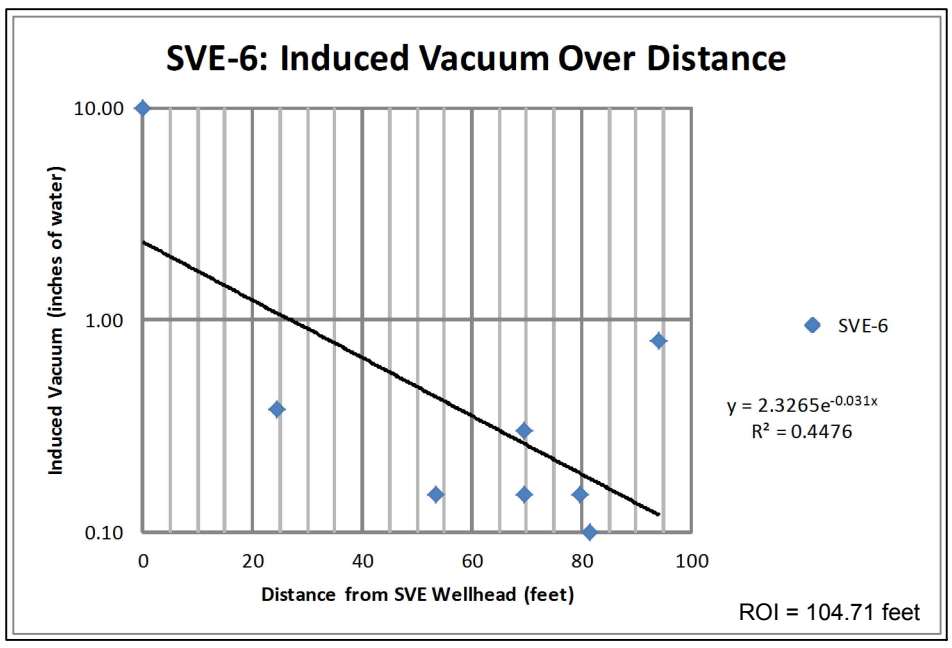


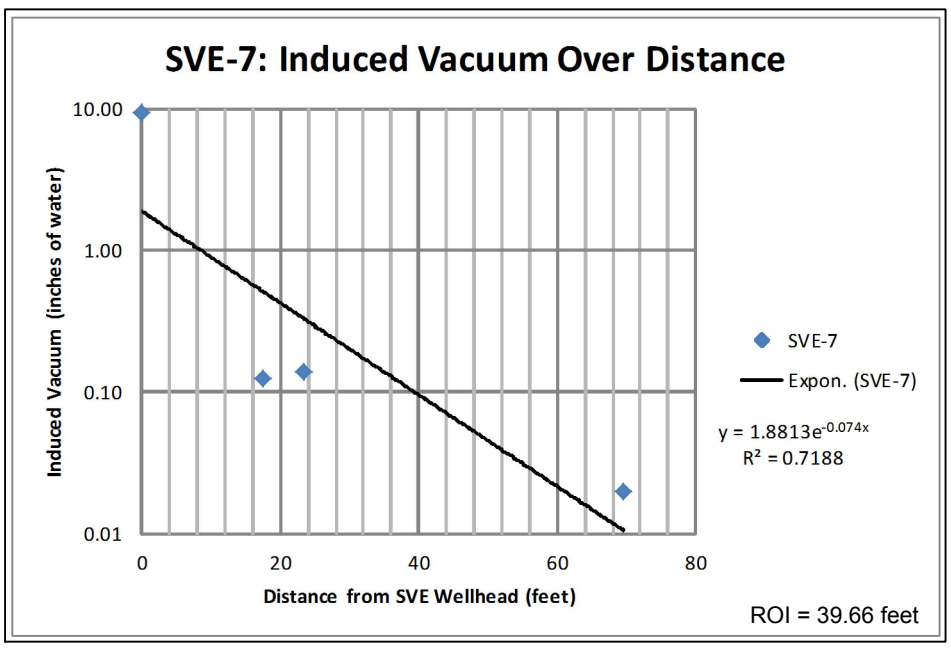
NOTE:
1. ROI = Radius of Influence
2. SVE = Soil Vapor Extraction
3. Average ROI calculated at wells SVE-3 through SVE-8 was 56.49 feet.

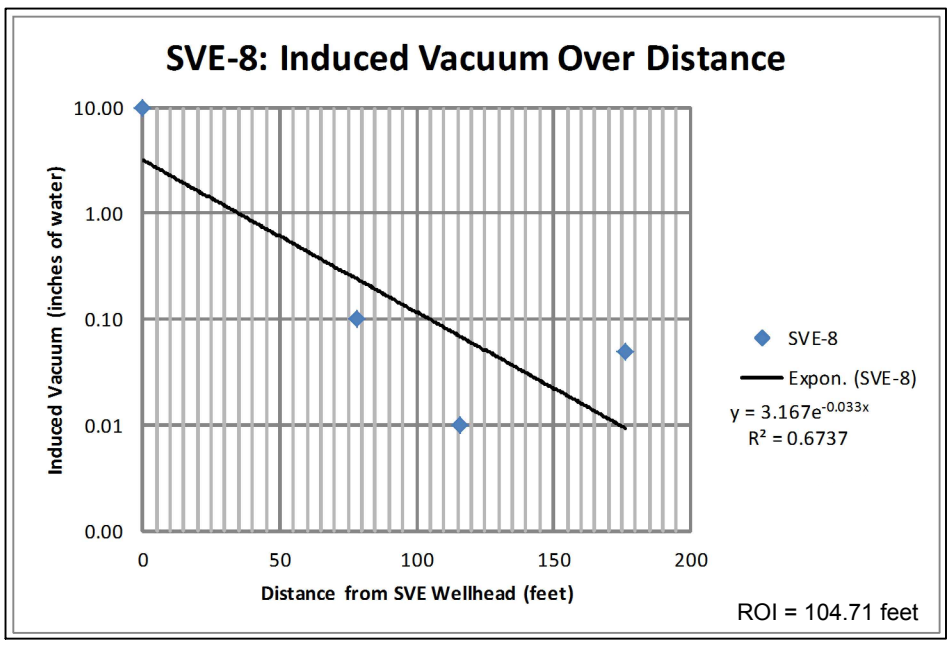


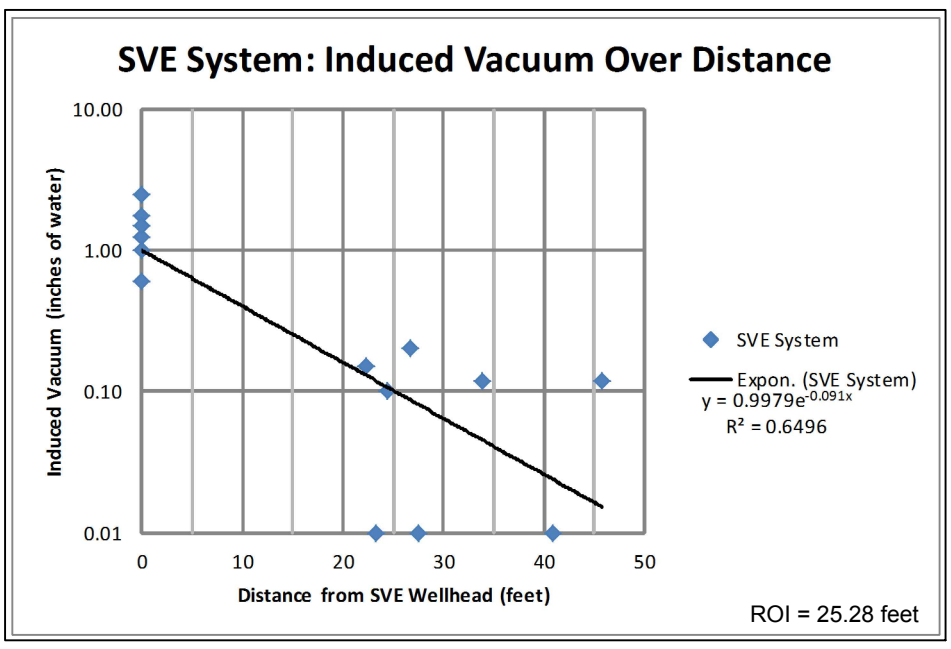


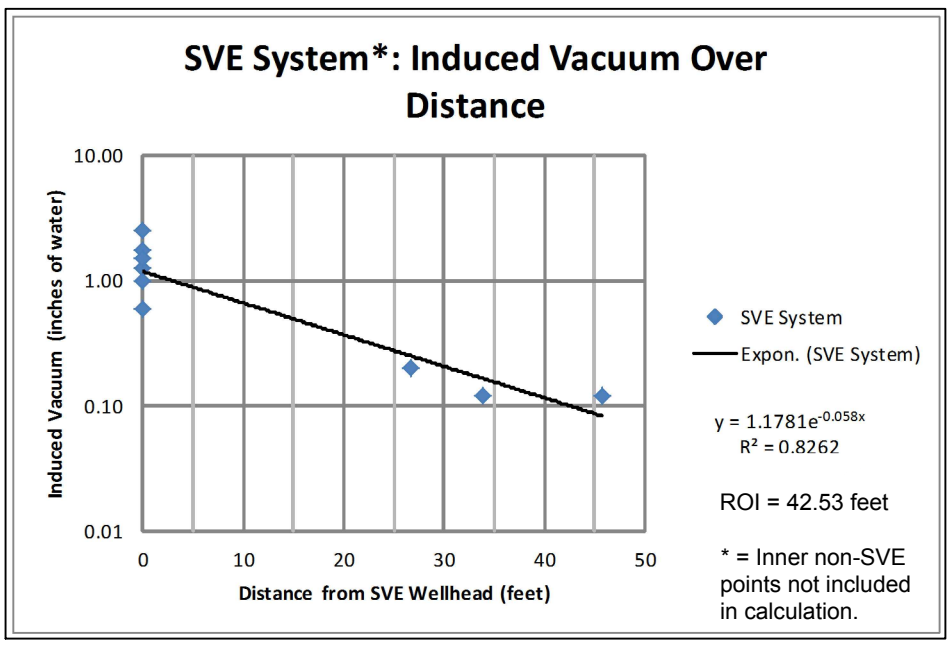




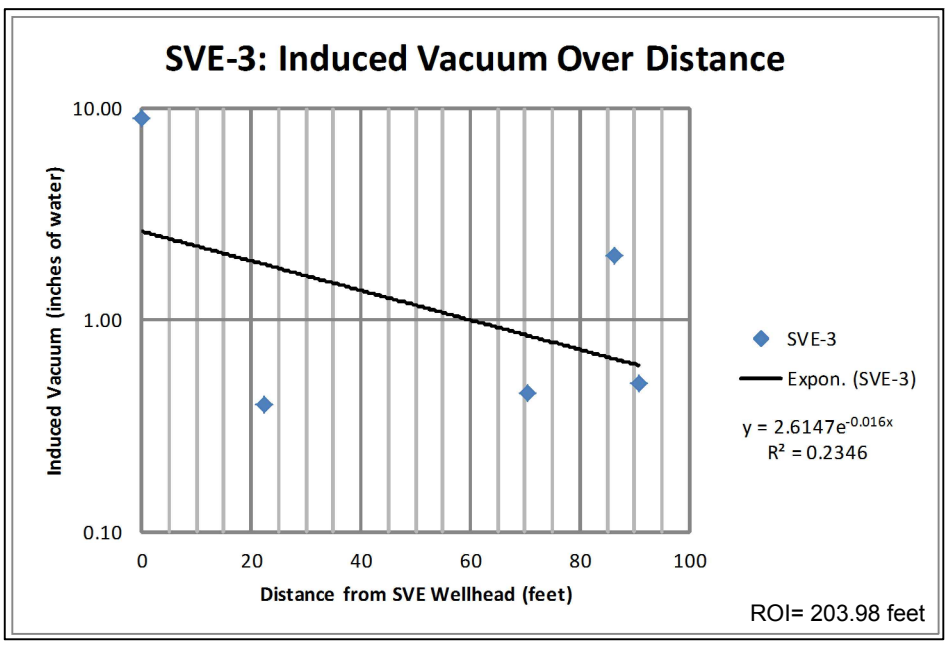


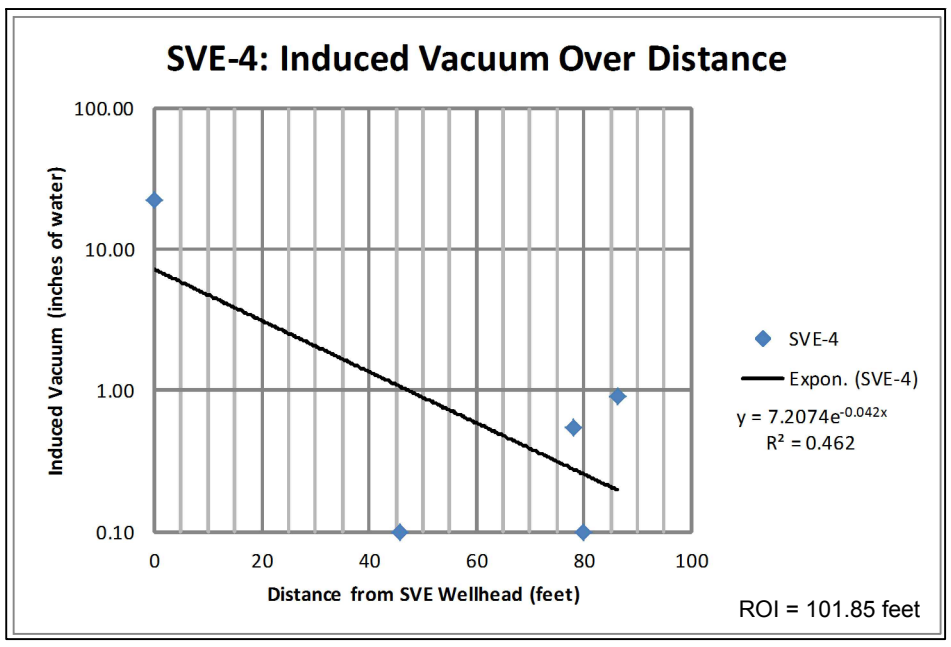


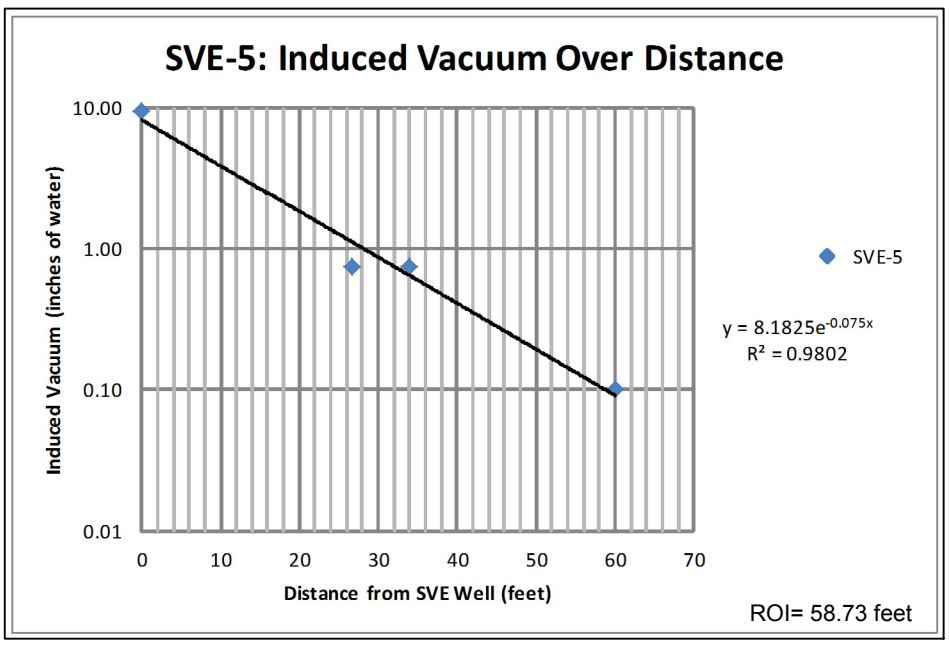


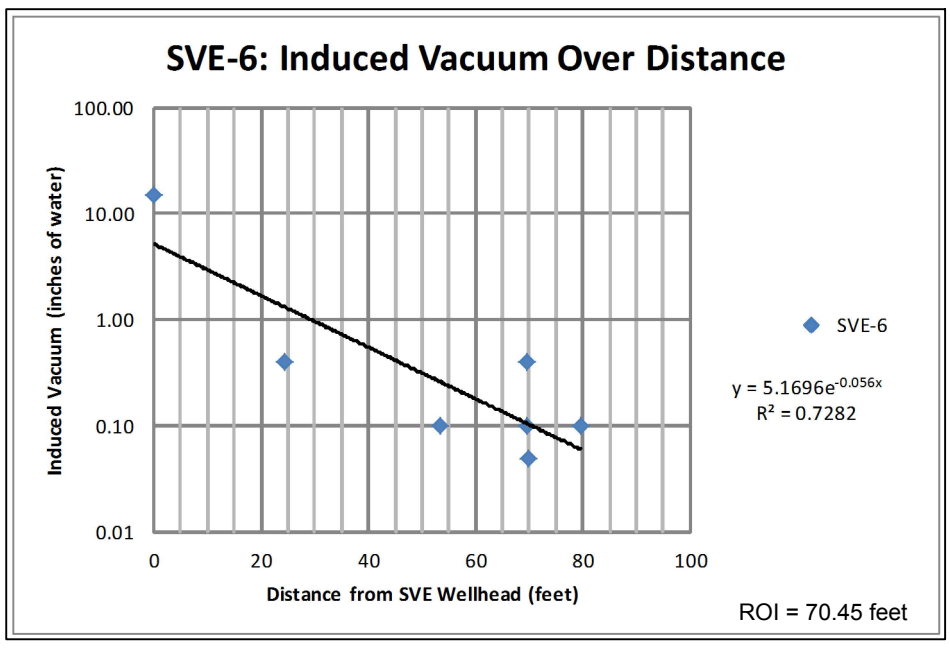


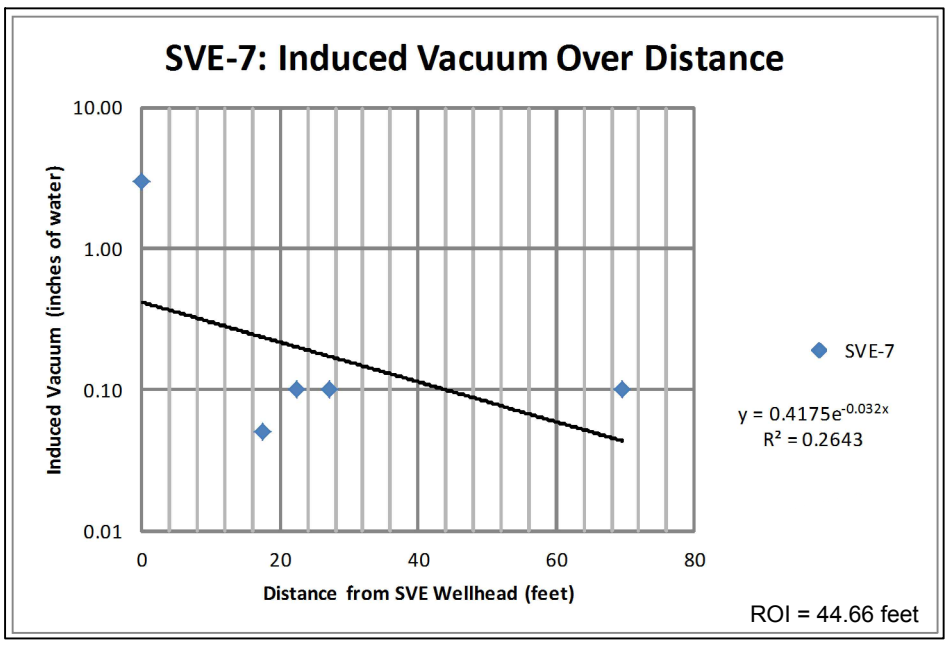
NOTE:
1. ROI = Radius of Influence
2. SVE = Soil Vapor Extraction
3. Average ROI calculated at wells SVE-3 through SVE-8 was 129.59 feet.

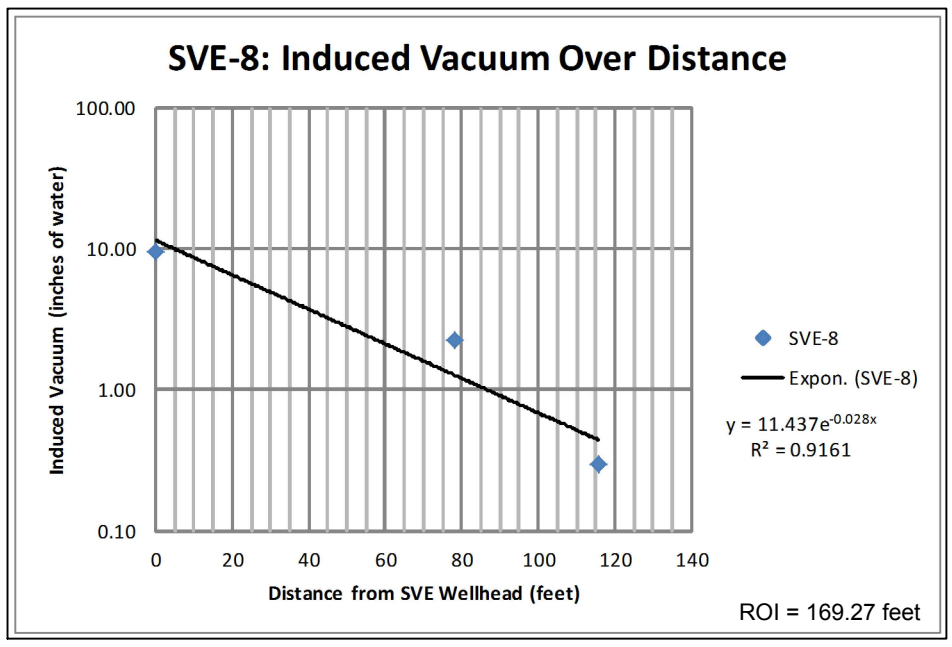




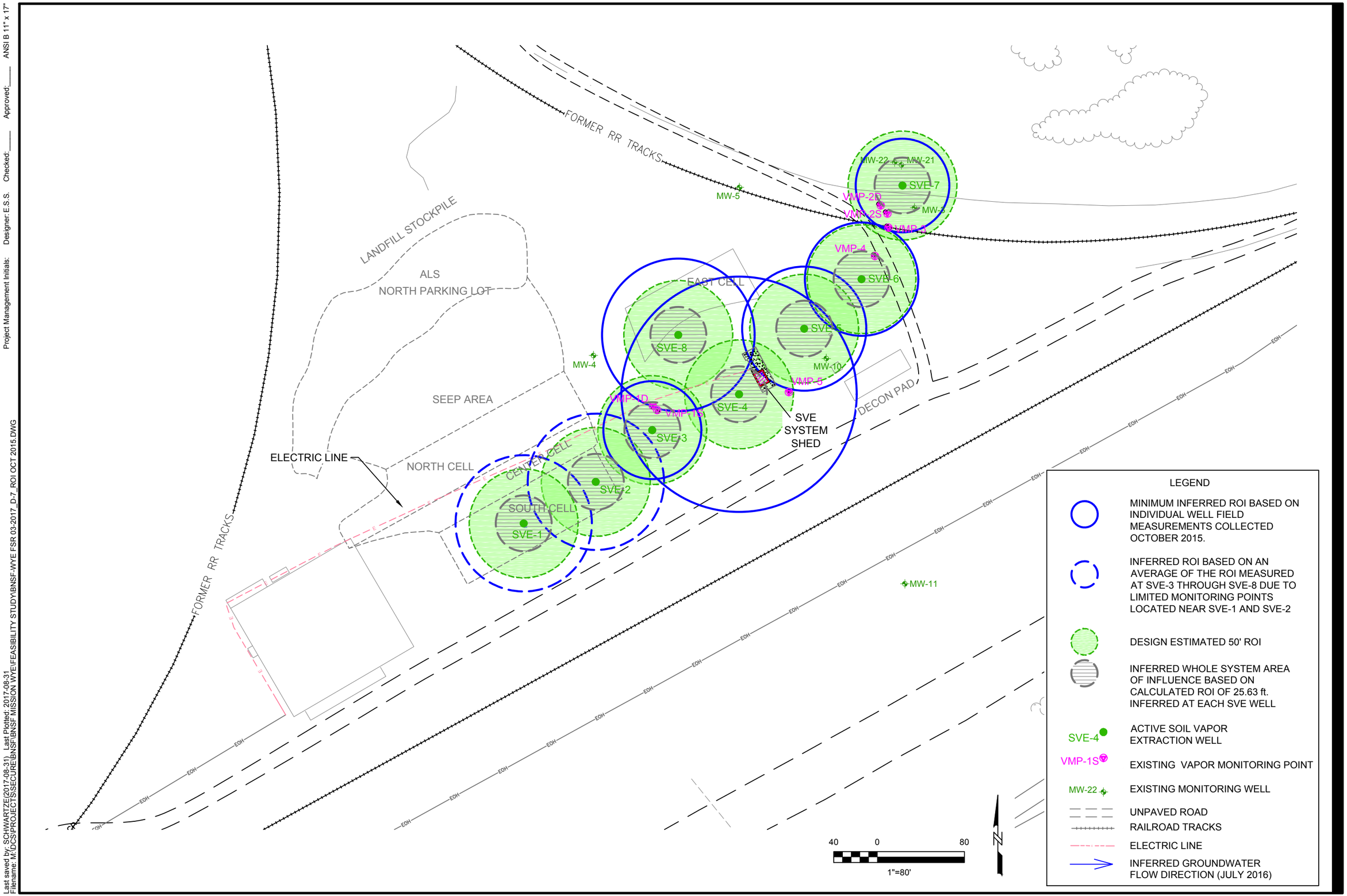








NOTE:
1. ROI = Radius of Influence
2. SVE = Soil Vapor Extraction
3. Average ROI calculated at wells SVE-3 through SVE-8 was 108.16 feet.



AECOM

Figure: D-7

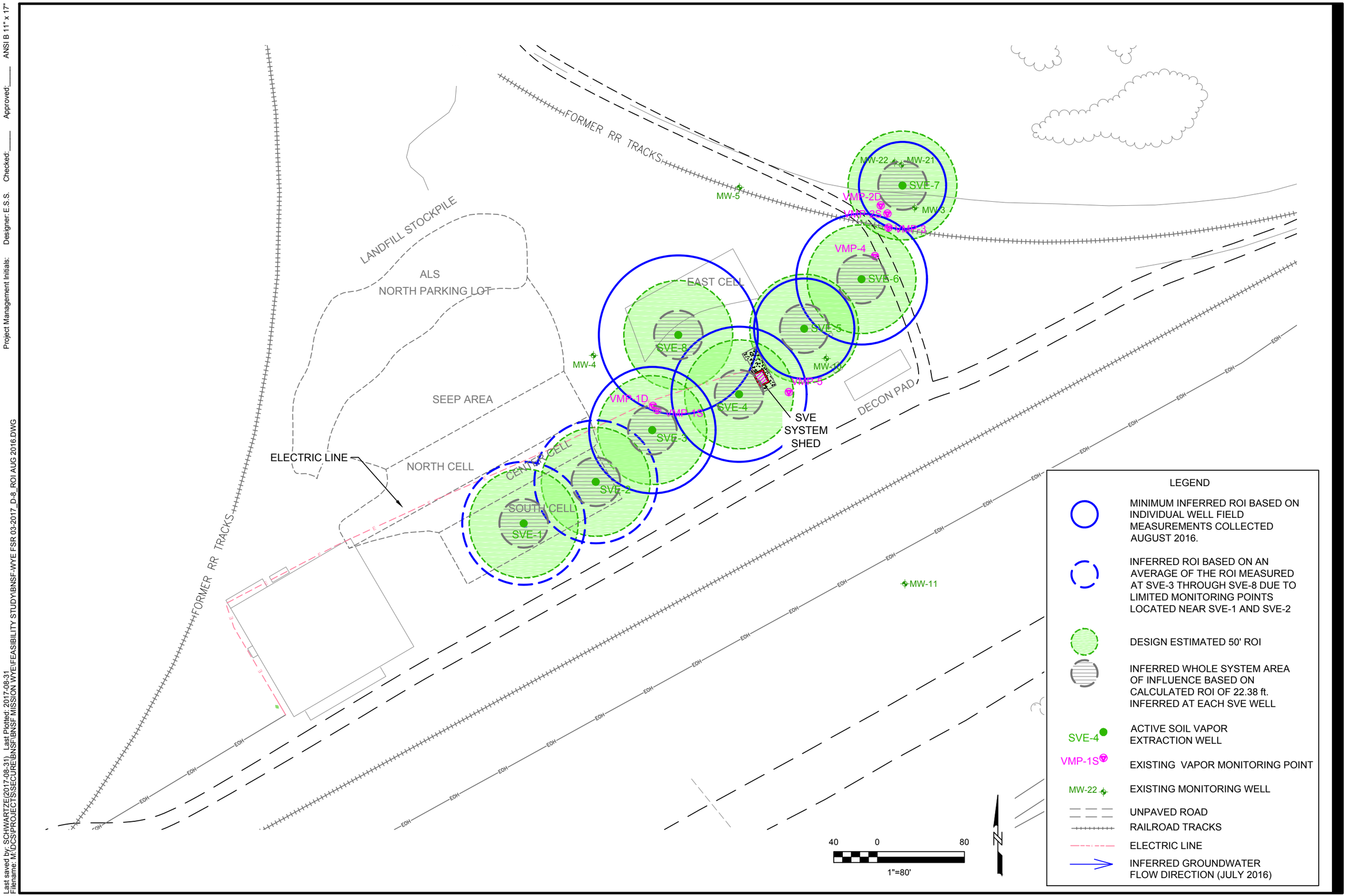
RADIUS OF INFLUENCE OF SVE WELLS
OCTOBER 2015

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: 08/31/17

Project Management Initials: Designer: E.S.S. Checked:_____ Approved:_____ ANSI B 11" x 17"

Last saved by: SCHWARTZE(2017-08-31) Last Plotted: 2017-08-31
Filename: M:\DCS\PROJECTS\SECURE\BNSF\BNSF MISSION WYE\FEASIBILITY STUDY\BNSF-WYE FSR 03-2017_D-7_ROI OCT 2015.DWG



AECOM

Figure: D-8

RADIUS OF INFLUENCE OF SVE WELLS
AUGUST 2016

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: 08/31/17

Project Management Initials: Designer: E.S.S. Checked:_____ Approved:_____ ANSI B 11" x 17"

Last saved by: SCHWARTZE(2017-08-31) Last Plotted: 2017-08-31
Filename: M:\DCS\PROJECTS\SECURE\BNSF\BNSF MISSION WYE\FEASIBILITY STUDY\BNSF-WYE FSR 03-2017_D-8_ROI AUG 2016.DWG

AECOM

Figure: D-9

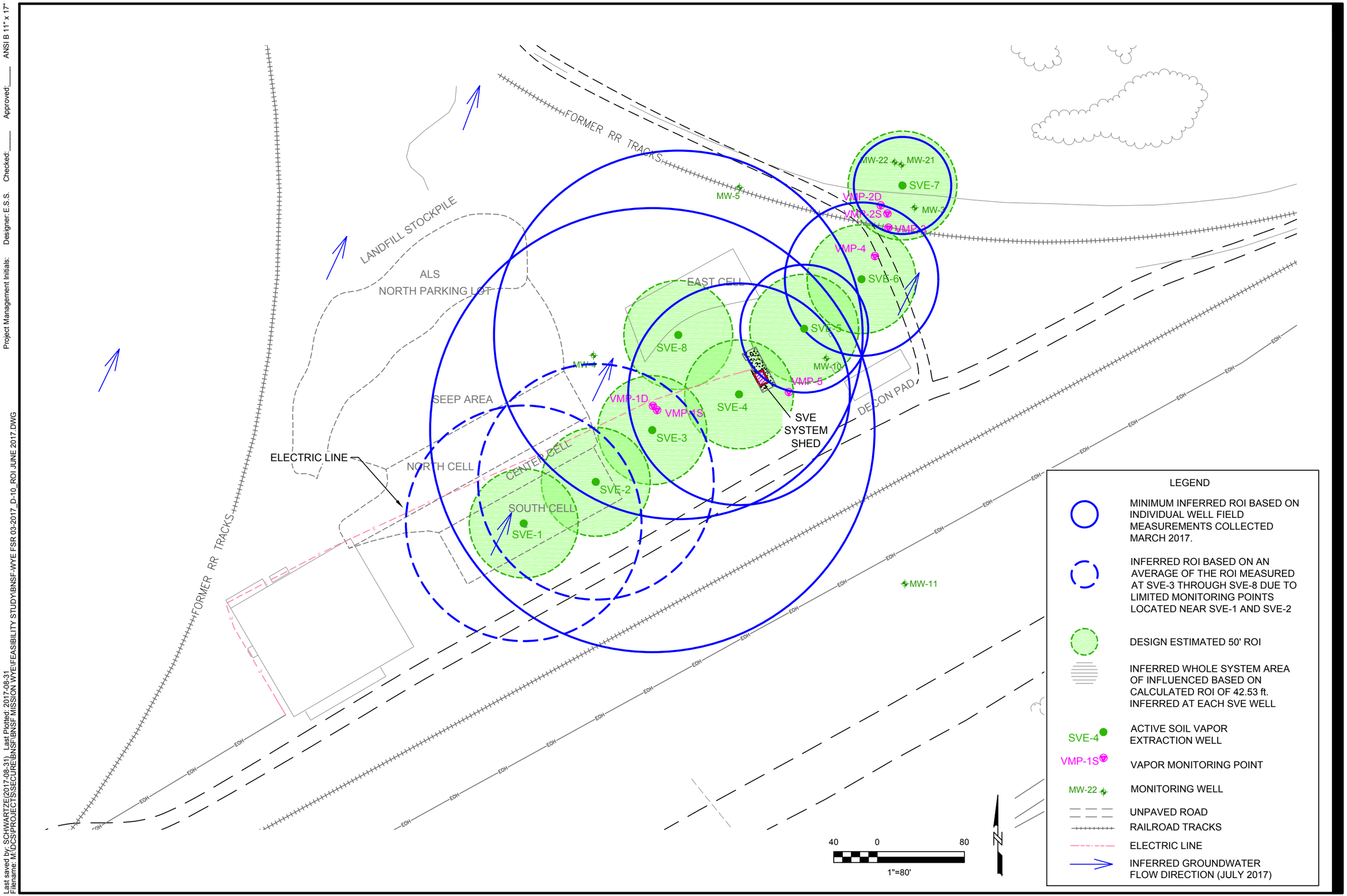
RADIUS OF INFLUENCE OF SVE WELLS
MARCH 2017

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: 08/31/17

Project Management Initials: Designer: E.S.S. Checked:_____ Approved:_____ ANSI B 11" x 17"

Last saved by: SCHWARTZE(2017-08-31) Last Plotted: 2017-08-31
Filename: M:\DCS\PROJECTS\SECURE\BNSF\BNSF MISSION WYE\FEASIBILITY STUDY\BNSF-WYE FSR 03-2017_D-9_ROI MAR 2017.DWG



AECOM

Figure: D-10

RADIUS OF INFLUENCE OF SVE WELLS
JUNE 2017

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: 08/31/17

Project Management Initials: Designer: E.S.S. Checked:_____ Approved:_____ ANSI B 11" x 17"

Last saved by: SCHWARTZE(2017-08-31) Last Plotted: 2017-08-31
Filename: M:\DCS\PROJECTS\SECURE\BNSF\BNSF MISSION WYE\FEASIBILITY STUDY\BNSF-WYE FSR 03-2017_D-10_ROI JUNE 2017.DWG

Attachment 1

Laboratory Analytical Reports

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

August 05, 2015

Shelly Young
AECOM, Inc.
207 North Broadway, Suite 315
Billings, MT 59101

RE: Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Dear Shelly Young:
Enclosed are the analytical results for sample(s) received by the laboratory on July 28, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

cc: Anna Kakai, AECOM

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Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

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: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10315840001	**Harris Stock Well**	Water	07/22/15 11:05	07/28/15 09:15
10315840002	**MW-19**	Water	07/22/15 11:20	07/28/15 09:15
10315840003	**MW-18**	Water	07/22/15 13:20	07/28/15 09:15
10315840004	**MW-32**	Water	07/22/15 11:40	07/28/15 09:15
10315840005	**MW-12**	Water	07/22/15 14:00	07/28/15 09:15
10315840006	**MW-14**	Water	07/22/15 14:35	07/28/15 09:15
10315840007	**Gravel Pit Well**	Water	07/22/15 14:30	07/28/15 09:15
10315840008	**Gravel Pit Pond**	Water	07/22/15 14:55	07/28/15 09:15
10315840009	**MW-1**	Water	07/22/15 15:40	07/28/15 09:15
10315840010	**MW-21**	Water	07/22/15 16:30	07/28/15 09:15
10315840011	**MW-22**	Water	07/23/15 11:25	07/28/15 09:15
10315840012	**MW-9**	Water	07/23/15 12:09	07/28/15 09:15
10315840013	**MW-4**	Water	07/23/15 13:45	07/28/15 09:15
10315840014	**MW-33**	Water	07/23/15 13:45	07/28/15 09:15
10315840015	**MW-5**	Water	07/23/15 14:25	07/28/15 09:15
10315840016	**MW-30**	Water	07/23/15 14:35	07/28/15 09:15
10315840017	**MW-3**	Water	07/23/15 15:05	07/28/15 09:15
10315840018	**Trip Blank**	Water	07/22/15 00:00	07/28/15 09:15

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SAMPLE ANALYTE COUNT

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10315840001	**Harris Stock Well**	EPA 524.2	SH2	73	PASI-M
10315840002	**MW-19**	EPA 8260B	AJC	70	PASI-M
10315840003	**MW-18**	EPA 8260B	AJC	70	PASI-M
10315840004	**MW-32**	EPA 8260B	AJC	70	PASI-M
10315840005	**MW-12**	EPA 8260B	AJC	70	PASI-M
10315840006	**MW-14**	EPA 8260B	AJC	70	PASI-M
10315840007	**Gravel Pit Well**	EPA 524.2	SH2	73	PASI-M
10315840008	**Gravel Pit Pond**	EPA 8260B	AJC	70	PASI-M
10315840009	**MW-1**	EPA 8260B	AJC	70	PASI-M
10315840010	**MW-21**	EPA 8260B	AJC	70	PASI-M
10315840011	**MW-22**	EPA 8260B	AJC	70	PASI-M
10315840012	**MW-9**	EPA 8260B	AJC	70	PASI-M
10315840013	**MW-4**	EPA 8260B	AJC	70	PASI-M
10315840014	**MW-33**	EPA 8260B	AJC	70	PASI-M
10315840015	**MW-5**	EPA 8260B	AJC	70	PASI-M
10315840016	**MW-30**	EPA 8260B	AJC	70	PASI-M
10315840017	**MW-3**	EPA 8260B	AJC	70	PASI-M
10315840018	**Trip Blank**	EPA 8260B	AJC	70	PASI-M

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PROJECT NARRATIVE

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Method: **EPA 524.2**
Description: 524.2 MSV
Client: AECOM
Date: August 05, 2015

General Information:
2 samples were analyzed for EPA 524.2. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

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.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates 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.

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: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: August 05, 2015

General Information:
16 samples were analyzed for EPA 8260B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

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.

QC Batch: MSV/32527

CH: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.

- LCS (Lab ID: 2033997)
  - Bromomethane
- MS (Lab ID: 2035048)
  - Bromomethane

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates 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.

QC Batch: MSV/32527

L0: Analyte recovery in the laboratory control sample (LCS) was outside QC limits.

- LCS (Lab ID: 2033997)
  - trans-1,2-Dichloroethene

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: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: August 05, 2015

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: Harris Stock Well **Lab ID: 10315840001** Collected: 07/22/15 11:05 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
524.2 MSV	Analytical Method: EPA 524.2								
Acetone	ND	ug/L	20.0	2.8	1		08/01/15 01:23	67-64-1	
Benzene	ND	ug/L	0.50	0.21	1		08/01/15 01:23	71-43-2	
Bromobenzene	ND	ug/L	0.50	0.25	1		08/01/15 01:23	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.32	1		08/01/15 01:23	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.14	1		08/01/15 01:23	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		08/01/15 01:23	75-25-2	
Bromomethane	ND	ug/L	4.0	0.32	1		08/01/15 01:23	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		08/01/15 01:23	78-93-3	
n-Butylbenzene	ND	ug/L	0.50	0.083	1		08/01/15 01:23	104-51-8	
sec-Butylbenzene	ND	ug/L	0.50	0.16	1		08/01/15 01:23	135-98-8	
tert-Butylbenzene	ND	ug/L	0.50	0.18	1		08/01/15 01:23	98-06-6	
Carbon disulfide	ND	ug/L	1.0	0.22	1		08/01/15 01:23	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		08/01/15 01:23	56-23-5	
Chlorobenzene	ND	ug/L	0.50	0.23	1		08/01/15 01:23	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		08/01/15 01:23	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		08/01/15 01:23	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		08/01/15 01:23	74-87-3	
2-Chlorotoluene	ND	ug/L	0.50	0.22	1		08/01/15 01:23	95-49-8	
4-Chlorotoluene	ND	ug/L	0.50	0.24	1		08/01/15 01:23	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		08/01/15 01:23	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		08/01/15 01:23	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	0.50	0.21	1		08/01/15 01:23	106-93-4	
Dibromomethane	ND	ug/L	1.0	0.31	1		08/01/15 01:23	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	0.50	0.22	1		08/01/15 01:23	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	0.21	1		08/01/15 01:23	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	0.16	1		08/01/15 01:23	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		08/01/15 01:23	75-71-8	
1,1-Dichloroethane	ND	ug/L	0.50	0.19	1		08/01/15 01:23	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	0.17	1		08/01/15 01:23	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	0.17	1		08/01/15 01:23	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	0.17	1		08/01/15 01:23	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	0.18	1		08/01/15 01:23	156-60-5	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		08/01/15 01:23	78-87-5	
1,3-Dichloropropane	ND	ug/L	0.50	0.24	1		08/01/15 01:23	142-28-9	
2,2-Dichloropropane	ND	ug/L	1.0	0.36	1		08/01/15 01:23	594-20-7	
1,1-Dichloropropene	ND	ug/L	0.50	0.16	1		08/01/15 01:23	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	0.50	0.21	1		08/01/15 01:23	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.22	1		08/01/15 01:23	10061-02-6	
Ethylbenzene	ND	ug/L	0.50	0.23	1		08/01/15 01:23	100-41-4	
Ethyl methacrylate	ND	ug/L	4.0	0.56	1		08/01/15 01:23	97-63-2	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.14	1		08/01/15 01:23	87-68-3	
2-Hexanone	ND	ug/L	5.0	2.3	1		08/01/15 01:23	591-78-6	
Isopropylbenzene (Cumene)	ND	ug/L	0.50	0.090	1		08/01/15 01:23	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.097	1		08/01/15 01:23	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		08/01/15 01:23	75-09-2	
Methyl methacrylate	ND	ug/L	5.0	0.50	1		08/01/15 01:23	80-62-6	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: Harris Stock Well **Lab ID: 10315840001** Collected: 07/22/15 11:05 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
524.2 MSV	Analytical Method: EPA 524.2								
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		08/01/15 01:23	108-10-1	
Methyl-tert-butyl ether	ND	ug/L	0.50	0.16	1		08/01/15 01:23	1634-04-4	
Naphthalene	ND	ug/L	1.0	0.14	1		08/01/15 01:23	91-20-3	
2-Nitropropane	ND	ug/L	20.0	2.0	1		08/01/15 01:23	79-46-9	
n-Propylbenzene	ND	ug/L	0.50	0.21	1		08/01/15 01:23	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		08/01/15 01:23	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	0.20	1		08/01/15 01:23	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	0.19	1		08/01/15 01:23	79-34-5	
Tetrachloroethene	**0.76J**	ug/L	1.0	0.15	1		08/01/15 01:23	127-18-4	
Toluene	ND	ug/L	0.50	0.12	1		08/01/15 01:23	108-88-3	
Total Trihalomethanes (Calc.)	ND	ug/L	4.0	2.0	1		08/01/15 01:23		
1,2,3-Trichlorobenzene	ND	ug/L	0.50	0.23	1		08/01/15 01:23	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	0.50	0.22	1		08/01/15 01:23	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	0.50	0.20	1		08/01/15 01:23	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	0.24	1		08/01/15 01:23	79-00-5	
Trichloroethene	**0.41J**	ug/L	0.50	0.14	1		08/01/15 01:23	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	0.18	1		08/01/15 01:23	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.34	1		08/01/15 01:23	96-18-4	
1,2,4-Trimethylbenzene	ND	ug/L	0.50	0.16	1		08/01/15 01:23	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	0.50	0.20	1		08/01/15 01:23	108-67-8	
Vinyl chloride	ND	ug/L	0.20	0.081	1		08/01/15 01:23	75-01-4	
Xylene (Total)	ND	ug/L	1.5	0.41	1		08/01/15 01:23	1330-20-7	
m&p-Xylene	ND	ug/L	1.0	0.41	1		08/01/15 01:23	179601-23-1	
o-Xylene	ND	ug/L	0.50	0.14	1		08/01/15 01:23	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	100	%.	75-125		1		08/01/15 01:23	460-00-4	
Toluene-d8 (S)	99	%.	75-125		1		08/01/15 01:23	2037-26-5	
1,2-Dichloroethane-d4 (S)	100	%.	75-125		1		08/01/15 01:23	17060-07-0	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-19 **Lab ID: 10315840002** Collected: 07/22/15 11:20 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/28/15 22:19	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/28/15 22:19	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/28/15 22:19	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/28/15 22:19	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/28/15 22:19	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/28/15 22:19	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/28/15 22:19	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/28/15 22:19	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/28/15 22:19	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/28/15 22:19	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/28/15 22:19	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/28/15 22:19	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/28/15 22:19	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/28/15 22:19	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/28/15 22:19	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/28/15 22:19	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/28/15 22:19	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/28/15 22:19	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/28/15 22:19	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/28/15 22:19	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/28/15 22:19	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/28/15 22:19	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/28/15 22:19	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/28/15 22:19	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/28/15 22:19	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/28/15 22:19	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/28/15 22:19	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/28/15 22:19	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/28/15 22:19	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/28/15 22:19	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		07/28/15 22:19	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/28/15 22:19	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/28/15 22:19	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/28/15 22:19	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/28/15 22:19	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/28/15 22:19	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/28/15 22:19	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/28/15 22:19	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/28/15 22:19	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/28/15 22:19	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/28/15 22:19	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/28/15 22:19	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/28/15 22:19	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/28/15 22:19	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/28/15 22:19	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/28/15 22:19	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-19 **Lab ID: 10315840002** Collected: 07/22/15 11:20 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/28/15 22:19	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/28/15 22:19	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/28/15 22:19	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/28/15 22:19	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/28/15 22:19	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/28/15 22:19	79-34-5	
Tetrachloroethene	**0.23J**	ug/L	1.0	0.19	1		07/28/15 22:19	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/28/15 22:19	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/28/15 22:19	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/28/15 22:19	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/28/15 22:19	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/28/15 22:19	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/28/15 22:19	79-00-5	
Trichloroethene	**0.57**	ug/L	0.40	0.14	1		07/28/15 22:19	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/28/15 22:19	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/28/15 22:19	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/28/15 22:19	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/28/15 22:19	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/28/15 22:19	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/28/15 22:19	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/28/15 22:19	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	93	%.	75-125		1		07/28/15 22:19	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/28/15 22:19	2037-26-5	
4-Bromofluorobenzene (S)	97	%.	75-125		1		07/28/15 22:19	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-18 **Lab ID: 10315840003** Collected: 07/22/15 13:20 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/28/15 22:33	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/28/15 22:33	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/28/15 22:33	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/28/15 22:33	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/28/15 22:33	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/28/15 22:33	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/28/15 22:33	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/28/15 22:33	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/28/15 22:33	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/28/15 22:33	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/28/15 22:33	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/28/15 22:33	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/28/15 22:33	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/28/15 22:33	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/28/15 22:33	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/28/15 22:33	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/28/15 22:33	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/28/15 22:33	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/28/15 22:33	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/28/15 22:33	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/28/15 22:33	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/28/15 22:33	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/28/15 22:33	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/28/15 22:33	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/28/15 22:33	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/28/15 22:33	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/28/15 22:33	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/28/15 22:33	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/28/15 22:33	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/28/15 22:33	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		07/28/15 22:33	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/28/15 22:33	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/28/15 22:33	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/28/15 22:33	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/28/15 22:33	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/28/15 22:33	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/28/15 22:33	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/28/15 22:33	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/28/15 22:33	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/28/15 22:33	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/28/15 22:33	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/28/15 22:33	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/28/15 22:33	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/28/15 22:33	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/28/15 22:33	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/28/15 22:33	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-18 **Lab ID: 10315840003** Collected: 07/22/15 13:20 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/28/15 22:33	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/28/15 22:33	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/28/15 22:33	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/28/15 22:33	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/28/15 22:33	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/28/15 22:33	79-34-5	
Tetrachloroethene	**0.39J**	ug/L	1.0	0.19	1		07/28/15 22:33	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/28/15 22:33	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/28/15 22:33	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/28/15 22:33	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/28/15 22:33	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/28/15 22:33	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/28/15 22:33	79-00-5	
Trichloroethene	**0.44**	ug/L	0.40	0.14	1		07/28/15 22:33	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/28/15 22:33	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/28/15 22:33	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/28/15 22:33	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/28/15 22:33	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/28/15 22:33	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/28/15 22:33	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/28/15 22:33	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	97	%.	75-125		1		07/28/15 22:33	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/28/15 22:33	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	75-125		1		07/28/15 22:33	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-32 **Lab ID: 10315840004** Collected: 07/22/15 11:40 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/28/15 23:02	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/28/15 23:02	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/28/15 23:02	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/28/15 23:02	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/28/15 23:02	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/28/15 23:02	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/28/15 23:02	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/28/15 23:02	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/28/15 23:02	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/28/15 23:02	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/28/15 23:02	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/28/15 23:02	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/28/15 23:02	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/28/15 23:02	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/28/15 23:02	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/28/15 23:02	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/28/15 23:02	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/28/15 23:02	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/28/15 23:02	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/28/15 23:02	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/28/15 23:02	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/28/15 23:02	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/28/15 23:02	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/28/15 23:02	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/28/15 23:02	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/28/15 23:02	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/28/15 23:02	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/28/15 23:02	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/28/15 23:02	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/28/15 23:02	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		07/28/15 23:02	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/28/15 23:02	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/28/15 23:02	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/28/15 23:02	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/28/15 23:02	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/28/15 23:02	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/28/15 23:02	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/28/15 23:02	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/28/15 23:02	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/28/15 23:02	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/28/15 23:02	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/28/15 23:02	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/28/15 23:02	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/28/15 23:02	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/28/15 23:02	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/28/15 23:02	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-32 **Lab ID: 10315840004** Collected: 07/22/15 11:40 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/28/15 23:02	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/28/15 23:02	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/28/15 23:02	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/28/15 23:02	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/28/15 23:02	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/28/15 23:02	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.19	1		07/28/15 23:02	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/28/15 23:02	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/28/15 23:02	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/28/15 23:02	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/28/15 23:02	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/28/15 23:02	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/28/15 23:02	79-00-5	
Trichloroethene	ND	ug/L	0.40	0.14	1		07/28/15 23:02	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/28/15 23:02	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/28/15 23:02	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/28/15 23:02	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/28/15 23:02	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/28/15 23:02	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/28/15 23:02	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/28/15 23:02	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	94	%.	75-125		1		07/28/15 23:02	17060-07-0	
Toluene-d8 (S)	100	%.	75-125		1		07/28/15 23:02	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	75-125		1		07/28/15 23:02	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-12 **Lab ID: 10315840005** Collected: 07/22/15 14:00 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/28/15 23:16	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/28/15 23:16	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/28/15 23:16	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/28/15 23:16	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/28/15 23:16	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/28/15 23:16	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/28/15 23:16	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/28/15 23:16	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/28/15 23:16	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/28/15 23:16	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/28/15 23:16	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/28/15 23:16	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/28/15 23:16	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/28/15 23:16	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/28/15 23:16	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/28/15 23:16	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/28/15 23:16	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/28/15 23:16	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/28/15 23:16	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/28/15 23:16	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/28/15 23:16	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/28/15 23:16	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/28/15 23:16	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/28/15 23:16	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/28/15 23:16	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/28/15 23:16	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/28/15 23:16	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/28/15 23:16	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/28/15 23:16	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/28/15 23:16	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		07/28/15 23:16	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/28/15 23:16	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/28/15 23:16	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/28/15 23:16	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/28/15 23:16	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/28/15 23:16	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/28/15 23:16	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/28/15 23:16	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/28/15 23:16	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/28/15 23:16	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/28/15 23:16	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/28/15 23:16	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/28/15 23:16	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/28/15 23:16	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/28/15 23:16	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/28/15 23:16	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-12 **Lab ID: 10315840005** Collected: 07/22/15 14:00 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/28/15 23:16	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/28/15 23:16	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/28/15 23:16	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/28/15 23:16	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/28/15 23:16	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/28/15 23:16	79-34-5	
Tetrachloroethene	**0.24J**	ug/L	1.0	0.19	1		07/28/15 23:16	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/28/15 23:16	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/28/15 23:16	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/28/15 23:16	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/28/15 23:16	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/28/15 23:16	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/28/15 23:16	79-00-5	
Trichloroethene	**0.58**	ug/L	0.40	0.14	1		07/28/15 23:16	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/28/15 23:16	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/28/15 23:16	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/28/15 23:16	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/28/15 23:16	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/28/15 23:16	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/28/15 23:16	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/28/15 23:16	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	96	%.	75-125		1		07/28/15 23:16	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		07/28/15 23:16	2037-26-5	
4-Bromofluorobenzene (S)	97	%.	75-125		1		07/28/15 23:16	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-14 **Lab ID: 10315840006** Collected: 07/22/15 14:35 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/28/15 23:31	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/28/15 23:31	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/28/15 23:31	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/28/15 23:31	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/28/15 23:31	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/28/15 23:31	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/28/15 23:31	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/28/15 23:31	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/28/15 23:31	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/28/15 23:31	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/28/15 23:31	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/28/15 23:31	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/28/15 23:31	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/28/15 23:31	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/28/15 23:31	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/28/15 23:31	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/28/15 23:31	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/28/15 23:31	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/28/15 23:31	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/28/15 23:31	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/28/15 23:31	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/28/15 23:31	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/28/15 23:31	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/28/15 23:31	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/28/15 23:31	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/28/15 23:31	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/28/15 23:31	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/28/15 23:31	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/28/15 23:31	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/28/15 23:31	75-35-4	
cis-1,2-Dichloroethene	**0.94J**	ug/L	1.0	0.25	1		07/28/15 23:31	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/28/15 23:31	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/28/15 23:31	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/28/15 23:31	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/28/15 23:31	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/28/15 23:31	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/28/15 23:31	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/28/15 23:31	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/28/15 23:31	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/28/15 23:31	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/28/15 23:31	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/28/15 23:31	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/28/15 23:31	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/28/15 23:31	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/28/15 23:31	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/28/15 23:31	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-14 **Lab ID: 10315840006** Collected: 07/22/15 14:35 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/28/15 23:31	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/28/15 23:31	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/28/15 23:31	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/28/15 23:31	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/28/15 23:31	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/28/15 23:31	79-34-5	
Tetrachloroethene	**1.8**	ug/L	1.0	0.19	1		07/28/15 23:31	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/28/15 23:31	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/28/15 23:31	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/28/15 23:31	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/28/15 23:31	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/28/15 23:31	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/28/15 23:31	79-00-5	
Trichloroethene	**0.64**	ug/L	0.40	0.14	1		07/28/15 23:31	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/28/15 23:31	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/28/15 23:31	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/28/15 23:31	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/28/15 23:31	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/28/15 23:31	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/28/15 23:31	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/28/15 23:31	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	95	%.	75-125		1		07/28/15 23:31	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/28/15 23:31	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	75-125		1		07/28/15 23:31	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: Gravel Pit Well **Lab ID: 10315840007** Collected: 07/22/15 14:30 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
524.2 MSV	Analytical Method: EPA 524.2								
Acetone	ND	ug/L	20.0	2.8	1		08/01/15 01:50	67-64-1	
Benzene	ND	ug/L	0.50	0.21	1		08/01/15 01:50	71-43-2	
Bromobenzene	ND	ug/L	0.50	0.25	1		08/01/15 01:50	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.32	1		08/01/15 01:50	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.14	1		08/01/15 01:50	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		08/01/15 01:50	75-25-2	
Bromomethane	ND	ug/L	4.0	0.32	1		08/01/15 01:50	74-83-9	
2-Butanone (MEK)	**5.5**	ug/L	5.0	2.5	1		08/01/15 01:50	78-93-3	
n-Butylbenzene	ND	ug/L	0.50	0.083	1		08/01/15 01:50	104-51-8	
sec-Butylbenzene	ND	ug/L	0.50	0.16	1		08/01/15 01:50	135-98-8	
tert-Butylbenzene	ND	ug/L	0.50	0.18	1		08/01/15 01:50	98-06-6	
Carbon disulfide	ND	ug/L	1.0	0.22	1		08/01/15 01:50	75-15-0	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		08/01/15 01:50	56-23-5	
Chlorobenzene	ND	ug/L	0.50	0.23	1		08/01/15 01:50	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		08/01/15 01:50	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		08/01/15 01:50	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		08/01/15 01:50	74-87-3	
2-Chlorotoluene	ND	ug/L	0.50	0.22	1		08/01/15 01:50	95-49-8	
4-Chlorotoluene	ND	ug/L	0.50	0.24	1		08/01/15 01:50	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		08/01/15 01:50	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		08/01/15 01:50	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	0.50	0.21	1		08/01/15 01:50	106-93-4	
Dibromomethane	ND	ug/L	1.0	0.31	1		08/01/15 01:50	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	0.50	0.22	1		08/01/15 01:50	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	0.50	0.21	1		08/01/15 01:50	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	0.50	0.16	1		08/01/15 01:50	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		08/01/15 01:50	75-71-8	
1,1-Dichloroethane	ND	ug/L	0.50	0.19	1		08/01/15 01:50	75-34-3	
1,2-Dichloroethane	ND	ug/L	0.50	0.17	1		08/01/15 01:50	107-06-2	
1,1-Dichloroethene	ND	ug/L	0.50	0.17	1		08/01/15 01:50	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	0.50	0.17	1		08/01/15 01:50	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	0.50	0.18	1		08/01/15 01:50	156-60-5	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		08/01/15 01:50	78-87-5	
1,3-Dichloropropane	ND	ug/L	0.50	0.24	1		08/01/15 01:50	142-28-9	
2,2-Dichloropropane	ND	ug/L	1.0	0.36	1		08/01/15 01:50	594-20-7	
1,1-Dichloropropene	ND	ug/L	0.50	0.16	1		08/01/15 01:50	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	0.50	0.21	1		08/01/15 01:50	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	0.22	1		08/01/15 01:50	10061-02-6	
Ethylbenzene	ND	ug/L	0.50	0.23	1		08/01/15 01:50	100-41-4	
Ethyl methacrylate	ND	ug/L	4.0	0.56	1		08/01/15 01:50	97-63-2	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.14	1		08/01/15 01:50	87-68-3	
2-Hexanone	ND	ug/L	5.0	2.3	1		08/01/15 01:50	591-78-6	
Isopropylbenzene (Cumene)	ND	ug/L	0.50	0.090	1		08/01/15 01:50	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.097	1		08/01/15 01:50	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		08/01/15 01:50	75-09-2	
Methyl methacrylate	ND	ug/L	5.0	0.50	1		08/01/15 01:50	80-62-6	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: Gravel Pit Well **Lab ID: 10315840007** Collected: 07/22/15 14:30 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
524.2 MSV	Analytical Method: EPA 524.2								
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		08/01/15 01:50	108-10-1	
Methyl-tert-butyl ether	ND	ug/L	0.50	0.16	1		08/01/15 01:50	1634-04-4	
Naphthalene	ND	ug/L	1.0	0.14	1		08/01/15 01:50	91-20-3	
2-Nitropropane	ND	ug/L	20.0	2.0	1		08/01/15 01:50	79-46-9	
n-Propylbenzene	ND	ug/L	0.50	0.21	1		08/01/15 01:50	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		08/01/15 01:50	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	0.50	0.20	1		08/01/15 01:50	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	0.50	0.19	1		08/01/15 01:50	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.15	1		08/01/15 01:50	127-18-4	
Toluene	ND	ug/L	0.50	0.12	1		08/01/15 01:50	108-88-3	
Total Trihalomethanes (Calc.)	ND	ug/L	4.0	2.0	1		08/01/15 01:50		
1,2,3-Trichlorobenzene	ND	ug/L	0.50	0.23	1		08/01/15 01:50	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	0.50	0.22	1		08/01/15 01:50	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	0.50	0.20	1		08/01/15 01:50	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	0.50	0.24	1		08/01/15 01:50	79-00-5	
Trichloroethene	ND	ug/L	0.50	0.14	1		08/01/15 01:50	79-01-6	
Trichlorofluoromethane	ND	ug/L	0.50	0.18	1		08/01/15 01:50	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.34	1		08/01/15 01:50	96-18-4	
1,2,4-Trimethylbenzene	ND	ug/L	0.50	0.16	1		08/01/15 01:50	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	0.50	0.20	1		08/01/15 01:50	108-67-8	
Vinyl chloride	ND	ug/L	0.20	0.081	1		08/01/15 01:50	75-01-4	
Xylene (Total)	ND	ug/L	1.5	0.41	1		08/01/15 01:50	1330-20-7	
m&p-Xylene	ND	ug/L	1.0	0.41	1		08/01/15 01:50	179601-23-1	
o-Xylene	ND	ug/L	0.50	0.14	1		08/01/15 01:50	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	100	%.	75-125		1		08/01/15 01:50	460-00-4	
Toluene-d8 (S)	101	%.	75-125		1		08/01/15 01:50	2037-26-5	
1,2-Dichloroethane-d4 (S)	100	%.	75-125		1		08/01/15 01:50	17060-07-0	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: Gravel Pit Pond **Lab ID: 10315840008** Collected: 07/22/15 14:55 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/28/15 23:45	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/28/15 23:45	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/28/15 23:45	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/28/15 23:45	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/28/15 23:45	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/28/15 23:45	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/28/15 23:45	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/28/15 23:45	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/28/15 23:45	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/28/15 23:45	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/28/15 23:45	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/28/15 23:45	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/28/15 23:45	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/28/15 23:45	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/28/15 23:45	75-00-3	
Chloroform	**0.32J**	ug/L	1.0	0.27	1		07/28/15 23:45	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/28/15 23:45	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/28/15 23:45	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/28/15 23:45	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/28/15 23:45	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/28/15 23:45	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/28/15 23:45	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/28/15 23:45	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/28/15 23:45	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/28/15 23:45	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/28/15 23:45	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/28/15 23:45	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/28/15 23:45	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/28/15 23:45	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/28/15 23:45	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		07/28/15 23:45	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/28/15 23:45	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/28/15 23:45	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/28/15 23:45	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/28/15 23:45	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/28/15 23:45	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/28/15 23:45	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/28/15 23:45	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/28/15 23:45	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/28/15 23:45	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/28/15 23:45	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/28/15 23:45	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/28/15 23:45	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/28/15 23:45	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/28/15 23:45	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/28/15 23:45	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: Gravel Pit Pond **Lab ID: 10315840008** Collected: 07/22/15 14:55 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/28/15 23:45	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/28/15 23:45	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/28/15 23:45	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/28/15 23:45	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/28/15 23:45	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/28/15 23:45	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.19	1		07/28/15 23:45	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/28/15 23:45	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/28/15 23:45	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/28/15 23:45	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/28/15 23:45	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/28/15 23:45	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/28/15 23:45	79-00-5	
Trichloroethene	ND	ug/L	0.40	0.14	1		07/28/15 23:45	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/28/15 23:45	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/28/15 23:45	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/28/15 23:45	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/28/15 23:45	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/28/15 23:45	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/28/15 23:45	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/28/15 23:45	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	97	%.	75-125		1		07/28/15 23:45	17060-07-0	
Toluene-d8 (S)	101	%.	75-125		1		07/28/15 23:45	2037-26-5	
4-Bromofluorobenzene (S)	100	%.	75-125		1		07/28/15 23:45	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-1 **Lab ID: 10315840009** Collected: 07/22/15 15:40 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/29/15 00:00	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/29/15 00:00	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/29/15 00:00	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/29/15 00:00	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/29/15 00:00	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/29/15 00:00	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/29/15 00:00	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/29/15 00:00	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/29/15 00:00	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/29/15 00:00	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:00	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/29/15 00:00	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/29/15 00:00	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:00	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/29/15 00:00	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/29/15 00:00	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/29/15 00:00	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/29/15 00:00	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/29/15 00:00	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/29/15 00:00	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/29/15 00:00	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/29/15 00:00	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/29/15 00:00	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 00:00	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/29/15 00:00	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:00	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/29/15 00:00	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/29/15 00:00	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/29/15 00:00	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/29/15 00:00	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		07/29/15 00:00	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/29/15 00:00	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/29/15 00:00	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/29/15 00:00	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/29/15 00:00	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/29/15 00:00	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/29/15 00:00	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/29/15 00:00	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/29/15 00:00	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/29/15 00:00	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:00	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/29/15 00:00	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/29/15 00:00	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/29/15 00:00	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/29/15 00:00	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/29/15 00:00	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-1 **Lab ID: 10315840009** Collected: 07/22/15 15:40 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/29/15 00:00	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/29/15 00:00	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/29/15 00:00	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/29/15 00:00	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/29/15 00:00	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/29/15 00:00	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.19	1		07/29/15 00:00	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/29/15 00:00	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/29/15 00:00	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:00	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 00:00	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/29/15 00:00	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/29/15 00:00	79-00-5	
Trichloroethene	ND	ug/L	0.40	0.14	1		07/29/15 00:00	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/29/15 00:00	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/29/15 00:00	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/29/15 00:00	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:00	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/29/15 00:00	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/29/15 00:00	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/29/15 00:00	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	96	%.	75-125		1		07/29/15 00:00	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		07/29/15 00:00	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	75-125		1		07/29/15 00:00	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-21 **Lab ID: 10315840010** Collected: 07/22/15 16:30 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/29/15 00:14	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/29/15 00:14	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/29/15 00:14	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/29/15 00:14	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/29/15 00:14	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/29/15 00:14	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/29/15 00:14	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/29/15 00:14	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/29/15 00:14	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/29/15 00:14	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:14	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/29/15 00:14	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/29/15 00:14	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:14	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/29/15 00:14	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/29/15 00:14	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/29/15 00:14	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/29/15 00:14	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/29/15 00:14	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/29/15 00:14	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/29/15 00:14	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/29/15 00:14	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/29/15 00:14	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 00:14	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/29/15 00:14	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:14	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/29/15 00:14	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/29/15 00:14	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/29/15 00:14	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/29/15 00:14	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		07/29/15 00:14	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/29/15 00:14	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/29/15 00:14	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/29/15 00:14	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/29/15 00:14	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/29/15 00:14	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/29/15 00:14	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/29/15 00:14	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/29/15 00:14	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/29/15 00:14	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:14	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/29/15 00:14	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/29/15 00:14	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/29/15 00:14	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/29/15 00:14	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/29/15 00:14	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-21 **Lab ID: 10315840010** Collected: 07/22/15 16:30 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/29/15 00:14	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/29/15 00:14	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/29/15 00:14	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/29/15 00:14	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/29/15 00:14	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/29/15 00:14	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.19	1		07/29/15 00:14	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/29/15 00:14	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/29/15 00:14	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:14	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 00:14	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/29/15 00:14	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/29/15 00:14	79-00-5	
Trichloroethene	ND	ug/L	0.40	0.14	1		07/29/15 00:14	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/29/15 00:14	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/29/15 00:14	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/29/15 00:14	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:14	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/29/15 00:14	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/29/15 00:14	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/29/15 00:14	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	96	%.	75-125		1		07/29/15 00:14	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/29/15 00:14	2037-26-5	
4-Bromofluorobenzene (S)	97	%.	75-125		1		07/29/15 00:14	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-22 **Lab ID: 10315840011** Collected: 07/23/15 11:25 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/29/15 00:29	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/29/15 00:29	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/29/15 00:29	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/29/15 00:29	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/29/15 00:29	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/29/15 00:29	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/29/15 00:29	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/29/15 00:29	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/29/15 00:29	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/29/15 00:29	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:29	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/29/15 00:29	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/29/15 00:29	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:29	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/29/15 00:29	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/29/15 00:29	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/29/15 00:29	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/29/15 00:29	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/29/15 00:29	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/29/15 00:29	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/29/15 00:29	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/29/15 00:29	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/29/15 00:29	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 00:29	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/29/15 00:29	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:29	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/29/15 00:29	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/29/15 00:29	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/29/15 00:29	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/29/15 00:29	75-35-4	
cis-1,2-Dichloroethene	**0.48J**	ug/L	1.0	0.25	1		07/29/15 00:29	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/29/15 00:29	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/29/15 00:29	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/29/15 00:29	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/29/15 00:29	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/29/15 00:29	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/29/15 00:29	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/29/15 00:29	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/29/15 00:29	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/29/15 00:29	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:29	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/29/15 00:29	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/29/15 00:29	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/29/15 00:29	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/29/15 00:29	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/29/15 00:29	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-22 **Lab ID: 10315840011** Collected: 07/23/15 11:25 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/29/15 00:29	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/29/15 00:29	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/29/15 00:29	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/29/15 00:29	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/29/15 00:29	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/29/15 00:29	79-34-5	
Tetrachloroethene	**1.4**	ug/L	1.0	0.19	1		07/29/15 00:29	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/29/15 00:29	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/29/15 00:29	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:29	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 00:29	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/29/15 00:29	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/29/15 00:29	79-00-5	
Trichloroethene	**0.38J**	ug/L	0.40	0.14	1		07/29/15 00:29	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/29/15 00:29	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/29/15 00:29	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/29/15 00:29	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:29	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/29/15 00:29	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/29/15 00:29	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/29/15 00:29	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	94	%.	75-125		1		07/29/15 00:29	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		07/29/15 00:29	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	75-125		1		07/29/15 00:29	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-9 **Lab ID: 10315840012** Collected: 07/23/15 12:09 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/29/15 00:43	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/29/15 00:43	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/29/15 00:43	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/29/15 00:43	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/29/15 00:43	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/29/15 00:43	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/29/15 00:43	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/29/15 00:43	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/29/15 00:43	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/29/15 00:43	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:43	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/29/15 00:43	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/29/15 00:43	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:43	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/29/15 00:43	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/29/15 00:43	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/29/15 00:43	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/29/15 00:43	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/29/15 00:43	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/29/15 00:43	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/29/15 00:43	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/29/15 00:43	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/29/15 00:43	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 00:43	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/29/15 00:43	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:43	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/29/15 00:43	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/29/15 00:43	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/29/15 00:43	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/29/15 00:43	75-35-4	
cis-1,2-Dichloroethene	**2.6**	ug/L	1.0	0.25	1		07/29/15 00:43	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/29/15 00:43	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/29/15 00:43	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/29/15 00:43	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/29/15 00:43	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/29/15 00:43	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/29/15 00:43	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/29/15 00:43	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/29/15 00:43	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/29/15 00:43	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:43	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/29/15 00:43	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/29/15 00:43	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/29/15 00:43	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/29/15 00:43	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/29/15 00:43	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-9 **Lab ID: 10315840012** Collected: 07/23/15 12:09 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/29/15 00:43	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/29/15 00:43	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/29/15 00:43	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/29/15 00:43	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/29/15 00:43	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/29/15 00:43	79-34-5	
Tetrachloroethene	**5.2**	ug/L	1.0	0.19	1		07/29/15 00:43	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/29/15 00:43	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/29/15 00:43	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:43	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 00:43	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/29/15 00:43	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/29/15 00:43	79-00-5	
Trichloroethene	**1.5**	ug/L	0.40	0.14	1		07/29/15 00:43	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/29/15 00:43	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/29/15 00:43	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/29/15 00:43	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:43	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/29/15 00:43	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/29/15 00:43	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/29/15 00:43	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	95	%.	75-125		1		07/29/15 00:43	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/29/15 00:43	2037-26-5	
4-Bromofluorobenzene (S)	97	%.	75-125		1		07/29/15 00:43	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-4 **Lab ID: 10315840013** Collected: 07/23/15 13:45 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/29/15 00:58	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/29/15 00:58	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/29/15 00:58	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/29/15 00:58	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/29/15 00:58	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/29/15 00:58	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/29/15 00:58	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/29/15 00:58	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/29/15 00:58	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/29/15 00:58	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:58	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/29/15 00:58	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/29/15 00:58	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:58	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/29/15 00:58	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/29/15 00:58	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/29/15 00:58	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/29/15 00:58	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/29/15 00:58	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/29/15 00:58	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/29/15 00:58	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/29/15 00:58	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/29/15 00:58	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 00:58	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/29/15 00:58	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:58	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/29/15 00:58	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/29/15 00:58	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/29/15 00:58	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/29/15 00:58	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		07/29/15 00:58	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/29/15 00:58	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/29/15 00:58	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/29/15 00:58	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/29/15 00:58	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/29/15 00:58	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/29/15 00:58	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/29/15 00:58	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/29/15 00:58	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/29/15 00:58	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:58	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/29/15 00:58	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/29/15 00:58	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/29/15 00:58	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/29/15 00:58	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/29/15 00:58	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-4 **Lab ID: 10315840013** Collected: 07/23/15 13:45 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/29/15 00:58	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/29/15 00:58	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/29/15 00:58	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/29/15 00:58	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/29/15 00:58	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/29/15 00:58	79-34-5	
Tetrachloroethene	**1.3**	ug/L	1.0	0.19	1		07/29/15 00:58	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/29/15 00:58	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/29/15 00:58	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 00:58	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 00:58	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/29/15 00:58	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/29/15 00:58	79-00-5	
Trichloroethene	**0.59**	ug/L	0.40	0.14	1		07/29/15 00:58	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/29/15 00:58	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/29/15 00:58	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/29/15 00:58	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 00:58	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/29/15 00:58	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/29/15 00:58	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/29/15 00:58	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	95	%.	75-125		1		07/29/15 00:58	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		07/29/15 00:58	2037-26-5	
4-Bromofluorobenzene (S)	96	%.	75-125		1		07/29/15 00:58	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-33 **Lab ID: 10315840014** Collected: 07/23/15 13:45 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/29/15 01:12	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/29/15 01:12	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/29/15 01:12	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/29/15 01:12	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/29/15 01:12	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/29/15 01:12	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/29/15 01:12	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/29/15 01:12	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/29/15 01:12	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/29/15 01:12	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 01:12	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/29/15 01:12	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/29/15 01:12	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 01:12	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/29/15 01:12	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/29/15 01:12	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/29/15 01:12	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/29/15 01:12	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/29/15 01:12	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/29/15 01:12	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/29/15 01:12	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/29/15 01:12	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/29/15 01:12	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 01:12	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/29/15 01:12	541-73-1	
1,4-Dichlorobenzene	**0.19J**	ug/L	1.0	0.16	1		07/29/15 01:12	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/29/15 01:12	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/29/15 01:12	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/29/15 01:12	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/29/15 01:12	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		07/29/15 01:12	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/29/15 01:12	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/29/15 01:12	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/29/15 01:12	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/29/15 01:12	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/29/15 01:12	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/29/15 01:12	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/29/15 01:12	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/29/15 01:12	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/29/15 01:12	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/29/15 01:12	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/29/15 01:12	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/29/15 01:12	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/29/15 01:12	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/29/15 01:12	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/29/15 01:12	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-33 **Lab ID: 10315840014** Collected: 07/23/15 13:45 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/29/15 01:12	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/29/15 01:12	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/29/15 01:12	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/29/15 01:12	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/29/15 01:12	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/29/15 01:12	79-34-5	
Tetrachloroethene	**1.4**	ug/L	1.0	0.19	1		07/29/15 01:12	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/29/15 01:12	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/29/15 01:12	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 01:12	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 01:12	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/29/15 01:12	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/29/15 01:12	79-00-5	
Trichloroethene	**0.53**	ug/L	0.40	0.14	1		07/29/15 01:12	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/29/15 01:12	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/29/15 01:12	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/29/15 01:12	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 01:12	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/29/15 01:12	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/29/15 01:12	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/29/15 01:12	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	97	%.	75-125		1		07/29/15 01:12	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		07/29/15 01:12	2037-26-5	
4-Bromofluorobenzene (S)	99	%.	75-125		1		07/29/15 01:12	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-5 **Lab ID: 10315840015** Collected: 07/23/15 14:25 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/29/15 01:27	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/29/15 01:27	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/29/15 01:27	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/29/15 01:27	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/29/15 01:27	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/29/15 01:27	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/29/15 01:27	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/29/15 01:27	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/29/15 01:27	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/29/15 01:27	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 01:27	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/29/15 01:27	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/29/15 01:27	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 01:27	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/29/15 01:27	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/29/15 01:27	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/29/15 01:27	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/29/15 01:27	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/29/15 01:27	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/29/15 01:27	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/29/15 01:27	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/29/15 01:27	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/29/15 01:27	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 01:27	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/29/15 01:27	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/29/15 01:27	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/29/15 01:27	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/29/15 01:27	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/29/15 01:27	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/29/15 01:27	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		07/29/15 01:27	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/29/15 01:27	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/29/15 01:27	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/29/15 01:27	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/29/15 01:27	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/29/15 01:27	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/29/15 01:27	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/29/15 01:27	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/29/15 01:27	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/29/15 01:27	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/29/15 01:27	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/29/15 01:27	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/29/15 01:27	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/29/15 01:27	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/29/15 01:27	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/29/15 01:27	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-5 **Lab ID: 10315840015** Collected: 07/23/15 14:25 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/29/15 01:27	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/29/15 01:27	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/29/15 01:27	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/29/15 01:27	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/29/15 01:27	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/29/15 01:27	79-34-5	
Tetrachloroethene	**1.0**	ug/L	1.0	0.19	1		07/29/15 01:27	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/29/15 01:27	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/29/15 01:27	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 01:27	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 01:27	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/29/15 01:27	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/29/15 01:27	79-00-5	
Trichloroethene	**0.44**	ug/L	0.40	0.14	1		07/29/15 01:27	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/29/15 01:27	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/29/15 01:27	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/29/15 01:27	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 01:27	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/29/15 01:27	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/29/15 01:27	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/29/15 01:27	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	96	%.	75-125		1		07/29/15 01:27	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		07/29/15 01:27	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	75-125		1		07/29/15 01:27	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-30 **Lab ID: 10315840016** Collected: 07/23/15 14:35 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/29/15 01:41	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/29/15 01:41	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/29/15 01:41	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/29/15 01:41	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/29/15 01:41	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/29/15 01:41	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/29/15 01:41	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/29/15 01:41	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/29/15 01:41	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/29/15 01:41	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 01:41	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/29/15 01:41	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/29/15 01:41	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 01:41	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/29/15 01:41	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/29/15 01:41	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/29/15 01:41	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/29/15 01:41	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/29/15 01:41	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/29/15 01:41	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/29/15 01:41	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/29/15 01:41	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/29/15 01:41	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 01:41	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/29/15 01:41	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/29/15 01:41	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/29/15 01:41	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/29/15 01:41	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/29/15 01:41	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/29/15 01:41	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		07/29/15 01:41	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/29/15 01:41	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/29/15 01:41	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/29/15 01:41	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/29/15 01:41	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/29/15 01:41	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/29/15 01:41	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/29/15 01:41	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/29/15 01:41	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/29/15 01:41	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/29/15 01:41	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/29/15 01:41	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/29/15 01:41	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/29/15 01:41	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/29/15 01:41	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/29/15 01:41	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-30 **Lab ID: 10315840016** Collected: 07/23/15 14:35 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/29/15 01:41	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/29/15 01:41	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/29/15 01:41	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/29/15 01:41	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/29/15 01:41	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/29/15 01:41	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.19	1		07/29/15 01:41	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/29/15 01:41	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/29/15 01:41	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 01:41	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 01:41	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/29/15 01:41	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/29/15 01:41	79-00-5	
Trichloroethene	ND	ug/L	0.40	0.14	1		07/29/15 01:41	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/29/15 01:41	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/29/15 01:41	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/29/15 01:41	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 01:41	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/29/15 01:41	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/29/15 01:41	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/29/15 01:41	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	96	%.	75-125		1		07/29/15 01:41	17060-07-0	
Toluene-d8 (S)	97	%.	75-125		1		07/29/15 01:41	2037-26-5	
4-Bromofluorobenzene (S)	97	%.	75-125		1		07/29/15 01:41	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-3 **Lab ID: 10315840017** Collected: 07/23/15 15:05 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/29/15 01:56	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/29/15 01:56	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/29/15 01:56	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/29/15 01:56	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/29/15 01:56	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/29/15 01:56	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/29/15 01:56	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/29/15 01:56	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/29/15 01:56	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/29/15 01:56	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 01:56	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/29/15 01:56	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/29/15 01:56	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 01:56	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/29/15 01:56	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/29/15 01:56	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/29/15 01:56	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/29/15 01:56	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/29/15 01:56	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/29/15 01:56	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/29/15 01:56	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/29/15 01:56	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/29/15 01:56	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 01:56	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/29/15 01:56	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/29/15 01:56	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/29/15 01:56	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/29/15 01:56	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/29/15 01:56	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/29/15 01:56	75-35-4	
cis-1,2-Dichloroethene	**6.6**	ug/L	1.0	0.25	1		07/29/15 01:56	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/29/15 01:56	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/29/15 01:56	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/29/15 01:56	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/29/15 01:56	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/29/15 01:56	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/29/15 01:56	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/29/15 01:56	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/29/15 01:56	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/29/15 01:56	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/29/15 01:56	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/29/15 01:56	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/29/15 01:56	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/29/15 01:56	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/29/15 01:56	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/29/15 01:56	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: MW-3 **Lab ID: 10315840017** Collected: 07/23/15 15:05 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/29/15 01:56	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/29/15 01:56	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/29/15 01:56	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/29/15 01:56	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/29/15 01:56	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/29/15 01:56	79-34-5	
Tetrachloroethene	**67.4**	ug/L	1.0	0.19	1		07/29/15 01:56	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/29/15 01:56	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/29/15 01:56	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/29/15 01:56	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/29/15 01:56	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/29/15 01:56	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/29/15 01:56	79-00-5	
Trichloroethene	**4.6**	ug/L	0.40	0.14	1		07/29/15 01:56	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/29/15 01:56	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/29/15 01:56	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/29/15 01:56	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/29/15 01:56	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/29/15 01:56	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/29/15 01:56	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/29/15 01:56	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	97	%.	75-125		1		07/29/15 01:56	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/29/15 01:56	2037-26-5	
4-Bromofluorobenzene (S)	97	%.	75-125		1		07/29/15 01:56	460-00-4	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: Trip Blank **Lab ID: 10315840018** Collected: 07/22/15 00:00 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		07/28/15 22:04	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		07/28/15 22:04	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		07/28/15 22:04	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		07/28/15 22:04	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		07/28/15 22:04	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		07/28/15 22:04	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		07/28/15 22:04	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		07/28/15 22:04	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		07/28/15 22:04	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		07/28/15 22:04	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		07/28/15 22:04	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		07/28/15 22:04	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		07/28/15 22:04	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		07/28/15 22:04	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		07/28/15 22:04	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		07/28/15 22:04	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		07/28/15 22:04	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		07/28/15 22:04	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		07/28/15 22:04	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		07/28/15 22:04	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		07/28/15 22:04	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		07/28/15 22:04	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		07/28/15 22:04	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		07/28/15 22:04	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		07/28/15 22:04	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		07/28/15 22:04	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		07/28/15 22:04	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		07/28/15 22:04	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		07/28/15 22:04	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		07/28/15 22:04	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		07/28/15 22:04	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		07/28/15 22:04	156-60-5	L3
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		07/28/15 22:04	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		07/28/15 22:04	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		07/28/15 22:04	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		07/28/15 22:04	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		07/28/15 22:04	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		07/28/15 22:04	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		07/28/15 22:04	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		07/28/15 22:04	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		07/28/15 22:04	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		07/28/15 22:04	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		07/28/15 22:04	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		07/28/15 22:04	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		07/28/15 22:04	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		07/28/15 22:04	108-10-1	

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ANALYTICAL RESULTS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Sample: Trip Blank **Lab ID: 10315840018** Collected: 07/22/15 00:00 Received: 07/28/15 09:15 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		07/28/15 22:04	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		07/28/15 22:04	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		07/28/15 22:04	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		07/28/15 22:04	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		07/28/15 22:04	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		07/28/15 22:04	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.19	1		07/28/15 22:04	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		07/28/15 22:04	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		07/28/15 22:04	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		07/28/15 22:04	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		07/28/15 22:04	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		07/28/15 22:04	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		07/28/15 22:04	79-00-5	
Trichloroethene	ND	ug/L	0.40	0.14	1		07/28/15 22:04	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		07/28/15 22:04	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		07/28/15 22:04	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		07/28/15 22:04	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		07/28/15 22:04	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		07/28/15 22:04	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		07/28/15 22:04	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		07/28/15 22:04	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	94	%.	75-125		1		07/28/15 22:04	17060-07-0	
Toluene-d8 (S)	101	%.	75-125		1		07/28/15 22:04	2037-26-5	
4-Bromofluorobenzene (S)	97	%.	75-125		1		07/28/15 22:04	460-00-4	

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QUALITY CONTROL DATA

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

QC Batch: MSV/32571 | Analysis Method: EPA 524.2
QC Batch Method: EPA 524.2 | Analysis Description: 524.2 MSV
Associated Lab Samples: 10315840001, 10315840007

METHOD BLANK: 2037654 | Matrix: Water
Associated Lab Samples: 10315840001, 10315840007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	0.50	08/01/15 00:58	
1,1,1-Trichloroethane	ug/L	ND	0.50	08/01/15 00:58	
1,1,2,2-Tetrachloroethane	ug/L	ND	0.50	08/01/15 00:58	
1,1,2-Trichloroethane	ug/L	ND	0.50	08/01/15 00:58	
1,1-Dichloroethane	ug/L	ND	0.50	08/01/15 00:58	
1,1-Dichloroethene	ug/L	ND	0.50	08/01/15 00:58	
1,1-Dichloropropene	ug/L	ND	0.50	08/01/15 00:58	
1,2,3-Trichlorobenzene	ug/L	ND	0.50	08/01/15 00:58	
1,2,3-Trichloropropane	ug/L	ND	4.0	08/01/15 00:58	
1,2,4-Trichlorobenzene	ug/L	ND	0.50	08/01/15 00:58	
1,2,4-Trimethylbenzene	ug/L	ND	0.50	08/01/15 00:58	
1,2-Dibromo-3-chloropropane	ug/L	ND	4.0	08/01/15 00:58	
1,2-Dibromoethane (EDB)	ug/L	ND	0.50	08/01/15 00:58	
1,2-Dichlorobenzene	ug/L	ND	0.50	08/01/15 00:58	
1,2-Dichloroethane	ug/L	ND	0.50	08/01/15 00:58	
1,2-Dichloropropane	ug/L	ND	4.0	08/01/15 00:58	
1,3,5-Trimethylbenzene	ug/L	ND	0.50	08/01/15 00:58	
1,3-Dichlorobenzene	ug/L	ND	0.50	08/01/15 00:58	
1,3-Dichloropropane	ug/L	ND	0.50	08/01/15 00:58	
1,4-Dichlorobenzene	ug/L	ND	0.50	08/01/15 00:58	
2,2-Dichloropropane	ug/L	ND	1.0	08/01/15 00:58	
2-Butanone (MEK)	ug/L	ND	5.0	08/01/15 00:58	
2-Chlorotoluene	ug/L	ND	0.50	08/01/15 00:58	
2-Hexanone	ug/L	ND	5.0	08/01/15 00:58	
2-Nitropropane	ug/L	ND	20.0	08/01/15 00:58	
4-Chlorotoluene	ug/L	ND	0.50	08/01/15 00:58	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	5.0	08/01/15 00:58	
Acetone	ug/L	ND	20.0	08/01/15 00:58	
Benzene	ug/L	ND	0.50	08/01/15 00:58	
Bromobenzene	ug/L	ND	0.50	08/01/15 00:58	
Bromochloromethane	ug/L	ND	1.0	08/01/15 00:58	
Bromodichloromethane	ug/L	ND	1.0	08/01/15 00:58	
Bromoform	ug/L	ND	4.0	08/01/15 00:58	
Bromomethane	ug/L	ND	4.0	08/01/15 00:58	
Carbon disulfide	ug/L	ND	1.0	08/01/15 00:58	
Carbon tetrachloride	ug/L	ND	1.0	08/01/15 00:58	
Chlorobenzene	ug/L	ND	0.50	08/01/15 00:58	
Chloroethane	ug/L	ND	1.0	08/01/15 00:58	
Chloroform	ug/L	ND	1.0	08/01/15 00:58	
Chloromethane	ug/L	ND	4.0	08/01/15 00:58	
cis-1,2-Dichloroethene	ug/L	ND	0.50	08/01/15 00:58	

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QUALITY CONTROL DATA

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

METHOD BLANK: 2037654 Matrix: Water
Associated Lab Samples: 10315840001, 10315840007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
cis-1,3-Dichloropropene	ug/L	ND	0.50	08/01/15 00:58	
Dibromochloromethane	ug/L	ND	1.0	08/01/15 00:58	
Dibromomethane	ug/L	ND	1.0	08/01/15 00:58	
Dichlorodifluoromethane	ug/L	ND	1.0	08/01/15 00:58	
Ethyl methacrylate	ug/L	ND	4.0	08/01/15 00:58	
Ethylbenzene	ug/L	ND	0.50	08/01/15 00:58	
Hexachloro-1,3-butadiene	ug/L	ND	1.0	08/01/15 00:58	
Isopropylbenzene (Cumene)	ug/L	ND	0.50	08/01/15 00:58	
m&p-Xylene	ug/L	ND	1.0	08/01/15 00:58	
Methyl methacrylate	ug/L	ND	5.0	08/01/15 00:58	
Methyl-tert-butyl ether	ug/L	ND	0.50	08/01/15 00:58	
Methylene Chloride	ug/L	ND	4.0	08/01/15 00:58	
n-Butylbenzene	ug/L	ND	0.50	08/01/15 00:58	
n-Propylbenzene	ug/L	ND	0.50	08/01/15 00:58	
Naphthalene	ug/L	ND	1.0	08/01/15 00:58	
o-Xylene	ug/L	ND	0.50	08/01/15 00:58	
p-Isopropyltoluene	ug/L	ND	1.0	08/01/15 00:58	
sec-Butylbenzene	ug/L	ND	0.50	08/01/15 00:58	
Styrene	ug/L	ND	1.0	08/01/15 00:58	
tert-Butylbenzene	ug/L	ND	0.50	08/01/15 00:58	
Tetrachloroethene	ug/L	ND	1.0	08/01/15 00:58	
Toluene	ug/L	ND	0.50	08/01/15 00:58	
Total Trihalomethanes (Calc.)	ug/L	ND	4.0	08/01/15 00:58	
trans-1,2-Dichloroethene	ug/L	ND	0.50	08/01/15 00:58	
trans-1,3-Dichloropropene	ug/L	ND	1.0	08/01/15 00:58	
Trichloroethene	ug/L	ND	0.50	08/01/15 00:58	
Trichlorofluoromethane	ug/L	ND	0.50	08/01/15 00:58	
Vinyl chloride	ug/L	ND	0.20	08/01/15 00:58	
Xylene (Total)	ug/L	ND	1.5	08/01/15 00:58	
1,2-Dichloroethane-d4 (S)	%.	99	75-125	08/01/15 00:58	
4-Bromofluorobenzene (S)	%.	101	75-125	08/01/15 00:58	
Toluene-d8 (S)	%.	101	75-125	08/01/15 00:58	

LABORATORY CONTROL SAMPLE: 2037655

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	21.9	109	70-130	
1,1,1-Trichloroethane	ug/L	20	21.8	109	70-130	
1,1,2,2-Tetrachloroethane	ug/L	20	20.2	101	70-130	
1,1,2-Trichloroethane	ug/L	20	20.8	104	70-130	
1,1-Dichloroethane	ug/L	20	22.3	111	70-130	
1,1-Dichloroethene	ug/L	20	20.7	104	70-130	
1,1-Dichloropropene	ug/L	20	20.6	103	70-130	
1,2,3-Trichlorobenzene	ug/L	20	20.7	104	70-130	

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QUALITY CONTROL DATA

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

LABORATORY CONTROL SAMPLE: 2037655

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,3-Trichloropropane	ug/L	20	19.6	98	70-130	
1,2,4-Trichlorobenzene	ug/L	20	21.6	108	70-130	
1,2,4-Trimethylbenzene	ug/L	20	20.4	102	70-130	
1,2-Dibromo-3-chloropropane	ug/L	50	49.7	99	70-130	
1,2-Dibromoethane (EDB)	ug/L	20	20.6	103	70-130	
1,2-Dichlorobenzene	ug/L	20	20.9	105	70-130	
1,2-Dichloroethane	ug/L	20	22.5	113	70-130	
1,2-Dichloropropane	ug/L	20	20.7	103	70-130	
1,3,5-Trimethylbenzene	ug/L	20	20.9	105	70-130	
1,3-Dichlorobenzene	ug/L	20	21.8	109	70-130	
1,3-Dichloropropane	ug/L	20	21.6	108	70-130	
1,4-Dichlorobenzene	ug/L	20	20.7	103	70-130	
2,2-Dichloropropane	ug/L	20	20.7	104	70-130	
2-Butanone (MEK)	ug/L	100	92.2	92	70-130	
2-Chlorotoluene	ug/L	20	20.5	103	70-130	
2-Hexanone	ug/L	100	100	100	70-130	
2-Nitropropane	ug/L	100	99.4	99	70-130	
4-Chlorotoluene	ug/L	20	20.9	105	70-130	
4-Methyl-2-pentanone (MIBK)	ug/L	100	102	102	70-130	
Acetone	ug/L	100	106	106	70-130	
Benzene	ug/L	20	21.8	109	70-130	
Bromobenzene	ug/L	20	21.2	106	70-130	
Bromochloromethane	ug/L	20	20.0	100	70-130	
Bromodichloromethane	ug/L	20	20.9	105	70-130	
Bromoform	ug/L	20	19.5	98	70-130	
Bromomethane	ug/L	20	24.7	124	70-130	
Carbon disulfide	ug/L	20	21.1	106	70-130	
Carbon tetrachloride	ug/L	20	19.5	98	70-130	
Chlorobenzene	ug/L	20	21.5	107	70-130	
Chloroethane	ug/L	20	22.4	112	70-130	
Chloroform	ug/L	20	22.0	110	70-130	
Chloromethane	ug/L	20	19.8	99	70-130	
cis-1,2-Dichloroethene	ug/L	20	21.1	105	70-130	
cis-1,3-Dichloropropene	ug/L	20	21.6	108	70-130	
Dibromochloromethane	ug/L	20	21.0	105	70-130	
Dibromomethane	ug/L	20	21.4	107	70-130	
Dichlorodifluoromethane	ug/L	20	22.5	112	70-130	
Ethyl methacrylate	ug/L	20	19.4	97	70-130	
Ethylbenzene	ug/L	20	22.0	110	70-130	
Hexachloro-1,3-butadiene	ug/L	20	19.8	99	70-130	
Isopropylbenzene (Cumene)	ug/L	20	21.0	105	70-130	
m&p-Xylene	ug/L	40	41.7	104	70-130	
Methyl methacrylate	ug/L	20	20.6	103	70-130	
Methyl-tert-butyl ether	ug/L	20	21.2	106	70-130	
Methylene Chloride	ug/L	20	19.2	96	70-130	
n-Butylbenzene	ug/L	20	20.6	103	70-130	
n-Propylbenzene	ug/L	20	21.8	109	70-130	

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QUALITY CONTROL DATA

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

LABORATORY CONTROL SAMPLE: 2037655

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Naphthalene	ug/L	20	20.2	101	70-130	
o-Xylene	ug/L	20	21.8	109	70-130	
p-Isopropyltoluene	ug/L	20	19.6	98	70-130	
sec-Butylbenzene	ug/L	20	20.4	102	70-130	
Styrene	ug/L	20	20.3	102	70-130	
tert-Butylbenzene	ug/L	20	21.0	105	70-130	
Tetrachloroethene	ug/L	20	21.2	106	70-130	
Toluene	ug/L	20	21.5	107	70-130	
Total Trihalomethanes (Calc.)	ug/L	80	83.4	104	70-130	
trans-1,2-Dichloroethene	ug/L	20	22.2	111	70-130	
trans-1,3-Dichloropropene	ug/L	20	20.5	102	70-130	
Trichloroethene	ug/L	20	22.1	111	70-130	
Trichlorofluoromethane	ug/L	20	21.4	107	70-130	
Vinyl chloride	ug/L	20	19.4	97	70-130	
Xylene (Total)	ug/L	60	63.4	106	70-130	
1,2-Dichloroethane-d4 (S)	%.			97	75-125	
4-Bromofluorobenzene (S)	%.			98	75-125	
Toluene-d8 (S)	%.			100	75-125	

MATRIX SPIKE SAMPLE: 2037657

Parameter	Units	10316156001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	20	19.7	98	70-130	
1,1,1-Trichloroethane	ug/L	ND	20	21.6	108	70-130	
1,1,2,2-Tetrachloroethane	ug/L	ND	20	18.6	93	70-130	
1,1,2-Trichloroethane	ug/L	ND	20	18.1	90	70-130	
1,1-Dichloroethane	ug/L	ND	20	20.5	103	70-130	
1,1-Dichloroethene	ug/L	ND	20	18.5	93	70-130	
1,1-Dichloropropene	ug/L	ND	20	19.8	99	70-130	
1,2,3-Trichlorobenzene	ug/L	ND	20	17.6	88	70-130	
1,2,3-Trichloropropane	ug/L	ND	20	18.0	90	70-130	
1,2,4-Trichlorobenzene	ug/L	ND	20	18.4	92	70-130	
1,2,4-Trimethylbenzene	ug/L	ND	20	18.3	92	70-130	
1,2-Dibromo-3-chloropropane	ug/L	ND	50	42.8	86	70-130	
1,2-Dibromoethane (EDB)	ug/L	ND	20	18.0	90	70-130	
1,2-Dichlorobenzene	ug/L	ND	20	18.8	94	70-130	
1,2-Dichloroethane	ug/L	ND	20	20.1	101	70-130	
1,2-Dichloropropane	ug/L	ND	20	18.9	94	70-130	
1,3,5-Trimethylbenzene	ug/L	ND	20	19.7	99	70-130	
1,3-Dichlorobenzene	ug/L	ND	20	19.8	99	70-130	
1,3-Dichloropropane	ug/L	ND	20	19.0	95	70-130	
1,4-Dichlorobenzene	ug/L	ND	20	18.6	93	70-130	
2,2-Dichloropropane	ug/L	ND	20	18.0	90	70-130	
2-Butanone (MEK)	ug/L	ND	100	85.7	86	70-130	
2-Chlorotoluene	ug/L	ND	20	19.4	97	70-130	

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QUALITY CONTROL DATA

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

MATRIX SPIKE SAMPLE: 2037657

Parameter	Units	10316156001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
2-Hexanone	ug/L	ND	100	86.5	87	70-130	
2-Nitropropane	ug/L	ND	100	86.0	86	70-130	
4-Chlorotoluene	ug/L	ND	20	18.8	94	70-130	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	88.4	88	70-130	
Acetone	ug/L	ND	100	96.7	97	70-130	
Benzene	ug/L	ND	20	20.9	104	70-130	
Bromobenzene	ug/L	ND	20	18.8	94	70-130	
Bromochloromethane	ug/L	ND	20	18.1	90	70-130	
Bromodichloromethane	ug/L	ND	20	20.1	101	70-130	
Bromoform	ug/L	ND	20	17.0	85	70-130	
Bromomethane	ug/L	ND	20	20.7	103	70-130	
Carbon disulfide	ug/L	ND	20	21.0	105	70-130	
Carbon tetrachloride	ug/L	ND	20	19.9	100	70-130	
Chlorobenzene	ug/L	ND	20	18.9	95	70-130	
Chloroethane	ug/L	ND	20	21.8	109	70-130	
Chloroform	ug/L	ND	20	20.6	103	70-130	
Chloromethane	ug/L	ND	20	20.1	101	70-130	
cis-1,2-Dichloroethene	ug/L	ND	20	19.1	95	70-130	
cis-1,3-Dichloropropene	ug/L	ND	20	18.5	92	70-130	
Dibromochloromethane	ug/L	ND	20	17.9	89	70-130	
Dibromomethane	ug/L	ND	20	20.0	100	70-130	
Dichlorodifluoromethane	ug/L	ND	20	23.4	117	70-130	
Ethyl methacrylate	ug/L	ND	20	16.6	83	70-130	
Ethylbenzene	ug/L	ND	20	19.7	98	70-130	
Hexachloro-1,3-butadiene	ug/L	ND	20	16.1	80	70-130	
Isopropylbenzene (Cumene)	ug/L	ND	20	18.9	94	70-130	
m&p-Xylene	ug/L	ND	40	37.2	93	70-130	
Methyl methacrylate	ug/L	ND	20	17.6	88	70-130	
Methyl-tert-butyl ether	ug/L	ND	20	19.3	96	70-130	
Methylene Chloride	ug/L	ND	20	17.2	86	70-130	
n-Butylbenzene	ug/L	ND	20	19.0	95	70-130	
n-Propylbenzene	ug/L	ND	20	20.4	102	70-130	
Naphthalene	ug/L	ND	20	16.6	83	70-130	
o-Xylene	ug/L	ND	20	19.1	96	70-130	
p-Isopropyltoluene	ug/L	ND	20	18.5	92	70-130	
sec-Butylbenzene	ug/L	ND	20	18.9	95	70-130	
Styrene	ug/L	ND	20	17.9	89	70-130	
tert-Butylbenzene	ug/L	ND	20	19.7	98	70-130	
Tetrachloroethene	ug/L	ND	20	19.7	99	70-130	
Toluene	ug/L	ND	20	19.4	97	70-130	
Total Trihalomethanes (Calc.)	ug/L	ND	80	75.6	94	70-130	
trans-1,2-Dichloroethene	ug/L	ND	20	20.3	102	70-130	
trans-1,3-Dichloropropene	ug/L	ND	20	18.4	92	70-130	
Trichloroethene	ug/L	ND	20	20.4	102	70-130	
Trichlorofluoromethane	ug/L	ND	20	22.4	112	70-130	
Vinyl chloride	ug/L	ND	20	19.4	97	70-130	
Xylene (Total)	ug/L	ND	60	56.3	94	70-130	

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QUALITY CONTROL DATA

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

MATRIX SPIKE SAMPLE: 2037657

Parameter	Units	10316156001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,2-Dichloroethane-d4 (S)	%.				100	75-125	
4-Bromofluorobenzene (S)	%.				99	75-125	
Toluene-d8 (S)	%.				94	75-125	

SAMPLE DUPLICATE: 2037658

Parameter	Units	10316156002 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	ND		20	
1,1,1-Trichloroethane	ug/L	ND	ND		20	
1,1,2,2-Tetrachloroethane	ug/L	ND	ND		20	
1,1,2-Trichloroethane	ug/L	ND	ND		20	
1,1-Dichloroethane	ug/L	ND	ND		20	
1,1-Dichloroethene	ug/L	ND	ND		20	
1,1-Dichloropropene	ug/L	ND	ND		20	
1,2,3-Trichlorobenzene	ug/L	ND	ND		20	
1,2,3-Trichloropropane	ug/L	ND	ND		20	
1,2,4-Trichlorobenzene	ug/L	ND	ND		20	
1,2,4-Trimethylbenzene	ug/L	ND	ND		20	
1,2-Dibromo-3-chloropropane	ug/L	ND	ND		20	
1,2-Dibromoethane (EDB)	ug/L	ND	ND		20	
1,2-Dichlorobenzene	ug/L	ND	ND		20	
1,2-Dichloroethane	ug/L	ND	ND		20	
1,2-Dichloropropane	ug/L	ND	ND		20	
1,3,5-Trimethylbenzene	ug/L	ND	ND		20	
1,3-Dichlorobenzene	ug/L	ND	ND		20	
1,3-Dichloropropane	ug/L	ND	ND		20	
1,4-Dichlorobenzene	ug/L	ND	ND		20	
2,2-Dichloropropane	ug/L	ND	ND		20	
2-Butanone (MEK)	ug/L	ND	ND		20	
2-Chlorotoluene	ug/L	ND	ND		20	
2-Hexanone	ug/L	ND	ND		20	
2-Nitropropane	ug/L	ND	ND		20	
4-Chlorotoluene	ug/L	ND	ND		20	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	ND		20	
Acetone	ug/L	ND	ND		20	
Benzene	ug/L	ND	ND		20	
Bromobenzene	ug/L	ND	ND		20	
Bromochloromethane	ug/L	ND	ND		20	
Bromodichloromethane	ug/L	ND	ND		20	
Bromoform	ug/L	ND	ND		20	
Bromomethane	ug/L	ND	ND		20	
Carbon disulfide	ug/L	ND	ND		20	
Carbon tetrachloride	ug/L	ND	ND		20	
Chlorobenzene	ug/L	ND	ND		20	
Chloroethane	ug/L	ND	ND		20	

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QUALITY CONTROL DATA

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

SAMPLE DUPLICATE: 2037658

Parameter	Units	10316156002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloroform	ug/L	ND	ND		20	
Chloromethane	ug/L	ND	ND		20	
cis-1,2-Dichloroethene	ug/L	ND	ND		20	
cis-1,3-Dichloropropene	ug/L	ND	ND		20	
Dibromochloromethane	ug/L	ND	ND		20	
Dibromomethane	ug/L	ND	ND		20	
Dichlorodifluoromethane	ug/L	ND	ND		20	
Ethyl methacrylate	ug/L	ND	ND		20	
Ethylbenzene	ug/L	ND	ND		20	
Hexachloro-1,3-butadiene	ug/L	ND	ND		20	
Isopropylbenzene (Cumene)	ug/L	ND	ND		20	
m&p-Xylene	ug/L	ND	ND		20	
Methyl methacrylate	ug/L	ND	ND		20	
Methyl-tert-butyl ether	ug/L	ND	ND		20	
Methylene Chloride	ug/L	ND	ND		20	
n-Butylbenzene	ug/L	ND	ND		20	
n-Propylbenzene	ug/L	ND	ND		20	
Naphthalene	ug/L	ND	ND		20	
o-Xylene	ug/L	ND	ND		20	
p-Isopropyltoluene	ug/L	ND	ND		20	
sec-Butylbenzene	ug/L	ND	ND		20	
Styrene	ug/L	ND	ND		20	
tert-Butylbenzene	ug/L	ND	ND		20	
Tetrachloroethene	ug/L	ND	ND		20	
Toluene	ug/L	ND	ND		20	
Total Trihalomethanes (Calc.)	ug/L	ND	ND		20	
trans-1,2-Dichloroethene	ug/L	ND	ND		20	
trans-1,3-Dichloropropene	ug/L	ND	ND		20	
Trichloroethene	ug/L	ND	ND		20	
Trichlorofluoromethane	ug/L	ND	ND		20	
Vinyl chloride	ug/L	ND	ND		20	
Xylene (Total)	ug/L	ND	ND		20	
1,2-Dichloroethane-d4 (S)	%.	99	101	2		
4-Bromofluorobenzene (S)	%.	99	99	0		
Toluene-d8 (S)	%.	100	100	0		

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QUALITY CONTROL DATA

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

QC Batch: MSV/32527 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260B MSV 465 W
Associated Lab Samples: 10315840002, 10315840003, 10315840004, 10315840005, 10315840006, 10315840008, 10315840009, 10315840010, 10315840011, 10315840012, 10315840013, 10315840014, 10315840015, 10315840016, 10315840017, 10315840018

METHOD BLANK: 2033996 Matrix: Water
Associated Lab Samples: 10315840002, 10315840003, 10315840004, 10315840005, 10315840006, 10315840008, 10315840009, 10315840010, 10315840011, 10315840012, 10315840013, 10315840014, 10315840015, 10315840016, 10315840017, 10315840018

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	1.0	07/28/15 21:50	
1,1,1-Trichloroethane	ug/L	ND	1.0	07/28/15 21:50	
1,1,2,2-Tetrachloroethane	ug/L	ND	1.0	07/28/15 21:50	
1,1,2-Trichloroethane	ug/L	ND	1.0	07/28/15 21:50	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	1.0	07/28/15 21:50	
1,1-Dichloroethane	ug/L	ND	1.0	07/28/15 21:50	
1,1-Dichloroethene	ug/L	ND	1.0	07/28/15 21:50	
1,1-Dichloropropene	ug/L	ND	1.0	07/28/15 21:50	
1,2,3-Trichlorobenzene	ug/L	ND	1.0	07/28/15 21:50	
1,2,3-Trichloropropane	ug/L	ND	4.0	07/28/15 21:50	
1,2,4-Trichlorobenzene	ug/L	ND	1.0	07/28/15 21:50	
1,2,4-Trimethylbenzene	ug/L	ND	1.0	07/28/15 21:50	
1,2-Dibromo-3-chloropropane	ug/L	ND	4.0	07/28/15 21:50	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	07/28/15 21:50	
1,2-Dichlorobenzene	ug/L	ND	1.0	07/28/15 21:50	
1,2-Dichloroethane	ug/L	ND	1.0	07/28/15 21:50	
1,2-Dichloropropane	ug/L	ND	4.0	07/28/15 21:50	
1,3,5-Trimethylbenzene	ug/L	ND	1.0	07/28/15 21:50	
1,3-Dichlorobenzene	ug/L	ND	1.0	07/28/15 21:50	
1,3-Dichloropropane	ug/L	ND	1.0	07/28/15 21:50	
1,4-Dichlorobenzene	ug/L	ND	1.0	07/28/15 21:50	
2,2-Dichloropropane	ug/L	ND	4.0	07/28/15 21:50	
2-Butanone (MEK)	ug/L	ND	5.0	07/28/15 21:50	
2-Chlorotoluene	ug/L	ND	1.0	07/28/15 21:50	
4-Chlorotoluene	ug/L	ND	1.0	07/28/15 21:50	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	5.0	07/28/15 21:50	
Acetone	ug/L	ND	20.0	07/28/15 21:50	
Allyl chloride	ug/L	ND	4.0	07/28/15 21:50	
Benzene	ug/L	ND	1.0	07/28/15 21:50	
Bromobenzene	ug/L	ND	1.0	07/28/15 21:50	
Bromochloromethane	ug/L	ND	1.0	07/28/15 21:50	
Bromodichloromethane	ug/L	ND	1.0	07/28/15 21:50	
Bromoform	ug/L	ND	4.0	07/28/15 21:50	
Bromomethane	ug/L	ND	4.0	07/28/15 21:50	
Carbon tetrachloride	ug/L	ND	1.0	07/28/15 21:50	
Chlorobenzene	ug/L	ND	1.0	07/28/15 21:50	
Chloroethane	ug/L	ND	1.0	07/28/15 21:50	
Chloroform	ug/L	ND	1.0	07/28/15 21:50	

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QUALITY CONTROL DATA

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

METHOD BLANK: 2033996 Matrix: Water

Associated Lab Samples: 10315840002, 10315840003, 10315840004, 10315840005, 10315840006, 10315840008, 10315840009, 10315840010, 10315840011, 10315840012, 10315840013, 10315840014, 10315840015, 10315840016, 10315840017, 10315840018

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chloromethane	ug/L	ND	4.0	07/28/15 21:50	
cis-1,2-Dichloroethene	ug/L	ND	1.0	07/28/15 21:50	
cis-1,3-Dichloropropene	ug/L	ND	4.0	07/28/15 21:50	
Dibromochloromethane	ug/L	ND	1.0	07/28/15 21:50	
Dibromomethane	ug/L	ND	4.0	07/28/15 21:50	
Dichlorodifluoromethane	ug/L	ND	1.0	07/28/15 21:50	
Dichlorofluoromethane	ug/L	ND	1.0	07/28/15 21:50	
Diethyl ether (Ethyl ether)	ug/L	ND	4.0	07/28/15 21:50	
Ethylbenzene	ug/L	ND	1.0	07/28/15 21:50	
Hexachloro-1,3-butadiene	ug/L	ND	1.0	07/28/15 21:50	
Isopropylbenzene (Cumene)	ug/L	ND	1.0	07/28/15 21:50	
Methyl-tert-butyl ether	ug/L	ND	1.0	07/28/15 21:50	
Methylene Chloride	ug/L	ND	4.0	07/28/15 21:50	
n-Butylbenzene	ug/L	ND	1.0	07/28/15 21:50	
n-Propylbenzene	ug/L	ND	1.0	07/28/15 21:50	
Naphthalene	ug/L	0.18J	4.0	07/28/15 21:50	
p-Isopropyltoluene	ug/L	ND	1.0	07/28/15 21:50	
sec-Butylbenzene	ug/L	ND	1.0	07/28/15 21:50	
Styrene	ug/L	ND	1.0	07/28/15 21:50	
tert-Butylbenzene	ug/L	ND	1.0	07/28/15 21:50	
Tetrachloroethene	ug/L	ND	1.0	07/28/15 21:50	
Tetrahydrofuran	ug/L	ND	10.0	07/28/15 21:50	
Toluene	ug/L	ND	1.0	07/28/15 21:50	
trans-1,2-Dichloroethene	ug/L	ND	1.0	07/28/15 21:50	
trans-1,3-Dichloropropene	ug/L	ND	4.0	07/28/15 21:50	
Trichloroethene	ug/L	ND	0.40	07/28/15 21:50	
Trichlorofluoromethane	ug/L	ND	1.0	07/28/15 21:50	
Vinyl chloride	ug/L	ND	0.40	07/28/15 21:50	
Xylene (Total)	ug/L	ND	3.0	07/28/15 21:50	
1,2-Dichloroethane-d4 (S)	%.	96	75-125	07/28/15 21:50	
4-Bromofluorobenzene (S)	%.	96	75-125	07/28/15 21:50	
Toluene-d8 (S)	%.	98	75-125	07/28/15 21:50	

LABORATORY CONTROL SAMPLE: 2033997

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	20.9	105	75-125	
1,1,1-Trichloroethane	ug/L	20	17.9	90	75-125	
1,1,2,2-Tetrachloroethane	ug/L	20	19.5	98	75-125	
1,1,2-Trichloroethane	ug/L	20	20.1	100	75-125	
1,1,2-Trichlorotrifluoroethane	ug/L	20	21.9	109	60-135	
1,1-Dichloroethane	ug/L	20	20.7	104	69-125	

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QUALITY CONTROL DATA

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

LABORATORY CONTROL SAMPLE: 2033997

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethene	ug/L	20	21.2	106	68-125	
1,1-Dichloropropene	ug/L	20	21.2	106	74-125	
1,2,3-Trichlorobenzene	ug/L	20	19.5	97	69-136	
1,2,3-Trichloropropane	ug/L	20	20.9	105	75-125	
1,2,4-Trichlorobenzene	ug/L	20	20.1	100	73-127	
1,2,4-Trimethylbenzene	ug/L	20	21.5	108	75-125	
1,2-Dibromo-3-chloropropane	ug/L	50	45.1	90	65-145	
1,2-Dibromoethane (EDB)	ug/L	20	21.3	106	75-125	
1,2-Dichlorobenzene	ug/L	20	21.7	108	75-125	
1,2-Dichloroethane	ug/L	20	19.8	99	73-125	
1,2-Dichloropropane	ug/L	20	21.2	106	75-125	
1,3,5-Trimethylbenzene	ug/L	20	21.4	107	75-125	
1,3-Dichlorobenzene	ug/L	20	21.7	108	74-125	
1,3-Dichloropropane	ug/L	20	20.2	101	75-125	
1,4-Dichlorobenzene	ug/L	20	20.2	101	75-125	
2,2-Dichloropropane	ug/L	20	14.7	74	59-139	
2-Butanone (MEK)	ug/L	100	81.4	81	63-130	
2-Chlorotoluene	ug/L	20	20.1	100	72-125	
4-Chlorotoluene	ug/L	20	21.3	107	73-125	
4-Methyl-2-pentanone (MIBK)	ug/L	100	96.0	96	71-126	
Acetone	ug/L	100	121	121	69-131	
Allyl chloride	ug/L	20	19.6	98	67-125	
Benzene	ug/L	20	20.4	102	71-125	
Bromobenzene	ug/L	20	21.1	106	75-125	
Bromochloromethane	ug/L	20	21.3	106	75-125	
Bromodichloromethane	ug/L	20	20.6	103	75-125	
Bromoform	ug/L	20	18.5	93	70-125	
Bromomethane	ug/L	20	14.7	73	30-150	CH
Carbon tetrachloride	ug/L	20	19.6	98	75-126	
Chlorobenzene	ug/L	20	21.0	105	75-125	
Chloroethane	ug/L	20	20.0	100	65-134	
Chloroform	ug/L	20	20.5	102	75-125	
Chloromethane	ug/L	20	19.5	97	39-150	
cis-1,2-Dichloroethene	ug/L	20	21.3	107	72-125	
cis-1,3-Dichloropropene	ug/L	20	20.2	101	75-125	
Dibromochloromethane	ug/L	20	18.8	94	75-125	
Dibromomethane	ug/L	20	20.9	105	75-125	
Dichlorodifluoromethane	ug/L	20	16.5	83	50-134	
Dichlorofluoromethane	ug/L	20	18.5	92	69-125	
Diethyl ether (Ethyl ether)	ug/L	20	19.7	98	72-125	
Ethylbenzene	ug/L	20	21.0	105	75-125	
Hexachloro-1,3-butadiene	ug/L	20	21.4	107	70-138	
Isopropylbenzene (Cumene)	ug/L	20	21.8	109	75-125	
Methyl-tert-butyl ether	ug/L	20	20.2	101	73-125	
Methylene Chloride	ug/L	20	24.2	121	73-125	
n-Butylbenzene	ug/L	20	22.1	110	72-133	
n-Propylbenzene	ug/L	20	21.6	108	72-126	

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

LABORATORY CONTROL SAMPLE: 2033997

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Naphthalene	ug/L	20	19.7	98	70-127	
p-Isopropyltoluene	ug/L	20	21.6	108	72-132	
sec-Butylbenzene	ug/L	20	20.5	103	73-132	
Styrene	ug/L	20	21.8	109	75-125	
tert-Butylbenzene	ug/L	20	20.9	104	73-128	
Tetrachloroethene	ug/L	20	20.9	105	74-125	
Tetrahydrofuran	ug/L	200	157	79	62-133	
Toluene	ug/L	20	21.2	106	74-125	
trans-1,2-Dichloroethene	ug/L	20	26.6	133	69-125	L0
trans-1,3-Dichloropropene	ug/L	20	17.6	88	75-125	
Trichloroethene	ug/L	20	21.7	108	75-125	
Trichlorofluoromethane	ug/L	20	17.0	85	74-127	
Vinyl chloride	ug/L	20	18.6	93	66-132	
Xylene (Total)	ug/L	60	62.8	105	75-125	
1,2-Dichloroethane-d4 (S)	%.			97	75-125	
4-Bromofluorobenzene (S)	%.			96	75-125	
Toluene-d8 (S)	%.			99	75-125	

MATRIX SPIKE SAMPLE: 2035048

Parameter	Units	10315840002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	20	20.9	105	70-138	
1,1,1-Trichloroethane	ug/L	ND	20	19.3	97	55-150	
1,1,2,2-Tetrachloroethane	ug/L	ND	20	19.3	96	64-140	
1,1,2-Trichloroethane	ug/L	ND	20	20.7	104	67-137	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	20	23.1	116	51-150	
1,1-Dichloroethane	ug/L	ND	20	21.3	106	49-150	
1,1-Dichloroethene	ug/L	ND	20	23.3	116	40-150	
1,1-Dichloropropene	ug/L	ND	20	23.3	117	50-150	
1,2,3-Trichlorobenzene	ug/L	ND	20	19.5	98	59-148	
1,2,3-Trichloropropane	ug/L	ND	20	19.0	95	65-141	
1,2,4-Trichlorobenzene	ug/L	ND	20	19.8	99	61-140	
1,2,4-Trimethylbenzene	ug/L	ND	20	21.7	109	58-141	
1,2-Dibromo-3-chloropropane	ug/L	ND	50	44.9	90	53-150	
1,2-Dibromoethane (EDB)	ug/L	ND	20	20.8	104	65-137	
1,2-Dichlorobenzene	ug/L	ND	20	21.3	107	66-133	
1,2-Dichloroethane	ug/L	ND	20	19.5	97	54-138	
1,2-Dichloropropane	ug/L	ND	20	21.1	106	62-138	
1,3,5-Trimethylbenzene	ug/L	ND	20	21.7	109	58-140	
1,3-Dichlorobenzene	ug/L	ND	20	21.3	107	66-132	
1,3-Dichloropropane	ug/L	ND	20	20.2	101	66-134	
1,4-Dichlorobenzene	ug/L	ND	20	20.1	100	65-129	
2,2-Dichloropropane	ug/L	ND	20	19.1	96	40-150	
2-Butanone (MEK)	ug/L	ND	100	80.9	81	51-147	
2-Chlorotoluene	ug/L	ND	20	20.4	102	58-147	

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

MATRIX SPIKE SAMPLE: 2035048

Parameter	Units	10315840002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
4-Chlorotoluene	ug/L	ND	20	21.8	109	64-138	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	96.0	96	59-143	
Acetone	ug/L	ND	100	115	115	63-147	
Allyl chloride	ug/L	ND	20	22.6	113	45-150	
Benzene	ug/L	ND	20	22.0	110	53-139	
Bromobenzene	ug/L	ND	20	21.2	106	66-136	
Bromochloromethane	ug/L	ND	20	22.2	111	64-136	
Bromodichloromethane	ug/L	ND	20	20.5	103	66-138	
Bromoform	ug/L	ND	20	18.1	90	59-136	
Bromomethane	ug/L	ND	20	22.9	114	30-150	CH
Carbon tetrachloride	ug/L	ND	20	22.0	110	56-150	
Chlorobenzene	ug/L	ND	20	21.2	106	65-133	
Chloroethane	ug/L	ND	20	20.8	104	48-150	
Chloroform	ug/L	ND	20	21.2	106	57-145	
Chloromethane	ug/L	ND	20	22.8	114	30-150	
cis-1,2-Dichloroethene	ug/L	ND	20	21.6	108	49-150	
cis-1,3-Dichloropropene	ug/L	ND	20	20.7	103	64-130	
Dibromochloromethane	ug/L	ND	20	19.0	95	68-138	
Dibromomethane	ug/L	ND	20	20.2	101	67-134	
Dichlorodifluoromethane	ug/L	ND	20	21.6	108	45-150	
Dichlorofluoromethane	ug/L	ND	20	19.8	99	54-150	
Diethyl ether (Ethyl ether)	ug/L	ND	20	18.3	91	50-145	
Ethylbenzene	ug/L	ND	20	21.6	108	55-139	
Hexachloro-1,3-butadiene	ug/L	ND	20	21.9	110	49-150	
Isopropylbenzene (Cumene)	ug/L	ND	20	22.3	112	64-142	
Methyl-tert-butyl ether	ug/L	ND	20	19.3	97	62-129	
Methylene Chloride	ug/L	ND	20	20.6	103	57-132	
n-Butylbenzene	ug/L	ND	20	22.3	111	55-150	
n-Propylbenzene	ug/L	ND	20	22.0	110	59-142	
Naphthalene	ug/L	ND	20	19.6	98	51-150	
p-Isopropyltoluene	ug/L	ND	20	22.1	111	60-149	
sec-Butylbenzene	ug/L	ND	20	21.0	105	60-150	
Styrene	ug/L	ND	20	22.2	111	68-134	
tert-Butylbenzene	ug/L	ND	20	21.3	106	62-146	
Tetrachloroethene	ug/L	0.23J	20	22.6	112	50-150	
Tetrahydrofuran	ug/L	ND	200	207	103	59-145	
Toluene	ug/L	ND	20	21.8	109	52-148	
trans-1,2-Dichloroethene	ug/L	ND	20	22.0	110	45-150	
trans-1,3-Dichloropropene	ug/L	ND	20	19.9	99	68-132	
Trichloroethene	ug/L	0.57	20	22.6	110	52-150	
Trichlorofluoromethane	ug/L	ND	20	19.5	97	55-150	
Vinyl chloride	ug/L	ND	20	23.3	116	43-150	
Xylene (Total)	ug/L	ND	60	64.5	107	54-144	
1,2-Dichloroethane-d4 (S)	%.				95	75-125	
4-Bromofluorobenzene (S)	%.				97	75-125	
Toluene-d8 (S)	%.				100	75-125	

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(612)607-1700

QUALITY CONTROL DATA

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

SAMPLE DUPLICATE: 2035049

Parameter	Units	10315840003 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	ND		30	
1,1,1-Trichloroethane	ug/L	ND	ND		30	
1,1,2,2-Tetrachloroethane	ug/L	ND	ND		30	
1,1,2-Trichloroethane	ug/L	ND	ND		30	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	ND		30	
1,1-Dichloroethane	ug/L	ND	ND		30	
1,1-Dichloroethene	ug/L	ND	ND		30	
1,1-Dichloropropene	ug/L	ND	ND		30	
1,2,3-Trichlorobenzene	ug/L	ND	ND		30	
1,2,3-Trichloropropane	ug/L	ND	ND		30	
1,2,4-Trichlorobenzene	ug/L	ND	ND		30	
1,2,4-Trimethylbenzene	ug/L	ND	ND		30	
1,2-Dibromo-3-chloropropane	ug/L	ND	ND		30	
1,2-Dibromoethane (EDB)	ug/L	ND	ND		30	
1,2-Dichlorobenzene	ug/L	ND	ND		30	
1,2-Dichloroethane	ug/L	ND	ND		30	
1,2-Dichloropropane	ug/L	ND	ND		30	
1,3,5-Trimethylbenzene	ug/L	ND	ND		30	
1,3-Dichlorobenzene	ug/L	ND	ND		30	
1,3-Dichloropropane	ug/L	ND	ND		30	
1,4-Dichlorobenzene	ug/L	ND	ND		30	
2,2-Dichloropropane	ug/L	ND	ND		30	
2-Butanone (MEK)	ug/L	ND	ND		30	
2-Chlorotoluene	ug/L	ND	ND		30	
4-Chlorotoluene	ug/L	ND	ND		30	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	ND		30	
Acetone	ug/L	ND	ND		30	
Allyl chloride	ug/L	ND	ND		30	
Benzene	ug/L	ND	ND		30	
Bromobenzene	ug/L	ND	ND		30	
Bromochloromethane	ug/L	ND	ND		30	
Bromodichloromethane	ug/L	ND	ND		30	
Bromoform	ug/L	ND	ND		30	
Bromomethane	ug/L	ND	ND		30	
Carbon tetrachloride	ug/L	ND	ND		30	
Chlorobenzene	ug/L	ND	ND		30	
Chloroethane	ug/L	ND	ND		30	
Chloroform	ug/L	ND	ND		30	
Chloromethane	ug/L	ND	ND		30	
cis-1,2-Dichloroethene	ug/L	ND	ND		30	
cis-1,3-Dichloropropene	ug/L	ND	ND		30	
Dibromochloromethane	ug/L	ND	ND		30	
Dibromomethane	ug/L	ND	ND		30	
Dichlorodifluoromethane	ug/L	ND	ND		30	
Dichlorofluoromethane	ug/L	ND	ND		30	
Diethyl ether (Ethyl ether)	ug/L	ND	ND		30	
Ethylbenzene	ug/L	ND	ND		30	

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(612)607-1700

QUALITY CONTROL DATA

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

SAMPLE DUPLICATE: 2035049

Parameter	Units	10315840003 Result	Dup Result	RPD	Max RPD	Qualifiers
Hexachloro-1,3-butadiene	ug/L	ND	ND		30	
Isopropylbenzene (Cumene)	ug/L	ND	ND		30	
Methyl-tert-butyl ether	ug/L	ND	ND		30	
Methylene Chloride	ug/L	ND	ND		30	
n-Butylbenzene	ug/L	ND	ND		30	
n-Propylbenzene	ug/L	ND	ND		30	
Naphthalene	ug/L	ND	ND		30	
p-Isopropyltoluene	ug/L	ND	ND		30	
sec-Butylbenzene	ug/L	ND	ND		30	
Styrene	ug/L	ND	ND		30	
tert-Butylbenzene	ug/L	ND	ND		30	
Tetrachloroethene	ug/L	0.39J	0.37J		30	
Tetrahydrofuran	ug/L	ND	ND		30	
Toluene	ug/L	ND	ND		30	
trans-1,2-Dichloroethene	ug/L	ND	ND		30	
trans-1,3-Dichloropropene	ug/L	ND	ND		30	
Trichloroethene	ug/L	0.44	0.49	10	30	
Trichlorofluoromethane	ug/L	ND	ND		30	
Vinyl chloride	ug/L	ND	ND		30	
Xylene (Total)	ug/L	ND	ND		30	
1,2-Dichloroethane-d4 (S)	%.	97	98	0		
4-Bromofluorobenzene (S)	%.	98	96	2		
Toluene-d8 (S)	%.	99	98	0		

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QUALIFIERS

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

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 decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

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

CH	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.
L0	Analyte recovery in the laboratory control sample (LCS) was outside QC limits.
L3	Analyte recovery in the laboratory control sample (LCS) exceeded QC limits. Analyte presence below reporting limits in associated samples. Results unaffected by high bias.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60338600-310 Mission Wye GWM
Pace Project No.: 10315840

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10315840001	**Harris Stock Well**	EPA 524.2	MSV/32571		
10315840007	**Gravel Pit Well**	EPA 524.2	MSV/32571		
10315840002	**MW-19**	EPA 8260B	MSV/32527		
10315840003	**MW-18**	EPA 8260B	MSV/32527		
10315840004	**MW-32**	EPA 8260B	MSV/32527		
10315840005	**MW-12**	EPA 8260B	MSV/32527		
10315840006	**MW-14**	EPA 8260B	MSV/32527		
10315840008	**Gravel Pit Pond**	EPA 8260B	MSV/32527		
10315840009	**MW-1**	EPA 8260B	MSV/32527		
10315840010	**MW-21**	EPA 8260B	MSV/32527		
10315840011	**MW-22**	EPA 8260B	MSV/32527		
10315840012	**MW-9**	EPA 8260B	MSV/32527		
10315840013	**MW-4**	EPA 8260B	MSV/32527		
10315840014	**MW-33**	EPA 8260B	MSV/32527		
10315840015	**MW-5**	EPA 8260B	MSV/32527		
10315840016	**MW-30**	EPA 8260B	MSV/32527		
10315840017	**MW-3**	EPA 8260B	MSV/32527		
10315840018	**Trip Blank**	EPA 8260B	MSV/32527		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10315840

Page: 1 of 2

1924246

Section A Required Client Information:

Company: AECOM/BNSF
Address: 207 N. Broadway Suite 315
Billings, MT 59101
Email To: Shelly.Young@aecom.com
Phone: (406)896-4592 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Shelly Young
Copy To:
Purchase Order No.: TT 9095-P02
Project Name: Mission Wye GWM Event
Project Number: 60338600-310

Section C Invoice Information:

Attention: Shelly Young
Company Name: AECOM
Address: 207 N. Broadway Suite 315
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #:

REGULATORY AGENCY: ☐ NPDES ☒ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MT

Section D Required Client Information

Matrix Codes MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N): N, N

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start Date	Composite Start Time	Composite End/Grab Date	Composite End/Grab Time	SAMPLE TEMP AT COLLECTION (°C)	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test: 8260 VOCs	Analysis Test: 524.2 VOCs	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	Harris Stock Well	WT	G	07/22/15	1105			-	3				X				X	0	3		001
2	MW-19	WT	G	07/22/15	1120			14.2					X					3	0		002
3	MW-18	WT	G	07/22/15	1320			12.2					X					3	0		003
4	MW-32	WT	G	07/22/15	1140			13.7					X					3	0		004
5	MW-12	WT	G	07/22/15	1400			14.0					X					3	0		005
6	MW-14	WT	G	07/22/15	1435			14.0					X					3	0		006
7	Gravel Pit Well	WT	G	07/22/15	1430			-					X				X	0	3		007
8	Gravel Pit Pond	WT	G	07/22/15	1455			-					X					3	0		008
9	MW-1	WT	G	07/22/15	1540			12.8					X					3	0		009
10	MW-21	WT	G	07/22/15	1630			12.2					X					3	0		010
11	MW-22	WT	G	07/23/15	1125			12.7					X					3	0		011
12	MW-9	WT	G	07/23/15	1209			12.2					Y					3	0		012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	AECOM	07/27/15	0800	PACE	7/28/15	0915	0.2	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Jake Hover
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 07/24/15

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

1924245

Section A Required Client Information:

Company: AECOM/BNSF
Address: 207 N. Broadway Suite 315, Billings, MT 59101
Email To: Shelly.Young@aecom.com
Phone: (406) 896-4582 Fax:
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Shelly Young
Copy To:
Purchase Order No.: TT9095-P02
Project Name: Missoula Wye GWM Event
Project Number: 60338600-310

Section C Invoice Information:

Attention: Shelly Young
Company Name: AECOM
Address: 207 N. Broadway 315
Pace Quote Reference:
Pace Project Manager: Carol Davy
Pace Profile #:

REGULATORY AGENCY: ☐ NPDES ☒ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MT

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N): Y/N N; Analysis Test: 8260 VOC

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	COLLECTED Composite Start TIME	COLLECTED Composite End/Grab DATE	COLLECTED Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-4	WT	G	07/23/15	1345	|	|	12.7	3				X					3		013
2	MW-33	WT	G	07/23/15	1345	|	|	12.7	3				X					3		014
3	MW-5	WT	G	07/23/15	1425	|	|	11.9	3				X					3		015
4	MW-30	WT	G	07/23/15	1435	|	|	-	3				X					3		016
5	MW-3	WT	G	07/23/15	1505	|	|	13.0	3				X					3		017
6	Trip Blanks	WT	-	-	-	-	-	-	2				X					2		018
7																				
8																				
9																				
10																				
11																				
12																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	AECOM	07/27/15	0800	PACE	7/28/15	0915	0.2	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Jake Haver
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 07/24/15

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 23Feb2015 Page 1 of 1
	Document No.: **F-MN-L-213-rev.13**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Accom/BNSF

Project #: WO#: 10315840

10315840

Courier: ☐ Fed Ex ☑ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: J455521752 8

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

Thermometer Used: ☐ B88A9130516413 ☐ B88A912167504 ☑ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.1 **Cooler Temp Corrected (°C):** 0.2 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** +0.1 **Date and Initials of Person Examining Contents:** MG 7/28/15

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				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. Note if sediment is visible in the dissolved container
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	
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☑ Yes	☐ No	☐ N/A	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): N/A				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Shelly Young Date/Time: 7-28-15

Comments/Resolution: Analyze samples closest to target temp and/or received first.
∴ UPS samples are being analyzed - this SDG.

Project Manager Review: [illegible] **Date:** 7-28-15

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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www.alsglobal.com

LABORATORY REPORT

December 2, 2015

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: BNSF Mission Wye / 60334021

Dear Shelly:

The report has been amended a third time to report the EPA TO-15 results down to the method detection limits. The revised pages have been indicated by the "Revised Page" footer located at the bottom right of the page.

The report has been amended a second time to include the DLCS under ASTM D1946-90. The revised page has been indicated by the "Revised Page" footer located at the bottom right of the page.

Your report number P1503608 has been amended for the samples submitted to our laboratory on August 31, 2015. The method reference for the fixed gases analysis has been changed from modified EPA 3C to ASTM D1946-90. The reported unit for this analysis has been changed to ppmV The revised pages have been denoted by the "Revised Page" footer located at the bottom right of the page.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera

By Kate Aguilera at 9:50 am, Dec 02, 2015

Kate Aguilera
Project Manager

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www.alsglobal.com

Client: AECOM Environment
Project: BNSF Mission Wye / 60334021

Service Request No: P1503608

CASE NARRATIVE

The samples were received intact under chain of custody on August 31, 2015 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen/argon, carbon monoxide, methane and carbon dioxide) per ASTM D 1946-90 using a gas chromatograph equipped with a thermal conductivity detector (TCD). This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP or AIHA-LAP accreditation.

Volatile Organic Compound Analysis

The samples were also analyzed for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The canisters were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	876241
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-001
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-15-6
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272015-5
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1503608

Project ID: BNSF Mission Wye / 60334021

Date Received: 8/31/2015

Time Received: 08:50

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	3C Modified - Fxd Gases Can	TO-15 Modified - VOC Cans
VMP-1S/08252015	P1503608-001	Air	8/25/2015	10:48	SC01611	-4.19	5.10	X	X
VMP-1D/08252015	P1503608-002	Air	8/25/2015	12:48	SC02042	-4.64	5.39	X	X
VMP-DUP/08252015	P1503608-003	Air	8/25/2015	12:00	SC01537	-4.34	5.34	X	X
VMP-2S/08252015	P1503608-004	Air	8/25/2015	14:32	SC01554	-3.96	5.42	X	X
VMP-2D/08252015	P1503608-005	Air	8/25/2015	15:00	SC00977	-4.70	5.35	X	X
VMP-5/08262015	P1503608-006	Air	8/26/2015	08:10	SC00670	-4.27	5.36	X	X
VMP-4/08262015	P1503608-007	Air	8/26/2015	09:22	AC02079	-5.24	5.37	X	X
VMP-3/08262015	P1503608-008	Air	8/26/2015	10:27	SC01674	-4.74	5.07	X	X

ALS ENVIRONMENTAL
Sample Volume Correction for Helium Pressurization for SCAN Analysis

Sample ID	Pi	Pf	Sample Volume (L)	Adjusted Volume (L)
P1503608-001	-4.19	5.10	25.000	29.3
P1503608-002	-4.64	5.39	15.000	17.8
P1503608-003	-4.34	5.34	100.000	118
P1503608-004	-3.96	5.42	250.000	293
P1503608-005	-4.70	5.35	100.000	119
P1503608-006	-4.27	5.36	500.000	589
P1503608-007	-5.24	5.37	200.000	239
P1503608-008	-4.74	5.07	200.000	237
P1503608-001DIL	-4.19	5.10	15.000	17.6
P1503608-003DIL	-4.34	5.34	20.000	23.6
P1503608-004DIL	-3.96	5.42	50.000	58.6
P1503608-005DIL	-4.70	5.35	20.000	23.7
P1503608-006DIL	-4.27	5.36	100.000	118
P1503608-007DIL	-5.24	5.37	50.000	59.8
P1503608-008DIL	-4.74	5.07	50.000	59.2

Air - Chain of Custody Record & Analytical Service Request

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No. P503608

Company Name & Address (Reporting Information): AECOM, 207 N. Broadway, Ste. 315, Billings, MT 59101

Project Name: BNSF - Mission Wye

Project Number: 60334021

Project Manager: Shelly Young

P.O. # / Billing Information

Phone: 406-855-0945

Fax: —

Email Address for Result Reporting: shelly.young@aecom.com

Sampler (Print & Sign): Cole R. Grover

ALS Contact:

Analysis Method

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	VOCs (TO-15)	Fixed Gases (D-1946)	Comments e.g. Actual Preservative or specific instructions
VMP-1S/08252015	1	8-25-2015	1048	6374	AVG04427	-26.5	-5.0	6l	X	X	
VMP-1D/08252015	2	↓	1248	12370	AVG04183	-26.5	-5.0	↓	X	X	
VMP-DUP/08252015	3	↓	1200	003559	AVG09907	-29.0	-5.5	↓	X	X	
VMP-2S/08252015	4	↓	1432	003492	AVG04430	-28.0	-5.0	↓	X	X	
VMP-2D/08252015	5	↓	1500	002770	AVG03251	-26.0	-5.0	↓	X	X	
VMP-5/08262015	6	8-26-2015	0810	01377	AVG03704	-27.0	-5.0	↓	X	X	
VMP-4/08262015	7	↓	0922	N0050	AVG04272	-25.0	-5.0	↓	X	X	
VMP-3/08262015	8	↓	1027	002791	AVG03310	-26.0	-5.0	↓	X	X	

Report Tier Levels - please select

Tier I - Results (Default In not specified) ____
Tier II (Results + QC Summaries ____
Tier III (Results + QC & Calibration Summaries) X
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required YES / No
Type: ____ Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Cole R. Grover	8-26-2015	1145			
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
			K. Kepic	8/31/15	0830

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1503608

Project: BNSF Mission Wye / 60334021

Sample(s) received on: 8/31/15 Date opened: 8/31/15 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by ALS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☐	☒
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1503608-001.01	6.0 L Source Can					
P1503608-002.01	6.0 L Source Can					
P1503608-003.01	6.0 L Source Can					
P1503608-004.01	6.0 L Source Can					
P1503608-005.01	6.0 L Source Can					
P1503608-006.01	6.0 L Source Can					
P1503608-007.01	6.0 L Ambient Can					
P1503608-008.01	6.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-1S/08252015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1503608
ALS Sample ID: P1503608-001

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01611

Date Collected: 8/25/15
Date Received: 8/31/15
Date Analyzed: 9/9/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.19 Final Pressure (psig): 5.10

Canister Dilution Factor: 1.88

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen +**			
7440-37-1	**Argon**	**216,000**	1,900	
7727-37-9	**Nitrogen**	**777,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	**Carbon Dioxide**	**7,400**	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Revised Page

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-1D/08252015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1503608
ALS Sample ID: P1503608-002

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC02042

Date Collected: 8/25/15
Date Received: 8/31/15
Date Analyzed: 9/9/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.64 Final Pressure (psig): 5.39

Canister Dilution Factor: 2.00

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen +**			
7440-37-1	**Argon**	**212,000**	2,000	
7727-37-9	**Nitrogen**	**778,000**	2,000	
74-82-8	Methane	ND	2,000	
124-38-9	**Carbon Dioxide**	**9,820**	2,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Revised Page

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-DUP/08252015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1503608
ALS Sample ID: P1503608-003

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01537

Date Collected: 8/25/15
Date Received: 8/31/15
Date Analyzed: 9/9/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.34 Final Pressure (psig): 5.34

Canister Dilution Factor: 1.93

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen +**			
7440-37-1	**Argon**	**214,000**	1,900	
7727-37-9	**Nitrogen**	**776,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	**Carbon Dioxide**	**9,390**	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Revised Page

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-2S/08252015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1503608
ALS Sample ID: P1503608-004

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01554

Date Collected: 8/25/15
Date Received: 8/31/15
Date Analyzed: 9/9/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.96 Final Pressure (psig): 5.42

Canister Dilution Factor: 1.87

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen +**			
7440-37-1	**Argon**	**217,000**	1,900	
7727-37-9	**Nitrogen**	**776,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	**Carbon Dioxide**	**7,530**	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

Revised Page

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-2D/08252015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1503608
ALS Sample ID: P1503608-005

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00977

Date Collected: 8/25/15
Date Received: 8/31/15
Date Analyzed: 9/9/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.70 Final Pressure (psig): 5.35

Canister Dilution Factor: 2.01

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen +**			
7440-37-1	**Argon**	**215,000**	2,000	
7727-37-9	**Nitrogen**	**776,000**	2,000	
74-82-8	Methane	ND	2,000	
124-38-9	**Carbon Dioxide**	**9,370**	2,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-5/08262015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1503608
ALS Sample ID: P1503608-006

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00670

Date Collected: 8/26/15
Date Received: 8/31/15
Date Analyzed: 9/9/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.27 Final Pressure (psig): 5.36

Canister Dilution Factor: 1.92

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen +**			
7440-37-1	**Argon**	**214,000**	1,900	
7727-37-9	**Nitrogen**	**775,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	**Carbon Dioxide**	**11,700**	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-4/08262015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1503608
ALS Sample ID: P1503608-007

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC02079

Date Collected: 8/26/15
Date Received: 8/31/15
Date Analyzed: 9/9/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -5.24 Final Pressure (psig): 5.37

Canister Dilution Factor: 2.12

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen +**			
7440-37-1	**Argon**	**214,000**	2,100	
7727-37-9	**Nitrogen**	**775,000**	2,100	
74-82-8	Methane	ND	2,100	
124-38-9	**Carbon Dioxide**	**11,000**	2,100	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-3/08262015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1503608
ALS Sample ID: P1503608-008

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01674

Date Collected: 8/26/15
Date Received: 8/31/15
Date Analyzed: 9/9/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.74 Final Pressure (psig): 5.07

Canister Dilution Factor: 1.98

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen +**			
7440-37-1	**Argon**	**216,000**	2,000	
7727-37-9	**Nitrogen**	**774,000**	2,000	
74-82-8	Methane	ND	2,000	
124-38-9	**Carbon Dioxide**	**9,310**	2,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1503608
ALS Sample ID: P150909-MB

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 9/09/15
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	Oxygen +			
7440-37-1	Argon	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

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ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1503608
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P150909-LCS

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Nalini Lall Date Analyzed: 9/09/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen +					
7440-37-1	Argon	50,000	**56,500**	**113**	84-121	
7727-37-9	Nitrogen	50,000	**58,700**	**117**	88-122	
74-82-8	Methane	40,000	**43,200**	**108**	85-116	
124-38-9	Carbon Dioxide	50,000	**53,300**	**107**	84-117	

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ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Duplicate Lab Control Sample**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1503608
ALS Sample ID: P150909-DLCS

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 9/09/15
Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount LCS / DLCS ppmV	Result LCS ppmV	Result DLCS ppmV	% Recovery LCS	% Recovery DLCS	ALS Acceptance Limits	RPD	RPD Limit	Data Qualifier
7782-44-7	Oxygen +									
7440-37-1	Argon	50,000	56,500	54,400	**113**	**109**	84-121	4	16	
7727-37-9	Nitrogen	50,000	58,700	52,800	**117**	**106**	88-122	10	21	
74-82-8	Methane	40,000	43,200	42,800	**108**	**107**	85-116	0.9	16	
124-38-9	Carbon Dioxide	50,000	53,300	52,400	**107**	**105**	84-117	2	16	

Revised Page

Method Path : I:\GC01\METHODS\
Method File : 3C112914.M
Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
Last Update : Mon Dec 01 13:41:04 2014
Response Via : Initial Calibration

Calibration Files
1 =11291412.D 2 =11291410.D 3 =11291413.D
4 =11291414.D 5 =11291415.D 6 =11291421.D

	Compound	1	2	3	4	5	6	Avg		%RSD
1)	Hydrogen	1.258	1.246	1.311	1.308	1.519		1.328	E1	8.32
2)	Oxygen	1.420	1.594	1.603	1.604	1.561	1.649	1.572	E1	5.07
3)	Nitrogen	2.029	1.951	1.833	1.829	1.803		1.829	E1	9.36
4)	Carbon Monoxide	1.712	1.637	1.814	1.800	1.763		1.745	E1	4.14
5)	Methane	1.370	1.329	1.353	1.359	1.332		1.348	E1	1.17
6)	Carbon Dioxide	2.104	2.103	2.082	2.080	2.018		2.102	E1	3.20

(#) = Out of Range ### Number of calibration levels exceeded format ###

Modified EPA Method 3C Daily QC Summary

Client : AECOM Environment
Analyst : NL
Method Name : EPA 3C, ASTM D 1946-90, VOA-EPA3C

Instrument : GC01_FXG
Date Analyzed : 9/9/2015

RT Summaries and QC Check (minutes)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ICAL Mean RT	**0.708**	**2.188**	**2.368**	**3.076**	**5.045**	**6.707**		
RT Windows (+/- min)	**0.072**	**0.133**	**0.146**	**0.034**	**0.130**	**0.145**		
std s30-08311502	0.711	2.229	2.404	3.090	5.081	6.742	09091502.D	07:25
+/- 0.33min of ICAL Mean RT	Pass	Pass	Pass	Pass	Pass	Pass		
mb							09091503.D	07:46
lab air		2.160 Pass	2.296 Pass			6.738 Pass	09091504.D	08:02
3608-001		2.179 Pass	2.324 Pass			6.736 Pass	09091506.D	08:38
3608-002		2.187 Pass	2.333 Pass			6.740 Pass	09091507.D	09:03
3608-003		2.183 Pass	2.328 Pass			6.735 Pass	09091508.D	09:23
3608-004		2.174 Pass	2.318 Pass			6.735 Pass	09091509.D	09:38
3608-005		2.187 Pass	2.335 Pass			6.739 Pass	09091510.D	10:02
3608-006		2.196 Pass	2.344 Pass			6.742 Pass	09091511.D	10:31
3608-007		2.193 Pass	2.340 Pass			6.741 Pass	09091512.D	10:54
3608-008		2.192 Pass	2.339 Pass			6.741 Pass	09091513.D	11:19
lcs s30-08131504	0.709 Pass	2.220 Pass	2.396 Pass	3.084 Pass	5.074 Pass	6.735 Pass	09091515.D	12:11
lcsd s30-08131504	0.710 Pass	2.223 Pass	2.399 Pass	3.086 Pass	5.075 Pass	6.737 Pass	09091516.D	12:41
std s30-08311502	0.708 Pass	2.217 Pass	2.392 Pass	3.079 Pass	5.069 Pass	6.732 Pass	09091517.D	12:58

Continuing Calibration Standards Summary (ppm)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ACTUAL	39980.0	40030.0	50000.0	49990.0	40020.0	50040.0		
CCV Criteria (+/- %D)	**15.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**		
std s30-08311502	41102.8 2.8%	41900.4 4.7%	52138.3 4.3%	52433.2 4.9%	40734.8 1.8%	50936.4 1.8%	09091502.D	07:25
std s30-08311502	41333.9 3.4%	42399.1 5.9%	54024.7 8.0%	52625.0 5.3%	41052.3 2.6%	50428.0 0.8%	09091517.D	12:58

Lab Dup Summary (ppm, without DF correction and nomalization)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time

LCS / LCS Dup Summary (ppm, without DF correction)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
LCS Actual Conc. (ppm)	40000.0	50000.0	50000.0	50000.0	40000.0	50000.0		
LCS Criteria (% Range)	**83%-114%**	**84%-121%**	**88%-122%**	**87%-118%**	**85%-116%**	**84%-117%**		
lcs s30-08131504	42900.6	56460.9	58651.9	54942.5	43240.2	53342.9	09091515.D	12:11
LCS % Recovery	107% Pass	113% Pass	117% Pass	110% Pass	108% Pass	107% Pass		
lcsd s30-08131504	42346.1	54354.9	52838.7	54272.8	42817.8	52418.7	09091516.D	12:41
LCS % Recovery	106% Pass	109% Pass	106% Pass	109% Pass	107% Pass	105% Pass		
Duplicate % RPD	1.3%	3.8%	10.4%	1.2%	1.0%	1.7%		
Duplicate Criteria % RPD	**16%** Pass	**16%** Pass	**21%** Pass	**16%** Pass	**16%** Pass	**16%** Pass		

Lab Air QC Summary

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxid	Methane	Carbon Dioxide	Lab Air Criteria Total (90%-110%)
lab air		214933.2	764588.9			468.8	98.0% Pass
Lab Air Normalized (%)		21.93%	78.01%			0.05%	100.0%

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-1S/08252015** ALS Project ID: P1503608
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1503608-001

Test Code: EPA TO-15 Modified Date Collected: 8/25/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 8/31/15
Analyst: Wida Ang Date Analyzed: 9/4/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.0293 Liter(s)
Test Notes: 0.0176 Liter(s)
Container ID: SC01611

Initial Pressure (psig): -4.19 Final Pressure (psig): 5.10

Canister Dilution Factor: 1.88

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**22**	32	12	**5.7**	8.1	3.1	**J**
79-01-6	Trichloroethene	**2,400**	32	9.0	**440**	6.0	1.7	
127-18-4	Tetrachloroethene	**8,900**	53	15	**1,300**	7.9	2.2	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	32	9.6	ND	6.5	2.0	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-1D/08252015** ALS Project ID: P1503608
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1503608-002

Test Code: EPA TO-15 Modified Date Collected: 8/25/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 8/31/15
Analyst: Wida Ang Date Analyzed: 9/4/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.0178 Liter(s)
Test Notes: 0.0075 Liter(s)
Container ID: SC02042

Initial Pressure (psig): -4.64 Final Pressure (psig): 5.39

Canister Dilution Factor: 2.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**49**	56	21	**12**	14	5.4	**J**
79-01-6	Trichloroethene	**3,800**	56	16	**700**	10	2.9	
127-18-4	Tetrachloroethene	**12,000**	130	37	**1,700**	20	5.5	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	56	17	ND	11	3.4	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-DUP/08252015** ALS Project ID: P1503608
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1503608-003

Test Code: EPA TO-15 Modified Date Collected: 8/25/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 8/31/15
Analyst: Wida Ang Date Analyzed: 9/4/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.118 Liter(s)
Test Notes: 0.0236 Liter(s)
Container ID: SC01537

Initial Pressure (psig): -4.34 Final Pressure (psig): 5.34

Canister Dilution Factor: 1.93

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**3.6**	8.2	3.1	**0.91**	2.1	0.78	**J**
79-01-6	Trichloroethene	**320**	8.2	2.3	**59**	1.5	0.43	
127-18-4	Tetrachloroethene	**3,500**	41	11	**520**	6.0	1.7	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	8.2	2.5	ND	1.7	0.50	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-2S/08252015** ALS Project ID: P1503608
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1503608-004

Test Code: EPA TO-15 Modified Date Collected: 8/25/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 8/31/15
Analyst: Wida Ang Date Analyzed: 9/4/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.293 Liter(s)
Test Notes: 0.0586 Liter(s)
Container ID: SC01554

Initial Pressure (psig): -3.96 Final Pressure (psig): 5.42

Canister Dilution Factor: 1.87

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	3.2	1.2	ND	0.81	0.31	
79-01-6	Trichloroethene	**120**	3.2	0.89	**22**	0.59	0.17	
127-18-4	Tetrachloroethene	**1,400**	16	4.5	**210**	2.4	0.66	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	3.2	0.96	ND	0.65	0.19	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-2D/08252015** ALS Project ID: P1503608
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1503608-005

Test Code: EPA TO-15 Modified Date Collected: 8/25/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 8/31/15
Analyst: Wida Ang Date Analyzed: 9/5/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.119 Liter(s)
Test Notes: 0.0237 Liter(s)
Container ID: SC00977

Initial Pressure (psig): -4.70 Final Pressure (psig): 5.35

Canister Dilution Factor: 2.01

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**3.6**	8.4	3.2	**0.91**	2.1	0.81	**J**
79-01-6	Trichloroethene	**340**	8.4	2.4	**63**	1.6	0.44	
127-18-4	Tetrachloroethene	**3,500**	42	12	**510**	6.3	1.8	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	8.4	2.5	ND	1.7	0.52	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-5/08262015** ALS Project ID: P1503608
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1503608-006

Test Code: EPA TO-15 Modified Date Collected: 8/26/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 8/31/15
Analyst: Wida Ang Date Analyzed: 9/5/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.589 Liter(s)
Test Notes: 0.118 Liter(s)
Container ID: SC00670

Initial Pressure (psig): -4.27 Final Pressure (psig): 5.36

Canister Dilution Factor: 1.92

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	1.6	0.62	ND	0.41	0.16	
79-01-6	Trichloroethene	**64**	1.6	0.46	**12**	0.30	0.085	
127-18-4	Tetrachloroethene	**650**	8.1	2.3	**96**	1.2	0.34	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	1.6	0.49	ND	0.33	0.10	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-4/08262015** ALS Project ID: P1503608
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1503608-007

Test Code: EPA TO-15 Modified Date Collected: 8/26/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 8/31/15
Analyst: Wida Ang Date Analyzed: 9/5/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.239 Liter(s)
Test Notes: 0.0598 Liter(s)
Container ID: AC02079

Initial Pressure (psig): -5.24 Final Pressure (psig): 5.37

Canister Dilution Factor: 2.12

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	4.4	1.7	ND	1.1	0.43	
79-01-6	Trichloroethene	**170**	4.4	1.2	**32**	0.83	0.23	
127-18-4	Tetrachloroethene	**1,900**	18	5.0	**280**	2.6	0.73	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	4.4	1.3	ND	0.90	0.27	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **VMP-3/08262015** ALS Project ID: P1503608
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1503608-008

Test Code: EPA TO-15 Modified Date Collected: 8/26/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 8/31/15
Analyst: Wida Ang Date Analyzed: 9/5/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.237 Liter(s)
Test Notes: 0.0592 Liter(s)
Container ID: SC01674

Initial Pressure (psig): -4.74 Final Pressure (psig): 5.07

Canister Dilution Factor: 1.98

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**1.6**	4.2	1.6	**0.41**	1.1	0.40	**J**
79-01-6	Trichloroethene	**150**	4.2	1.2	**28**	0.78	0.22	
127-18-4	Tetrachloroethene	**1,700**	17	4.7	**250**	2.5	0.69	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	4.2	1.3	ND	0.85	0.26	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1503608
ALS Sample ID: P150904-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 9/4/15
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1503608
ALS Sample ID: P150904-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 9/4/15
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **BNSF Mission Wye / 60334021** ALS Project ID: P1503608

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date(s) Collected: 8/25 - 8/26/15
Analyst: Wida Ang Date(s) Received: 8/31/15
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 9/4 - 9/5/15
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P150904-MB	**97**	**104**	**99**	70-130	
Method Blank	P150904-MB	**99**	**103**	**97**	70-130	
Lab Control Sample	P150904-LCS	**94**	**103**	**101**	70-130	
Lab Control Sample	P150904-LCS	**97**	**100**	**100**	70-130	
VMP-1S/08252015	P1503608-001	**90**	**105**	**96**	70-130	
VMP-1D/08252015	P1503608-002	**91**	**105**	**95**	70-130	
VMP-DUP/08252015	P1503608-003	**96**	**101**	**99**	70-130	
VMP-2S/08252015	P1503608-004	**95**	**96**	**97**	70-130	
VMP-2D/08252015	P1503608-005	**93**	**103**	**100**	70-130	
VMP-5/08262015	P1503608-006	**94**	**102**	**97**	70-130	
VMP-4/08262015	P1503608-007	**90**	**103**	**98**	70-130	
VMP-3/08262015	P1503608-008	**86**	**104**	**98**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1503608
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P150904-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 9/4/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**173**	**82**	69-123	
79-01-6	Trichloroethene	216	**158**	**73**	69-115	
127-18-4	Tetrachloroethene	202	**165**	**82**	67-120	
95-63-6	1,2,4-Trimethylbenzene	218	**168**	**77**	71-122	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1503608
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P150904-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 9/4/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**184**	**88**	69-123	
79-01-6	Trichloroethene	216	**166**	**77**	69-115	
127-18-4	Tetrachloroethene	202	**168**	**83**	67-120	
95-63-6	1,2,4-Trimethylbenzene	218	**176**	**81**	71-122	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

Response Factor Report Instrument #MS08

Method Path : I:\MS08\Methods\
Method File : R8082615.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Thu Aug 27 07:19:54 2015
Response Via : Initial Calibration

Calibration Files
0.08=08261523.D 0.10=08261524.D 0.20=08261525.D 0.40=08261526.D 1.0 =08261527.D 5.0 =08261528.D 25 =08261529.D
50 =08261530.D 100 =08261531.D

		Compound	0.08	0.10	0.20	0.40	1.0	5.0	25	50	100	Avg	%RSD
1)	IR	Bromochloromethane...	----------ISTD----------										
2)	T	Propene		0.858	0.812	0.762	0.821	0.651	0.627	0.473	0.372	0.672	26.17
3)	T	Dichlorodifluo...	3.994	3.880	3.335	3.234	3.308	2.687	2.743	2.351	1.785	3.035	23.51
4)	T	Chloromethane	1.523	1.354	1.193	1.116	1.223	1.009	1.057	0.856	0.648	1.109	23.43
5)	T	1,2-Dichloro-1...	1.707	1.571	1.499	1.325	1.377	1.060	1.106	1.034	0.905	1.287	21.38
6)	T	Vinyl Chloride	1.412	1.303	1.180	1.154	1.165	0.977	1.012	0.948	0.850	1.111	16.21
7)	T	1,3-Butadiene	1.019	0.984	0.900	0.854	0.914	0.745	0.768	0.695	0.640	0.835	15.68
8)	T	Bromomethane			1.093	0.988	0.986	0.748	0.985	0.794	0.763	0.908	15.04
9)	T	Chloroethane	0.864	0.975	0.779	0.785	0.833	0.728	0.708	0.622	0.571	0.763	16.17
10)	T	Ethanol	0.688	0.673	0.618	0.548	0.571	0.461	0.463	0.393	0.362	0.531	22.23
11)	T	Acetonitrile	1.671	1.603	1.395	1.253	1.323	1.115	1.214	1.075	1.008	1.295	17.66
12)	T	Acrolein	0.667	0.667	0.672	0.563	0.596	0.516	0.546	0.492	0.458	0.575	14.01
13)	T	Acetone			0.812	0.733	0.759	0.614	0.567	0.478	0.431	0.628	23.21
14)	T	Trichlorofluor...	3.385	3.533	3.183	2.860	3.001	2.417	2.585	2.504	2.311	2.864	15.38
15)	T	2-Propanol (Is...	2.627	2.114	2.235	2.113	2.283	1.946	2.024	1.806	1.465	2.068	15.67
16)	T	Acrylonitrile	1.197	1.079	1.001	0.994	1.158	1.012	1.093	0.976	0.906	1.046	8.87
17)	T	1,1-Dichloroet...	1.520	1.421	1.302	1.174	1.331	1.080	1.114	1.005	0.916	1.207	16.55
18)	T	2-Methyl-2-Pro...	3.600	3.370	3.005	2.951	3.109	2.609	2.735	2.544	2.316	2.915	14.07
19)	T	Methylene Chlo...				1.464	1.346	0.998	1.016	0.891	0.779	1.083	24.62
20)	T	3-Chloro-1-pro...	1.164	1.010	1.079	1.033	1.105	0.994	1.088	0.970	0.904	1.038	7.60
21)	T	Trichlorotrifl...	1.631	1.461	1.261	1.195	1.295	1.003	1.037	0.963	0.866	1.190	20.98
22)	T	Carbon Disulfide				4.967	4.985	3.862	3.826	3.318	2.955	3.985	21.02
23)	T	trans-1,2-Dich...	1.659	1.745	1.535	1.360	1.523	1.323	1.418	1.317	1.225	1.456	11.81
24)	T	1,1-Dichloroet...	2.270	2.243	2.034	1.807	1.965	1.664	1.725	1.587	1.463	1.862	15.27
25)	T	Methyl tert-Bu...	4.678	4.710	4.182	3.829	3.880	3.333	3.544	3.334	3.064	3.839	15.35
26)	T	Vinyl Acetate	0.214	0.262	0.239	0.238	0.268	0.260	0.257	0.229	0.222	0.243	8.00
27)	T	2-Butanone (MEK)	0.771	0.650	0.744	0.736	0.716	0.669	0.697	0.619	0.561	0.685	9.75
28)	T	cis-1,2-Dichlo...	1.723	1.670	1.474	1.441	1.471	1.236	1.338	1.242	1.167	1.418	13.58
29)	T	Diisopropyl Ether			1.370	1.081	1.075	0.864	0.778	0.694	0.665	0.932	27.38
30)	T	Ethyl Acetate	0.278	0.266	0.302	0.307	0.319	0.265	0.224	0.194	0.199	0.262	17.73
31)	T	n-Hexane			1.562	1.460	1.400	1.159	0.952	0.830	0.861	1.175	25.75
32)	T	Chloroform	3.054	2.815	2.471	2.243	2.347	1.931	2.060	1.973	1.839	2.304	18.04
33)	S	1,2-Dichloroet...	1.810	1.835	1.852	1.863	1.766	1.797	1.815	1.881	1.827	1.827	1.93
34)	T	Tetrahydrofura...	0.706	0.669	0.659	0.622	0.740	0.645	0.666	0.608	0.562	0.653	8.05
35)	T	Ethyl tert-But...	2.081	1.817	1.648	1.620	1.690	1.501	1.547	1.440	1.313	1.628	13.79
36)	T	1,2-Dichloroet...	2.220	2.191	1.805	1.801	1.840	1.500	1.666	1.644	1.557	1.803	14.18
37)	IR	1,4-Difluorobenzen...	----------ISTD----------										
38)	T	1,1,1-Trichlor...	0.684	0.622	0.561	0.506	0.539	0.439	0.478	0.454	0.414	0.522	17.06
39)	T	Isopropyl Acetate	0.120	0.114	0.118	0.113	0.117	0.097	0.085	0.072	0.067	0.100	20.89
40)	T	1-Butanol	0.185	0.193	0.196	0.184	0.205	0.167	0.169	0.147	0.137	0.176	12.97
41)	T	Benzene			1.080	0.889	0.937	0.753	0.758	0.665	0.603	0.812	20.41
42)	T	Carbon Tetrach...	0.494	0.460	0.461	0.418	0.472	0.380	0.428	0.410	0.373	0.433	9.64

8/28/15

Method Path : I:\MS08\Methods\
Method File : R8082615.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

43)	T	Cyclohexane			0.459	0.388	0.434	0.345	0.326	0.281	0.252	0.355	21.57
44)	T	tert-Amyl Meth...	0.918	0.885	0.752	0.735	0.794	0.668	0.702	0.635	0.562	0.739	15.55
45)	T	1,2-Dichloropr...	0.236	0.214	0.195	0.188	0.207	0.174	0.176	0.155	0.139	0.187	16.06
46)	T	Bromodichlorom...	0.458	0.441	0.383	0.363	0.408	0.330	0.364	0.341	0.309	0.378	13.29
47)	T	Trichloroethene	0.436	0.434	0.325	0.330	0.352	0.273	0.276	0.247	0.221	0.322	23.81
48)	T	1,4-Dioxane	0.252	0.228	0.232	0.194	0.223	0.183	0.187	0.160	0.139	0.200	18.45
49)	T	2,2,4-Trimethy...	1.068	0.995	0.871	0.831	0.936	0.753	0.749	0.641	0.566	0.823	19.87
50)	T	Methyl Methacr...	0.110	0.134	0.096	0.092	0.115	0.095	0.096	0.086	0.078	0.100	16.94
51)	T	n-Heptane	0.263	0.218	0.238	0.206	0.241	0.188	0.186	0.162	0.146	0.205	18.80
52)	T	cis-1,3-Dichlo...	0.428	0.443	0.392	0.341	0.401	0.334	0.359	0.328	0.296	0.369	13.46
53)	T	4-Methyl-2-pen...	0.193	0.191	0.161	0.163	0.200	0.160	0.163	0.141	0.126	0.167	14.63
54)	T	trans-1,3-Dich...	0.338	0.315	0.274	0.289	0.336	0.316	0.378	0.357	0.326	0.325	9.85
55)	T	1,1,2-Trichlor...	0.320	0.258	0.256	0.237	0.271	0.218	0.233	0.209	0.189	0.244	15.89
56)	IR	Chlorobenzene-d5 (...	----------ISTD----------										
57)	S	Toluene-d8 (SS2)	2.212	2.174	2.168	2.150	2.161	2.154	2.129	2.120	2.194	2.163	1.34
58)	T	Toluene			2.540	2.257	2.518	1.999	2.002	1.801	1.677	2.113	15.93
59)	T	2-Hexanone	0.832	0.829	0.767	0.742	0.912	0.779	0.797	0.718	0.678	0.784	8.86
60)	T	Dibromochlorom...	0.978	0.797	0.714	0.726	0.803	0.686	0.773	0.725	0.672	0.764	12.11
61)	T	1,2-Dibromoethane	0.771	0.803	0.656	0.682	0.741	0.617	0.670	0.611	0.568	0.680	11.50
62)	T	n-Butyl Acetate	1.016	0.854	0.846	0.859	0.936	0.814	0.849	0.759	0.709	0.849	10.59
63)	T	n-Octane	0.422	0.436	0.345	0.377	0.401	0.333	0.335	0.295	0.276	0.358	15.45
64)	T	Tetrachloroethene	0.896	1.034	0.857	0.866	0.905	0.706	0.731	0.657	0.606	0.807	17.20
65)	T	Chlorobenzene	2.338	2.040	1.862	1.767	1.902	1.503	1.534	1.378	1.248	1.730	20.02
66)	T	Ethylbenzene	3.623	3.260	2.835	2.681	2.983	2.400	2.572	2.332	2.136	2.758	17.18
67)	T	m- & p-Xylenes	2.907	2.651	2.336	2.235	2.429	1.985	2.044	1.858	1.719	2.240	17.14
68)	T	Bromoform	0.719	0.698	0.665	0.602	0.692	0.612	0.697	0.649	0.595	0.659	7.06
69)	T	Styrene	2.002	1.934	1.690	1.606	1.854	1.599	1.653	1.456	1.328	1.680	13.05
70)	T	o-Xylene	3.217	2.838	2.462	2.370	2.614	2.125	2.215	2.010	1.828	2.409	17.96
71)	T	n-Nonane	0.815	0.848	0.805	0.726	0.792	0.675	0.666	0.590	0.557	0.719	14.47
72)	T	1,1,2,2-Tetrac...	1.095	0.967	0.912	0.887	1.008	0.876	0.903	0.787	0.718	0.906	12.38
73)	S	Bromofluoroben...	1.023	1.022	1.041	1.023	1.040	1.030	1.048	1.046	1.024	1.033	1.04
74)	T	Cumene	4.200	3.717	3.518	3.025	3.435	2.827	2.991	2.668	2.396	3.197	17.71
75)	T	alpha-Pinene	1.870	1.631	1.552	1.496	1.578	1.393	1.456	1.290	1.178	1.494	13.47
76)	T	n-Propylbenzene	4.850	4.433	3.934	3.586	3.908	3.310	3.427	3.005	2.709	3.685	18.36
77)	T	3-Ethyltoluene	3.729	3.582	3.222	3.086	3.245	2.894	2.937	2.546	2.345	3.065	14.58
78)	T	4-Ethyltoluene	3.759	3.400	3.086	2.763	3.380	2.587	2.774	2.538	2.244	2.948	16.65
79)	T	1,3,5-Trimethy...	3.272	2.972	2.767	2.600	2.886	2.380	2.528	2.255	2.073	2.637	14.30
80)	T	alpha-Methylst...	1.564	1.509	1.307	1.336	1.555	1.348	1.362	1.175	1.037	1.355	12.87
81)	T	2-Ethyltoluene	3.683	3.715	2.991	2.954	3.311	2.778	2.859	2.505	2.249	3.005	16.45
82)	T	1,2,4-Trimethy...	3.255	2.971	2.676	2.586	2.878	2.413	2.399	2.167	2.022	2.596	15.21
83)	T	n-Decane	1.195	1.116	1.012	0.972	1.150	0.950	0.905	0.773	0.724	0.977	16.55
84)	T	Benzyl Chloride			1.111	1.131	1.357	1.549	2.020	1.889	1.763	1.546	23.43
85)	T	1,3-Dichlorobe...	1.745	1.850	1.622	1.502	1.763	1.388	1.418	1.221	1.078	1.510	17.23
86)	T	1,4-Dichlorobe...	2.135	1.852	1.659	1.570	1.768	1.436	1.503	1.305	1.145	1.597	18.69
87)	T	sec-Butylbenzene	4.059	3.729	3.489	3.226	3.775	3.157	3.248	2.826	2.495	3.334	14.67
88)	T	4-Isopropyltol...	4.024	3.848	3.432	3.291	3.707	3.091	3.055	2.684	2.487	3.291	15.76
89)	T	1,2,3-Trimethy...	3.248	3.044	2.835	2.649	3.082	2.535	2.549	2.295	2.128	2.707	13.85
90)	T	1,2-Dichlorobe...	1.850	1.808	1.705	1.478	1.687	1.356	1.346	1.140	1.026	1.488	19.76
91)	T	d-Limonene	0.803	0.697	0.693	0.715	0.832	0.731	0.719	0.629	0.612	0.715	9.95
92)	T	1,2-Dibromo-3-...	0.461	0.494	0.467	0.453	0.548	0.523	0.613	0.541	0.482	0.509	10.23
93)	T	n-Undecane	1.011	1.065	0.968	0.969	1.143	0.981	0.999	0.844	0.782	0.974	11.05
94)	T	1,2,4-Trichlor...	1.336	1.225	1.134	1.122	1.223	1.018	1.139	0.974	0.848	1.113	13.24

Method Path : I:\MS08\Methods\
Method File : R8082615.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

95)	T	Naphthalene	4.026	4.018	3.756	3.541	3.841	3.316	3.462	2.948	2.610	3.502	13.77
96)	T	n-Dodecane	1.020	1.064	0.963	0.996	1.054	0.908	0.935	0.807	0.816	0.952	9.93
97)	T	Hexachlorobuta...	0.826	0.786	0.754	0.741	0.777	0.642	0.726	0.632	0.554	0.715	12.24
98)	T	Cyclohexanone	0.626	0.589	0.620	0.566	0.634	0.546	0.584	0.515	0.472	0.572	9.48
99)	T	tert-Butylbenzene	3.273	3.189	2.850	2.649	2.938	2.392	2.358	2.105	1.961	2.635	17.61
100)	T	n-Butylbenzene	2.916	2.611	2.629	2.432	2.832	2.401	2.524	2.201	1.958	2.501	11.92

(#) = Out of Range

Evaluate Continuing Calibration Report

Data File: I:\MS08\Data\2015 09\04\09041501.D
Acq On : 4 Sep 2015 3:52 Operator: WA
Sample : CCV R8090415 25ng
Misc : S29-08241501/S29-08271502 (9/25)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Sep 04 06:39:25 2015
Quant Method : I:\MS08\Methods\R8082615.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Aug 27 07:19:54 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

WA 9/8/15

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	143	-0.02
2	T	Propene	0.672	0.594	11.6	136	0.00
3	T	Dichlorodifluoromethane (CF	3.035	2.389	21.3	125	0.00
4	T	Chloromethane	1.109	0.974	12.2	132	-0.01
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.287	1.111	13.7	144	-0.01
6	T	Vinyl Chloride	1.111	1.065	4.1	151	-0.01
7	T	1,3-Butadiene	0.835	0.775	7.2	145	-0.02
8	T	Bromomethane	0.908	1.025	-12.9	149	-0.02
9	T	Chloroethane	0.763	0.686	10.1	139	-0.02
10	T	Ethanol	0.531	0.443	16.6	137	-0.05
11	T	Acetonitrile	1.295	1.144	11.7	135	-0.04
12	T	Acrolein	0.575	0.508	11.7	134	-0.03
13	T	Acetone	0.628	0.543	13.5	137	-0.03
14	T	Trichlorofluoromethane	2.864	2.319	19.0	129	-0.01
15	T	2-Propanol (Isopropanol)	2.068	1.906	7.8	135	-0.04
16	T	Acrylonitrile	1.046	1.020	2.5	134	-0.03
17	T	1,1-Dichloroethene	1.207	1.048	13.2	135	-0.01
18	T	2-Methyl-2-Propanol (tert-B	2.915	2.569	11.9	135	-0.04
19	T	Methylene Chloride	1.083	0.962	11.2	136	-0.03
20	T	3-Chloro-1-propene (Allyl C	1.038	1.002	3.5	132	-0.02
21	T	Trichlorotrifluoroethane	1.190	0.991	16.7	137	-0.01
22	T	Carbon Disulfide	3.985	3.590	9.9	135	-0.01
23	T	trans-1,2-Dichloroethene	1.456	1.332	8.5	135	-0.02
24	T	1,1-Dichloroethane	1.862	1.642	11.8	136	-0.02
25	T	Methyl tert-Butyl Ether	3.839	3.344	12.9	135	-0.02
26	T	Vinyl Acetate	0.243	0.265	-9.1	148	-0.03
27	T	2-Butanone (MEK)	0.685	0.660	3.6	136	-0.03
28	T	cis-1,2-Dichloroethene	1.418	1.261	11.1	135	-0.02
29	T	Diisopropyl Ether	0.932	0.786	15.7	145	-0.01
30	T	Ethyl Acetate	0.262	0.233	11.1	149	-0.02
31	T	n-Hexane	1.175	1.040	11.5	157	-0.01
32	T	Chloroform	2.304	1.903	17.4	132	-0.02
33	S	1,2-Dichloroethane-d4(SS1)	1.827	1.686	7.7	133	-0.02
34	T	Tetrahydrofuran (THF)	0.653	0.643	1.5	139	-0.01
35	T	Ethyl tert-Butyl Ether	1.628	1.469	9.8	136	-0.01
36	T	1,2-Dichloroethane	1.803	1.511	16.2	130	-0.02
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	145	-0.01
38	T	1,1,1-Trichloroethane	0.522	0.434	16.9	132	-0.01
39	T	Isopropyl Acetate	0.100	0.086	14.0	147	-0.02
40	T	1-Butanol	0.176	0.165	6.2	142	-0.03
41	T	Benzene	0.812	0.735	9.5	141	-0.01
42	T	Carbon Tetrachloride	0.433	0.378	12.7	129	-0.01
43	T	Cyclohexane	0.355	0.318	10.4	142	-0.01
44	T	tert-Amyl Methyl Ether	0.739	0.658	11.0	136	-0.01
45	T	1,2-Dichloropropane	0.187	0.169	9.6	139	-0.01
46	T	Bromodichloromethane	0.378	0.329	13.0	131	-0.01
47	T	Trichloroethene	0.322	0.268	16.8	141	-0.01
48	T	1,4-Dioxane	0.200	0.177	11.5	138	-0.02
49	T	2,2,4-Trimethylpentane (Iso	0.823	0.718	12.8	139	0.00
50	T	Methyl Methacrylate	0.100	0.096	4.0	146	-0.02
51	T	n-Heptane	0.205	0.186	9.3	145	0.00
52	T	cis-1,3-Dichloropropene	0.369	0.342	7.3	139	0.00
53	T	4-Methyl-2-pentanone	0.167	0.158	5.4	141	-0.01
54	T	trans-1,3-Dichloropropene	0.325	0.347	-6.8	133	-0.01

Evaluate Continuing Calibration Report

Data File: I:\MS08\Data\2015 09\04\09041501.D
Acq On : 4 Sep 2015 3:52 Operator: WA
Sample : CCV R8090415 25ng
Misc : S29-08241501/S29-08271502 (9/25)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Sep 04 06:39:25 2015
Quant Method : I:\MS08\Methods\R8082615.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Aug 27 07:19:54 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
55	T	1,1,2-Trichloroethane	0.244	0.223	8.6	139	-0.01
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	141	0.00
57	S	Toluene-d8 (SS2)	2.163	2.182	-0.9	144	0.00
58	T	Toluene	2.113	1.996	5.5	141	0.00
59	T	2-Hexanone	0.784	0.787	-0.4	139	-0.01
60	T	Dibromochloromethane	0.764	0.725	5.1	132	0.00
61	T	1,2-Dibromoethane	0.680	0.646	5.0	136	0.00
62	T	n-Butyl Acetate	0.849	0.843	0.7	140	-0.01
63	T	n-Octane	0.358	0.335	6.4	141	-0.01
64	T	Tetrachloroethene	0.807	0.721	10.7	139	-0.01
65	T	Chlorobenzene	1.730	1.524	11.9	140	0.00
66	T	Ethylbenzene	2.758	2.490	9.7	136	0.00
67	T	m- & p-Xylenes	2.240	1.966	12.2	136	-0.02
68	T	Bromoform	0.659	0.657	0.3	133	0.00
69	T	Styrene	1.680	1.619	3.6	138	-0.01
70	T	o-Xylene	2.409	2.109	12.5	134	-0.01
71	T	n-Nonane	0.719	0.670	6.8	142	-0.01
72	T	1,1,2,2-Tetrachloroethane	0.906	0.864	4.6	135	0.00
73	S	Bromofluorobenzene (SS3)	1.033	1.034	-0.1	139	0.00
74	T	Cumene	3.197	2.815	11.9	133	0.00
75	T	alpha-Pinene	1.494	1.386	7.2	134	0.00
76	T	n-Propylbenzene	3.685	3.196	13.3	131	-0.01
77	T	3-Ethyltoluene	3.065	2.815	8.2	135	0.00
78	T	4-Ethyltoluene	2.948	2.558	13.2	130	-0.01
79	T	1,3,5-Trimethylbenzene	2.637	2.359	10.5	132	0.00
80	T	alpha-Methylstyrene	1.355	1.325	2.2	137	-0.01
81	T	2-Ethyltoluene	3.005	2.675	11.0	132	-0.01
82	T	1,2,4-Trimethylbenzene	2.596	2.235	13.9	131	-0.01
83	T	n-Decane	0.977	0.882	9.7	137	0.00
84	T	Benzyl Chloride	1.546	1.898	-22.8	132	-0.01
85	T	1,3-Dichlorobenzene	1.510	1.341	11.2	133	-0.01
86	T	1,4-Dichlorobenzene	1.597	1.428	10.6	134	-0.01
87	T	sec-Butylbenzene	3.334	2.989	10.3	130	-0.01
88	T	4-Isopropyltoluene (p-Cymen	3.291	2.808	14.7	130	-0.01
89	T	1,2,3-Trimethylbenzene	2.707	2.336	13.7	129	-0.01
90	T	1,2-Dichlorobenzene	1.488	1.254	15.7	131	0.00
91	T	d-Limonene	0.715	0.694	2.9	136	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.509	0.559	-9.8	129	-0.01
93	T	n-Undecane	0.974	0.949	2.6	134	0.00
94	T	1,2,4-Trichlorobenzene	1.113	1.051	5.6	130	0.00
95	T	Naphthalene	3.502	3.352	4.3	136	0.00
96	T	n-Dodecane	0.952	0.905	4.9	136	0.00
97	T	Hexachlorobutadiene	0.715	0.632	11.6	123	0.00
98	T	Cyclohexanone	0.572	0.568	0.7	137	-0.01
99	T	tert-Butylbenzene	2.635	2.206	16.3	132	-0.01
100	T	n-Butylbenzene	2.501	2.300	8.0	128	-0.01

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Evaluate Continuing Calibration Report

Data File: I:\MS08\Data\2015 09\04\09041525.D
Acq On : 4 Sep 2015 19:29 Operator: WA
Sample : CCV2 R8090415 25ng
Misc : S29-08241501/S29-08271502 (9/25)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Sep 08 08:29:47 2015
Quant Method : I:\MS08\Methods\R8082615.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Aug 27 07:19:54 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 9/8/15

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	117	-0.02
2	T	Propene	0.672	0.608	9.5	114	-0.01
3	T	Dichlorodifluoromethane (CF	3.035	2.575	15.2	110	-0.01
4	T	Chloromethane	1.109	0.993	10.5	110	-0.02
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.287	1.153	10.4	122	-0.02
6	T	Vinyl Chloride	1.111	1.073	3.4	125	-0.02
7	T	1,3-Butadiene	0.835	0.787	5.7	120	-0.02
8	T	Bromomethane	0.908	1.055	-16.2	126	-0.02
9	T	Chloroethane	0.763	0.701	8.1	116	-0.02
10	T	Ethanol	0.531	0.456	14.1	116	-0.05
11	T	Acetonitrile	1.295	1.173	9.4	114	-0.04
12	T	Acrolein	0.575	0.529	8.0	114	-0.03
13	T	Acetone	0.628	0.566	9.9	117	-0.04
14	T	Trichlorofluoromethane	2.864	2.513	12.3	114	-0.01
15	T	2-Propanol (Isopropanol)	2.068	1.976	4.4	115	-0.04
16	T	Acrylonitrile	1.046	1.070	-2.3	115	-0.04
17	T	1,1-Dichloroethene	1.207	1.101	8.8	116	-0.02
18	T	2-Methyl-2-Propanol (tert-B	2.915	2.722	6.6	117	-0.04
19	T	Methylene Chloride	1.083	1.014	6.4	117	-0.03
20	T	3-Chloro-1-propene (Allyl C	1.038	1.048	-1.0	113	-0.02
21	T	Trichlorotrifluoroethane	1.190	1.056	11.3	120	-0.01
22	T	Carbon Disulfide	3.985	3.796	4.7	117	-0.02
23	T	trans-1,2-Dichloroethene	1.456	1.409	3.2	117	-0.02
24	T	1,1-Dichloroethane	1.862	1.733	6.9	118	-0.02
25	T	Methyl tert-Butyl Ether	3.839	3.564	7.2	118	-0.02
26	T	Vinyl Acetate	0.243	0.280	-15.2	128	-0.03
27	T	2-Butanone (MEK)	0.685	0.709	-3.5	119	-0.03
28	T	cis-1,2-Dichloroethene	1.418	1.335	5.9	117	-0.02
29	T	Diisopropyl Ether	0.932	0.838	10.1	126	-0.02
30	T	Ethyl Acetate	0.262	0.243	7.3	127	-0.02
31	T	n-Hexane	1.175	1.112	5.4	137	-0.01
32	T	Chloroform	2.304	2.065	10.4	118	-0.02
33	S	1,2-Dichloroethane-d4(SS1)	1.827	1.751	4.2	113	-0.02
34	T	Tetrahydrofuran (THF)	0.653	0.686	-5.1	121	-0.02
35	T	Ethyl tert-Butyl Ether	1.628	1.569	3.6	119	-0.02
36	T	1,2-Dichloroethane	1.803	1.657	8.1	117	-0.02
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	123	-0.01
38	T	1,1,1-Trichloroethane	0.522	0.459	12.1	118	-0.01
39	T	Isopropyl Acetate	0.100	0.088	12.0	128	-0.02
40	T	1-Butanol	0.176	0.167	5.1	122	-0.04
41	T	Benzene	0.812	0.772	4.9	125	-0.01
42	T	Carbon Tetrachloride	0.433	0.405	6.5	116	-0.01
43	T	Cyclohexane	0.355	0.326	8.2	123	-0.01
44	T	tert-Amyl Methyl Ether	0.739	0.682	7.7	119	-0.01
45	T	1,2-Dichloropropane	0.187	0.176	5.9	123	-0.01
46	T	Bromodichloromethane	0.378	0.348	7.9	117	-0.01
47	T	Trichloroethene	0.322	0.280	13.0	125	-0.01
48	T	1,4-Dioxane	0.200	0.180	10.0	119	-0.02
49	T	2,2,4-Trimethylpentane (Iso	0.823	0.731	11.2	120	0.00
50	T	Methyl Methacrylate	0.100	0.100	0.0	128	-0.02
51	T	n-Heptane	0.205	0.198	3.4	131	-0.01
52	T	cis-1,3-Dichloropropene	0.369	0.356	3.5	122	-0.01
53	T	4-Methyl-2-pentanone	0.167	0.163	2.4	123	-0.01
54	T	trans-1,3-Dichloropropene	0.325	0.365	-12.3	118	-0.01

Evaluate Continuing Calibration Report

Data File: I:\MS08\Data\2015 09\04\09041525.D
Acq On : 4 Sep 2015 19:29 Operator: WA
Sample : CCV2 R8090415 25ng
Misc : S29-08241501/S29-08271502 (9/25)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Sep 08 08:29:47 2015
Quant Method : I:\MS08\Methods\R8082615.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Aug 27 07:19:54 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
55	T	1,1,2-Trichloroethane	0.244	0.227	7.0	120	-0.01
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	116	-0.01
57	S	Toluene-d8 (SS2)	2.163	2.238	-3.5	122	-0.01
58	T	Toluene	2.113	2.145	-1.5	124	0.00
59	T	2-Hexanone	0.784	0.840	-7.1	122	-0.02
60	T	Dibromochloromethane	0.764	0.790	-3.4	118	0.00
61	T	1,2-Dibromoethane	0.680	0.695	-2.2	120	0.00
62	T	n-Butyl Acetate	0.849	0.896	-5.5	122	-0.01
63	T	n-Octane	0.358	0.363	-1.4	125	-0.01
64	T	Tetrachloroethene	0.807	0.773	4.2	122	-0.01
65	T	Chlorobenzene	1.730	1.620	6.4	122	0.00
66	T	Ethylbenzene	2.758	2.682	2.8	121	0.00
67	T	m- & p-Xylenes	2.240	2.133	4.8	121	-0.01
68	T	Bromoform	0.659	0.709	-7.6	118	-0.01
69	T	Styrene	1.680	1.734	-3.2	121	-0.01
70	T	o-Xylene	2.409	2.269	5.8	118	-0.01
71	T	n-Nonane	0.719	0.712	1.0	124	-0.01
72	T	1,1,2,2-Tetrachloroethane	0.906	0.938	-3.5	120	0.00
73	S	Bromofluorobenzene (SS3)	1.033	1.002	3.0	111	0.00
74	T	Cumene	3.197	3.038	5.0	117	0.00
75	T	alpha-Pinene	1.494	1.489	0.3	118	0.00
76	T	n-Propylbenzene	3.685	3.485	5.4	118	-0.01
77	T	3-Ethyltoluene	3.065	3.067	-0.1	121	0.00
78	T	4-Ethyltoluene	2.948	2.774	5.9	116	0.00
79	T	1,3,5-Trimethylbenzene	2.637	2.562	2.8	117	0.00
80	T	alpha-Methylstyrene	1.355	1.431	-5.6	121	-0.01
81	T	2-Ethyltoluene	3.005	2.902	3.4	117	-0.01
82	T	1,2,4-Trimethylbenzene	2.596	2.422	6.7	117	-0.01
83	T	n-Decane	0.977	0.953	2.5	122	-0.01
84	T	Benzyl Chloride	1.546	2.090	-35.2#	120	-0.01
85	T	1,3-Dichlorobenzene	1.510	1.444	4.4	118	-0.01
86	T	1,4-Dichlorobenzene	1.597	1.548	3.1	119	-0.01
87	T	sec-Butylbenzene	3.334	3.273	1.8	116	-0.01
88	T	4-Isopropyltoluene (p-Cymen	3.291	3.063	6.9	116	-0.01
89	T	1,2,3-Trimethylbenzene	2.707	2.554	5.7	116	-0.01
90	T	1,2-Dichlorobenzene	1.488	1.366	8.2	117	-0.01
91	T	d-Limonene	0.715	0.760	-6.3	122	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.509	0.615	-20.8	116	-0.01
93	T	n-Undecane	0.974	1.035	-6.3	120	0.00
94	T	1,2,4-Trichlorobenzene	1.113	1.150	-3.3	117	0.00
95	T	Naphthalene	3.502	3.668	-4.7	122	0.00
96	T	n-Dodecane	0.952	0.978	-2.7	121	0.00
97	T	Hexachlorobutadiene	0.715	0.704	1.5	112	0.00
98	T	Cyclohexanone	0.572	0.608	-6.3	121	-0.02
99	T	tert-Butylbenzene	2.635	2.378	9.8	117	-0.01
100	T	n-Butylbenzene	2.501	2.529	-1.1	116	-0.01

(#) = Out of Range SPCC's out = 0 CCC's out = 0

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www.alsglobal.com

LABORATORY REPORT

December 2, 2015

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: BNSF Mission Wye

Dear Shelly:

Your report number P1503846 has been amended for the samples submitted to our laboratory on September 15, 2015. The EPA TO-15 results have been revised to report down to the method detection limits. The revised pages have been indicated by the "Revised Page" footer located at the bottom right of the page.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera

By Kate Aguilera at 10:05 am, Dec 02, 2015

Kate Aguilera
Project Manager

2655 Park Center Dr., Suite A
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Client: AECOM Environment
Project: BNSF Mission Wye

Service Request No: P1503846

CASE NARRATIVE

The sample was received intact under chain of custody on September 15, 2015 and was stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample at the time of sample receipt.

Volatile Organic Compound Analysis

The sample was analyzed for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The canister was cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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www.alsglobal.com

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2-R1
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	876241
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-001
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-15-6
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272015-5
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1503846

Project ID: BNSF Mission Wye

Date Received: 9/15/2015

Time Received: 09:55

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-15 Modified - VOC Cans
SVE-EB/09092015	P1503846-001	Air	9/9/2015	10:45	SC00491	-4.80	3.57	X

Air - Chain of Custody Record & Analytical Service Request

ALS
2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No: P1503846

ALS Contact:

Company Name & Address (Reporting Information): AECOM, 207 N. Broadway, Ste. 315, Billings, MT 59101

Project Name: BNSF - Mission Wye

Project Number:

P.O. # / Billing Information:

Project Manager: Shelly Young

Phone: 406-855-0945

Fax: —

Email Address for Result Reporting: shelly.young@aecom.com

Sampler (Print & Sign): Cole R. Grover / Cole R. Grover

Analysis Method: TO-15 (Full Scan)

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	TO-15 (Full Scan)		Comments e.g. Actual Preservative or specific instructions
SVE-EB/09092015	1	9-9-2015	1045	01547	AVG03442	-25.0	-0.5	6 l	X		

Report Tier Levels - please select
Tier I - Results (Default in not specified) ____
Tier II (Results + QC Summaries ____
Tier III (Results + QC & Calibration Summaries) X
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required (YES) / No
Type: ____
Units: ug/m3 / ppb

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Cole R. Grover	09/10/2015	0815	FedEx		
Relinquished by: (Signature) FedEx	Date:	Time:	Received by: (Signature)	9/15/15	0955

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1503846

Project: BNSF Mission Wye

Sample(s) received on: 9/15/15 Date opened: 9/15/15 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Container(s) **supplied by ALS**?	☒	☐	☐
3	Did **sample containers** arrive in good condition?	☒	☐	☐
4	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
5	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
6	Was **sample volume** received adequate for analysis?	☒	☐	☐
7	Are samples within specified holding times?	☒	☐	☐
8	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
9	Was a **trip blank** received?	☐	☒	☐
10	Were **custody seals** on outside of cooler/Box?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
	Were custody seals on outside of sample container?	☐	☐	☒
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
11	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
12	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
	Do they contain moisture?	☐	☐	☒
13	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1503846-001.01	6.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EB/09092015** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1503846-001

Test Code: EPA TO-15 Date Collected: 9/9/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 9/15/15
Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Analyzed: 9/17/15 & 9/26/15
Analyst: Evelyn Alvarez/Wida Ang Volume(s) Analyzed: 0.10 Liter(s)
Sample Type: 6.0 L Summa Canister 0.050 Liter(s)
Test Notes:
Container ID: SC00491

Initial Pressure (psig): -4.80 Final Pressure (psig): 3.57

Canister Dilution Factor: 1.85

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	ND	9.3	2.6	ND	5.4	1.5	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	9.3	3.1	ND	1.9	0.64	
74-87-3	Chloromethane	ND	9.3	2.8	ND	4.5	1.3	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	9.3	3.5	ND	1.3	0.50	
75-01-4	Vinyl Chloride	ND	9.3	3.1	ND	3.6	1.2	
106-99-0	1,3-Butadiene	ND	9.3	4.1	ND	4.2	1.8	
74-83-9	Bromomethane	ND	9.3	3.5	ND	2.4	0.91	
75-00-3	Chloroethane	ND	9.3	3.1	ND	3.5	1.2	
64-17-5	Ethanol	ND	93	15	ND	49	7.9	
75-05-8	Acetonitrile	ND	9.3	3.3	ND	5.5	2.0	
107-02-8	Acrolein	ND	37	3.1	ND	16	1.4	
67-64-1	Acetone	**100**	93	14	**43**	39	6.0	
75-69-4	Trichlorofluoromethane	ND	9.3	3.1	ND	1.6	0.56	
67-63-0	2-Propanol (Isopropyl Alcohol)	**44**	93	7.8	**18**	38	3.2	**J**
107-13-1	Acrylonitrile	ND	9.3	3.1	ND	4.3	1.4	
75-35-4	1,1-Dichloroethene	ND	9.3	3.1	ND	2.3	0.79	
75-09-2	Methylene Chloride	ND	9.3	3.1	ND	2.7	0.91	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	9.3	3.0	ND	3.0	0.95	
76-13-1	Trichlorotrifluoroethane	ND	9.3	3.1	ND	1.2	0.41	
75-15-0	Carbon Disulfide	**3.0**	93	2.8	**0.97**	30	0.89	**J**
156-60-5	trans-1,2-Dichloroethene	**5.4**	9.3	3.5	**1.4**	2.3	0.89	**J**
75-34-3	1,1-Dichloroethane	ND	9.3	3.0	ND	2.3	0.73	
1634-04-4	Methyl tert-Butyl Ether	ND	9.3	3.1	ND	2.6	0.87	
108-05-4	Vinyl Acetate	ND	93	12	ND	26	3.4	
78-93-3	2-Butanone (MEK)	**29**	93	3.9	**9.9**	31	1.3	**J**

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EB/09092015** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1503846-001

Test Code: EPA TO-15 Date Collected: 9/9/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 9/15/15
Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Analyzed: 9/17/15 & 9/26/15
Analyst: Evelyn Alvarez/Wida Ang Volume(s) Analyzed: 0.10 Liter(s)
Sample Type: 6.0 L Summa Canister 0.050 Liter(s)
Test Notes:
Container ID: SC00491

Initial Pressure (psig): -4.80 Final Pressure (psig): 3.57

Canister Dilution Factor: 1.85

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	**120**	9.3	3.0	**29**	2.3	0.75	
141-78-6	Ethyl Acetate	ND	19	6.5	ND	5.1	1.8	
110-54-3	n-Hexane	ND	9.3	2.8	ND	2.6	0.79	
67-66-3	Chloroform	ND	9.3	3.1	ND	1.9	0.64	
109-99-9	Tetrahydrofuran (THF)	**150**	9.3	3.7	**49**	3.1	1.3	
107-06-2	1,2-Dichloroethane	ND	9.3	3.0	ND	2.3	0.73	
71-55-6	1,1,1-Trichloroethane	**13**	9.3	3.1	**2.3**	1.7	0.58	
71-43-2	Benzene	ND	9.3	3.0	ND	2.9	0.93	
56-23-5	Carbon Tetrachloride	ND	9.3	2.8	ND	1.5	0.44	
110-82-7	Cyclohexane	ND	19	5.4	ND	5.4	1.6	
78-87-5	1,2-Dichloropropane	ND	9.3	3.0	ND	2.0	0.64	
75-27-4	Bromodichloromethane	ND	9.3	2.8	ND	1.4	0.41	
79-01-6	Trichloroethene	**270**	9.3	2.6	**50**	1.7	0.48	
123-91-1	1,4-Dioxane	ND	9.3	3.0	ND	2.6	0.82	
80-62-6	Methyl Methacrylate	ND	19	5.7	ND	4.5	1.4	
142-82-5	n-Heptane	ND	9.3	3.1	ND	2.3	0.77	
10061-01-5	cis-1,3-Dichloropropene	ND	9.3	2.6	ND	2.0	0.57	
108-10-1	4-Methyl-2-pentanone	ND	9.3	3.0	ND	2.3	0.72	
10061-02-6	trans-1,3-Dichloropropene	ND	9.3	3.0	ND	2.0	0.65	
79-00-5	1,1,2-Trichloroethane	ND	9.3	3.0	ND	1.7	0.54	
108-88-3	Toluene	**50**	9.3	3.1	**13**	2.5	0.83	
591-78-6	2-Hexanone	ND	9.3	3.0	ND	2.3	0.72	
124-48-1	Dibromochloromethane	ND	9.3	3.0	ND	1.1	0.35	
106-93-4	1,2-Dibromoethane	ND	9.3	3.0	ND	1.2	0.39	
123-86-4	n-Butyl Acetate	ND	9.3	3.0	ND	1.9	0.62	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EB/09092015** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1503846-001

Test Code: EPA TO-15 Date Collected: 9/9/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 9/15/15
Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Analyzed: 9/17/15 & 9/26/15
Analyst: Evelyn Alvarez/Wida Ang Volume(s) Analyzed: 0.10 Liter(s)
Sample Type: 6.0 L Summa Canister 0.050 Liter(s)
Test Notes:
Container ID: SC00491

Initial Pressure (psig): -4.80 Final Pressure (psig): 3.57

Canister Dilution Factor: 1.85

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
111-65-9	n-Octane	**8.0**	9.3	3.3	**1.7**	2.0	0.71	**J**
127-18-4	Tetrachloroethene	**1,700**	19	5.2	**250**	2.7	0.76	**D**
108-90-7	Chlorobenzene	ND	9.3	3.0	ND	2.0	0.64	
100-41-4	Ethylbenzene	ND	9.3	3.0	ND	2.1	0.68	
179601-23-1	m,p-Xylenes	ND	19	5.6	ND	4.3	1.3	
75-25-2	Bromoform	ND	9.3	2.8	ND	0.89	0.27	
100-42-5	Styrene	ND	9.3	2.8	ND	2.2	0.65	
95-47-6	o-Xylene	ND	9.3	2.8	ND	2.1	0.64	
111-84-2	n-Nonane	ND	9.3	2.8	ND	1.8	0.53	
79-34-5	1,1,2,2-Tetrachloroethane	ND	9.3	2.8	ND	1.3	0.40	
98-82-8	Cumene	**11**	9.3	2.8	**2.2**	1.9	0.56	
80-56-8	alpha-Pinene	ND	9.3	2.6	ND	1.7	0.46	
103-65-1	n-Propylbenzene	ND	9.3	3.0	ND	1.9	0.60	
622-96-8	4-Ethyltoluene	ND	9.3	3.0	ND	1.9	0.60	
108-67-8	1,3,5-Trimethylbenzene	ND	9.3	3.0	ND	1.9	0.60	
95-63-6	1,2,4-Trimethylbenzene	ND	9.3	2.8	ND	1.9	0.56	
100-44-7	Benzyl Chloride	ND	9.3	2.0	ND	1.8	0.39	
541-73-1	1,3-Dichlorobenzene	ND	9.3	2.8	ND	1.5	0.46	
106-46-7	1,4-Dichlorobenzene	ND	9.3	2.6	ND	1.5	0.43	
95-50-1	1,2-Dichlorobenzene	ND	9.3	2.8	ND	1.5	0.46	
5989-27-5	d-Limonene	**550**	9.3	2.6	**99**	1.7	0.46	
96-12-8	1,2-Dibromo-3-chloropropane	ND	9.3	1.8	ND	0.96	0.19	
120-82-1	1,2,4-Trichlorobenzene	ND	9.3	3.0	ND	1.2	0.40	
91-20-3	Naphthalene	ND	9.3	3.3	ND	1.8	0.64	
87-68-3	Hexachlorobutadiene	ND	9.3	2.6	ND	0.87	0.24	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P150917-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 9/17/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	ND	0.50	0.14	ND	0.29	0.081	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.50	0.17	ND	0.10	0.034	
74-87-3	Chloromethane	ND	0.50	0.15	ND	0.24	0.073	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.50	0.19	ND	0.072	0.027	
75-01-4	Vinyl Chloride	ND	0.50	0.17	ND	0.20	0.067	
106-99-0	1,3-Butadiene	ND	0.50	0.22	ND	0.23	0.099	
74-83-9	Bromomethane	ND	0.50	0.19	ND	0.13	0.049	
75-00-3	Chloroethane	ND	0.50	0.17	ND	0.19	0.064	
64-17-5	Ethanol	ND	5.0	0.80	ND	2.7	0.42	
75-05-8	Acetonitrile	ND	0.50	0.18	ND	0.30	0.11	
107-02-8	Acrolein	ND	2.0	0.17	ND	0.87	0.074	
67-64-1	Acetone	ND	5.0	0.77	ND	2.1	0.32	
75-69-4	Trichlorofluoromethane	ND	0.50	0.17	ND	0.089	0.030	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	5.0	0.42	ND	2.0	0.17	
107-13-1	Acrylonitrile	ND	0.50	0.17	ND	0.23	0.078	
75-35-4	1,1-Dichloroethene	ND	0.50	0.17	ND	0.13	0.043	
75-09-2	Methylene Chloride	ND	0.50	0.17	ND	0.14	0.049	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.50	0.16	ND	0.16	0.051	
76-13-1	Trichlorotrifluoroethane	ND	0.50	0.17	ND	0.065	0.022	
75-15-0	Carbon Disulfide	ND	5.0	0.15	ND	1.6	0.048	
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
75-34-3	1,1-Dichloroethane	ND	0.50	0.16	ND	0.12	0.040	
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	0.17	ND	0.14	0.047	
108-05-4	Vinyl Acetate	ND	5.0	0.65	ND	1.4	0.18	
78-93-3	2-Butanone (MEK)	ND	5.0	0.21	ND	1.7	0.071	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P150917-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 9/17/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.50	0.16	ND	0.13	0.040	
141-78-6	Ethyl Acetate	ND	1.0	0.35	ND	0.28	0.097	
110-54-3	n-Hexane	ND	0.50	0.15	ND	0.14	0.043	
67-66-3	Chloroform	ND	0.50	0.17	ND	0.10	0.035	
109-99-9	Tetrahydrofuran (THF)	ND	0.50	0.20	ND	0.17	0.068	
107-06-2	1,2-Dichloroethane	ND	0.50	0.16	ND	0.12	0.040	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.17	ND	0.092	0.031	
71-43-2	Benzene	ND	0.50	0.16	ND	0.16	0.050	
56-23-5	Carbon Tetrachloride	ND	0.50	0.15	ND	0.080	0.024	
110-82-7	Cyclohexane	ND	1.0	0.29	ND	0.29	0.084	
78-87-5	1,2-Dichloropropane	ND	0.50	0.16	ND	0.11	0.035	
75-27-4	Bromodichloromethane	ND	0.50	0.15	ND	0.075	0.022	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
123-91-1	1,4-Dioxane	ND	0.50	0.16	ND	0.14	0.044	
80-62-6	Methyl Methacrylate	ND	1.0	0.31	ND	0.24	0.076	
142-82-5	n-Heptane	ND	0.50	0.17	ND	0.12	0.041	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.14	ND	0.11	0.031	
108-10-1	4-Methyl-2-pentanone	ND	0.50	0.16	ND	0.12	0.039	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.16	ND	0.11	0.035	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.16	ND	0.092	0.029	
108-88-3	Toluene	ND	0.50	0.17	ND	0.13	0.045	
591-78-6	2-Hexanone	ND	0.50	0.16	ND	0.12	0.039	
124-48-1	Dibromochloromethane	ND	0.50	0.16	ND	0.059	0.019	
106-93-4	1,2-Dibromoethane	ND	0.50	0.16	ND	0.065	0.021	
123-86-4	n-Butyl Acetate	ND	0.50	0.16	ND	0.11	0.034	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P150917-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 9/17/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.50	0.18	ND	0.11	0.039	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
108-90-7	Chlorobenzene	ND	0.50	0.16	ND	0.11	0.035	
100-41-4	Ethylbenzene	ND	0.50	0.16	ND	0.12	0.037	
179601-23-1	m,p-Xylenes	ND	1.0	0.30	ND	0.23	0.069	
75-25-2	Bromoform	ND	0.50	0.15	ND	0.048	0.015	
100-42-5	Styrene	ND	0.50	0.15	ND	0.12	0.035	
95-47-6	o-Xylene	ND	0.50	0.15	ND	0.12	0.035	
111-84-2	n-Nonane	ND	0.50	0.15	ND	0.095	0.029	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.15	ND	0.073	0.022	
98-82-8	Cumene	ND	0.50	0.15	ND	0.10	0.031	
80-56-8	alpha-Pinene	ND	0.50	0.14	ND	0.090	0.025	
103-65-1	n-Propylbenzene	ND	0.50	0.16	ND	0.10	0.033	
622-96-8	4-Ethyltoluene	ND	0.50	0.16	ND	0.10	0.033	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	0.16	ND	0.10	0.033	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	
100-44-7	Benzyl Chloride	ND	0.50	0.11	ND	0.097	0.021	
541-73-1	1,3-Dichlorobenzene	ND	0.50	0.15	ND	0.083	0.025	
106-46-7	1,4-Dichlorobenzene	ND	0.50	0.14	ND	0.083	0.023	
95-50-1	1,2-Dichlorobenzene	ND	0.50	0.15	ND	0.083	0.025	
5989-27-5	d-Limonene	ND	0.50	0.14	ND	0.090	0.025	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.50	0.099	ND	0.052	0.010	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	0.16	ND	0.067	0.022	
91-20-3	Naphthalene	ND	0.50	0.18	ND	0.095	0.034	
87-68-3	Hexachlorobutadiene	ND	0.50	0.14	ND	0.047	0.013	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P150925-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 9/25/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	ND	0.50	0.14	ND	0.29	0.081	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.50	0.17	ND	0.10	0.034	
74-87-3	Chloromethane	ND	0.50	0.15	ND	0.24	0.073	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.50	0.19	ND	0.072	0.027	
75-01-4	Vinyl Chloride	ND	0.50	0.17	ND	0.20	0.067	
106-99-0	1,3-Butadiene	ND	0.50	0.22	ND	0.23	0.099	
74-83-9	Bromomethane	ND	0.50	0.19	ND	0.13	0.049	
75-00-3	Chloroethane	ND	0.50	0.17	ND	0.19	0.064	
64-17-5	Ethanol	ND	5.0	0.80	ND	2.7	0.42	
75-05-8	Acetonitrile	ND	0.50	0.18	ND	0.30	0.11	
107-02-8	Acrolein	ND	2.0	0.17	ND	0.87	0.074	
67-64-1	Acetone	ND	5.0	0.77	ND	2.1	0.32	
75-69-4	Trichlorofluoromethane	ND	0.50	0.17	ND	0.089	0.030	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	5.0	0.42	ND	2.0	0.17	
107-13-1	Acrylonitrile	ND	0.50	0.17	ND	0.23	0.078	
75-35-4	1,1-Dichloroethene	ND	0.50	0.17	ND	0.13	0.043	
75-09-2	Methylene Chloride	ND	0.50	0.17	ND	0.14	0.049	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.50	0.16	ND	0.16	0.051	
76-13-1	Trichlorotrifluoroethane	ND	0.50	0.17	ND	0.065	0.022	
75-15-0	Carbon Disulfide	ND	5.0	0.15	ND	1.6	0.048	
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
75-34-3	1,1-Dichloroethane	ND	0.50	0.16	ND	0.12	0.040	
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	0.17	ND	0.14	0.047	
108-05-4	Vinyl Acetate	ND	5.0	0.65	ND	1.4	0.18	
78-93-3	2-Butanone (MEK)	ND	5.0	0.21	ND	1.7	0.071	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P150925-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 9/25/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.50	0.16	ND	0.13	0.040	
141-78-6	Ethyl Acetate	ND	1.0	0.35	ND	0.28	0.097	
110-54-3	n-Hexane	ND	0.50	0.15	ND	0.14	0.043	
67-66-3	Chloroform	ND	0.50	0.17	ND	0.10	0.035	
109-99-9	Tetrahydrofuran (THF)	ND	0.50	0.20	ND	0.17	0.068	
107-06-2	1,2-Dichloroethane	ND	0.50	0.16	ND	0.12	0.040	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.17	ND	0.092	0.031	
71-43-2	Benzene	ND	0.50	0.16	ND	0.16	0.050	
56-23-5	Carbon Tetrachloride	ND	0.50	0.15	ND	0.080	0.024	
110-82-7	Cyclohexane	ND	1.0	0.29	ND	0.29	0.084	
78-87-5	1,2-Dichloropropane	ND	0.50	0.16	ND	0.11	0.035	
75-27-4	Bromodichloromethane	ND	0.50	0.15	ND	0.075	0.022	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
123-91-1	1,4-Dioxane	ND	0.50	0.16	ND	0.14	0.044	
80-62-6	Methyl Methacrylate	ND	1.0	0.31	ND	0.24	0.076	
142-82-5	n-Heptane	ND	0.50	0.17	ND	0.12	0.041	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.14	ND	0.11	0.031	
108-10-1	4-Methyl-2-pentanone	ND	0.50	0.16	ND	0.12	0.039	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.16	ND	0.11	0.035	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.16	ND	0.092	0.029	
108-88-3	Toluene	ND	0.50	0.17	ND	0.13	0.045	
591-78-6	2-Hexanone	ND	0.50	0.16	ND	0.12	0.039	
124-48-1	Dibromochloromethane	ND	0.50	0.16	ND	0.059	0.019	
106-93-4	1,2-Dibromoethane	ND	0.50	0.16	ND	0.065	0.021	
123-86-4	n-Butyl Acetate	ND	0.50	0.16	ND	0.11	0.034	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P150925-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 9/25/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.50	0.18	ND	0.11	0.039	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
108-90-7	Chlorobenzene	ND	0.50	0.16	ND	0.11	0.035	
100-41-4	Ethylbenzene	ND	0.50	0.16	ND	0.12	0.037	
179601-23-1	m,p-Xylenes	ND	1.0	0.30	ND	0.23	0.069	
75-25-2	Bromoform	ND	0.50	0.15	ND	0.048	0.015	
100-42-5	Styrene	ND	0.50	0.15	ND	0.12	0.035	
95-47-6	o-Xylene	ND	0.50	0.15	ND	0.12	0.035	
111-84-2	n-Nonane	ND	0.50	0.15	ND	0.095	0.029	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.15	ND	0.073	0.022	
98-82-8	Cumene	ND	0.50	0.15	ND	0.10	0.031	
80-56-8	alpha-Pinene	ND	0.50	0.14	ND	0.090	0.025	
103-65-1	n-Propylbenzene	ND	0.50	0.16	ND	0.10	0.033	
622-96-8	4-Ethyltoluene	ND	0.50	0.16	ND	0.10	0.033	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	0.16	ND	0.10	0.033	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	
100-44-7	Benzyl Chloride	ND	0.50	0.11	ND	0.097	0.021	
541-73-1	1,3-Dichlorobenzene	ND	0.50	0.15	ND	0.083	0.025	
106-46-7	1,4-Dichlorobenzene	ND	0.50	0.14	ND	0.083	0.023	
95-50-1	1,2-Dichlorobenzene	ND	0.50	0.15	ND	0.083	0.025	
5989-27-5	d-Limonene	ND	0.50	0.14	ND	0.090	0.025	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.50	0.099	ND	0.052	0.010	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	0.16	ND	0.067	0.022	
91-20-3	Naphthalene	ND	0.50	0.18	ND	0.095	0.034	
87-68-3	Hexachlorobutadiene	ND	0.50	0.14	ND	0.047	0.013	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **BNSF Mission Wye** ALS Project ID: P1503846

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Evelyn Alvarez/Wida Ang
Sample Type: 6.0 L Summa Canister(s)
Test Notes:

Date(s) Collected: 9/9/15
Date(s) Received: 9/15/15
Date(s) Analyzed: 9/17 - 9/25/15

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P150917-MB	**105**	**100**	**95**	70-130	
Method Blank	P150925-MB	**103**	**101**	**91**	70-130	
Lab Control Sample	P150917-LCS	**100**	**99**	**99**	70-130	
Lab Control Sample	P150925-LCS	**103**	**99**	**95**	70-130	
SVE-EB/09092015	P1503846-001	**99**	**104**	**96**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P150917-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 9/17/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
115-07-1	Propene	196	**166**	**85**	50-128	
75-71-8	Dichlorodifluoromethane (CFC 12)	188	**150**	**80**	66-117	
74-87-3	Chloromethane	200	**166**	**83**	51-133	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	204	**174**	**85**	65-117	
75-01-4	Vinyl Chloride	200	**186**	**93**	61-127	
106-99-0	1,3-Butadiene	206	**190**	**92**	65-132	
74-83-9	Bromomethane	202	**216**	**107**	62-114	
75-00-3	Chloroethane	200	**167**	**84**	64-122	
64-17-5	Ethanol	998	**778**	**78**	57-131	
75-05-8	Acetonitrile	212	**159**	**75**	52-135	
107-02-8	Acrolein	214	**158**	**74**	64-124	
67-64-1	Acetone	1,080	**876**	**81**	60-113	
75-69-4	Trichlorofluoromethane	216	**159**	**74**	64-112	
67-63-0	2-Propanol (Isopropyl Alcohol)	418	**367**	**88**	62-129	
107-13-1	Acrylonitrile	212	**185**	**87**	69-133	
75-35-4	1,1-Dichloroethene	216	**177**	**82**	70-114	
75-09-2	Methylene Chloride	222	**184**	**83**	63-103	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	218	**192**	**88**	57-135	
76-13-1	Trichlorotrifluoroethane	220	**177**	**80**	69-116	
75-15-0	Carbon Disulfide	210	**159**	**76**	66-118	
156-60-5	trans-1,2-Dichloroethene	210	**185**	**88**	69-123	
75-34-3	1,1-Dichloroethane	212	**179**	**84**	65-118	
1634-04-4	Methyl tert-Butyl Ether	216	**183**	**85**	57-125	
108-05-4	Vinyl Acetate	1,040	**1070**	**103**	69-131	
78-93-3	2-Butanone (MEK)	220	**193**	**88**	63-121	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P150917-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 9/17/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	218	**187**	**86**	69-119	
141-78-6	Ethyl Acetate	428	**363**	**85**	65-129	
110-54-3	n-Hexane	212	**176**	**83**	55-116	
67-66-3	Chloroform	224	**178**	**79**	68-111	
109-99-9	Tetrahydrofuran (THF)	220	**200**	**91**	69-120	
107-06-2	1,2-Dichloroethane	214	**183**	**86**	67-117	
71-55-6	1,1,1-Trichloroethane	210	**176**	**84**	74-116	
71-43-2	Benzene	226	**193**	**85**	61-109	
56-23-5	Carbon Tetrachloride	230	**196**	**85**	76-120	
110-82-7	Cyclohexane	424	**369**	**87**	72-115	
78-87-5	1,2-Dichloropropane	216	**184**	**85**	67-119	
75-27-4	Bromodichloromethane	218	**190**	**87**	78-124	
79-01-6	Trichloroethene	216	**165**	**76**	69-115	
123-91-1	1,4-Dioxane	210	**188**	**90**	69-127	
80-62-6	Methyl Methacrylate	422	**387**	**92**	76-128	
142-82-5	n-Heptane	216	**185**	**86**	66-118	
10061-01-5	cis-1,3-Dichloropropene	208	**187**	**90**	77-124	
108-10-1	4-Methyl-2-pentanone	220	**196**	**89**	66-134	
10061-02-6	trans-1,3-Dichloropropene	210	**223**	**106**	80-130	
79-00-5	1,1,2-Trichloroethane	216	**187**	**87**	75-119	
108-88-3	Toluene	218	**188**	**86**	68-114	
591-78-6	2-Hexanone	220	**207**	**94**	60-136	
124-48-1	Dibromochloromethane	220	**196**	**89**	75-132	
106-93-4	1,2-Dibromoethane	218	**191**	**88**	72-122	
123-86-4	n-Butyl Acetate	226	**203**	**90**	60-137	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P150917-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 9/17/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
111-65-9	n-Octane	210	**178**	**85**	66-120	
127-18-4	Tetrachloroethene	202	**164**	**81**	67-120	
108-90-7	Chlorobenzene	220	**176**	**80**	69-114	
100-41-4	Ethylbenzene	218	**183**	**84**	71-117	
179601-23-1	m,p-Xylenes	428	**355**	**83**	71-118	
75-25-2	Bromoform	228	**193**	**85**	76-149	
100-42-5	Styrene	222	**194**	**87**	71-128	
95-47-6	o-Xylene	210	**173**	**82**	72-118	
111-84-2	n-Nonane	204	**176**	**86**	63-123	
79-34-5	1,1,2,2-Tetrachloroethane	210	**182**	**87**	73-124	
98-82-8	Cumene	208	**170**	**82**	71-118	
80-56-8	alpha-Pinene	212	**182**	**86**	71-123	
103-65-1	n-Propylbenzene	204	**166**	**81**	71-120	
622-96-8	4-Ethyltoluene	214	**184**	**86**	71-121	
108-67-8	1,3,5-Trimethylbenzene	214	**179**	**84**	72-121	
95-63-6	1,2,4-Trimethylbenzene	218	**176**	**81**	71-122	
100-44-7	Benzyl Chloride	220	**270**	**123**	79-143	
541-73-1	1,3-Dichlorobenzene	228	**183**	**80**	67-121	
106-46-7	1,4-Dichlorobenzene	208	**175**	**84**	68-121	
95-50-1	1,2-Dichlorobenzene	220	**172**	**78**	68-121	
5989-27-5	d-Limonene	210	**192**	**91**	69-137	
96-12-8	1,2-Dibromo-3-chloropropane	218	**212**	**97**	73-145	
120-82-1	1,2,4-Trichlorobenzene	230	**183**	**80**	60-135	
91-20-3	Naphthalene	218	**175**	**80**	63-142	
87-68-3	Hexachlorobutadiene	230	**174**	**76**	65-127	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P150925-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 9/25/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
115-07-1	Propene	196	**165**	**84**	50-128	
75-71-8	Dichlorodifluoromethane (CFC 12)	188	**152**	**81**	66-117	
74-87-3	Chloromethane	200	**153**	**77**	51-133	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	204	**159**	**78**	65-117	
75-01-4	Vinyl Chloride	200	**169**	**85**	61-127	
106-99-0	1,3-Butadiene	206	**179**	**87**	65-132	
74-83-9	Bromomethane	202	**166**	**82**	62-114	
75-00-3	Chloroethane	200	**185**	**93**	64-122	
64-17-5	Ethanol	998	**1020**	**102**	57-131	
75-05-8	Acetonitrile	212	**195**	**92**	52-135	
107-02-8	Acrolein	214	**198**	**93**	64-124	
67-64-1	Acetone	1,080	**1030**	**95**	60-113	
75-69-4	Trichlorofluoromethane	216	**165**	**76**	64-112	
67-63-0	2-Propanol (Isopropyl Alcohol)	418	**409**	**98**	62-129	
107-13-1	Acrylonitrile	212	**215**	**101**	69-133	
75-35-4	1,1-Dichloroethene	216	**196**	**91**	70-114	
75-09-2	Methylene Chloride	222	**197**	**89**	63-103	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	218	**197**	**90**	57-135	
76-13-1	Trichlorotrifluoroethane	220	**182**	**83**	69-116	
75-15-0	Carbon Disulfide	210	**167**	**80**	66-118	
156-60-5	trans-1,2-Dichloroethene	210	**193**	**92**	69-123	
75-34-3	1,1-Dichloroethane	212	**196**	**92**	65-118	
1634-04-4	Methyl tert-Butyl Ether	216	**184**	**85**	57-125	
108-05-4	Vinyl Acetate	1,040	**1100**	**106**	69-131	
78-93-3	2-Butanone (MEK)	220	**207**	**94**	63-121	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P150925-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 9/25/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	218	**203**	**93**	69-119	
141-78-6	Ethyl Acetate	428	**458**	**107**	65-129	
110-54-3	n-Hexane	212	**208**	**98**	55-116	
67-66-3	Chloroform	224	**189**	**84**	68-111	
109-99-9	Tetrahydrofuran (THF)	220	**199**	**90**	69-120	
107-06-2	1,2-Dichloroethane	214	**191**	**89**	67-117	
71-55-6	1,1,1-Trichloroethane	210	**173**	**82**	74-116	
71-43-2	Benzene	226	**195**	**86**	61-109	
56-23-5	Carbon Tetrachloride	230	**177**	**77**	76-120	
110-82-7	Cyclohexane	424	**383**	**90**	72-115	
78-87-5	1,2-Dichloropropane	216	**203**	**94**	67-119	
75-27-4	Bromodichloromethane	218	**186**	**85**	78-124	
79-01-6	Trichloroethene	216	**173**	**80**	69-115	
123-91-1	1,4-Dioxane	210	**204**	**97**	69-127	
80-62-6	Methyl Methacrylate	422	**382**	**91**	76-128	
142-82-5	n-Heptane	216	**198**	**92**	66-118	
10061-01-5	cis-1,3-Dichloropropene	208	**192**	**92**	77-124	
108-10-1	4-Methyl-2-pentanone	220	**209**	**95**	66-134	
10061-02-6	trans-1,3-Dichloropropene	210	**200**	**95**	80-130	
79-00-5	1,1,2-Trichloroethane	216	**187**	**87**	75-119	
108-88-3	Toluene	218	**176**	**81**	68-114	
591-78-6	2-Hexanone	220	**206**	**94**	60-136	
124-48-1	Dibromochloromethane	220	**179**	**81**	75-132	
106-93-4	1,2-Dibromoethane	218	**187**	**86**	72-122	
123-86-4	n-Butyl Acetate	226	**211**	**93**	60-137	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1503846
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P150925-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 9/25/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
111-65-9	n-Octane	210	**183**	**87**	66-120	
127-18-4	Tetrachloroethene	202	**154**	**76**	67-120	
108-90-7	Chlorobenzene	220	**180**	**82**	69-114	
100-41-4	Ethylbenzene	218	**181**	**83**	71-117	
179601-23-1	m,p-Xylenes	428	**359**	**84**	71-118	
75-25-2	Bromoform	228	**166**	**73**	76-149	**L**
100-42-5	Styrene	222	**191**	**86**	71-128	
95-47-6	o-Xylene	210	**174**	**83**	72-118	
111-84-2	n-Nonane	204	**177**	**87**	63-123	
79-34-5	1,1,2,2-Tetrachloroethane	210	**187**	**89**	73-124	
98-82-8	Cumene	208	**168**	**81**	71-118	
80-56-8	alpha-Pinene	212	**176**	**83**	71-123	
103-65-1	n-Propylbenzene	204	**168**	**82**	71-120	
622-96-8	4-Ethyltoluene	214	**180**	**84**	71-121	
108-67-8	1,3,5-Trimethylbenzene	214	**173**	**81**	72-121	
95-63-6	1,2,4-Trimethylbenzene	218	**185**	**85**	71-122	
100-44-7	Benzyl Chloride	220	**208**	**95**	79-143	
541-73-1	1,3-Dichlorobenzene	228	**182**	**80**	67-121	
106-46-7	1,4-Dichlorobenzene	208	**172**	**83**	68-121	
95-50-1	1,2-Dichlorobenzene	220	**178**	**81**	68-121	
5989-27-5	d-Limonene	210	**180**	**86**	69-137	
96-12-8	1,2-Dibromo-3-chloropropane	218	**175**	**80**	73-145	
120-82-1	1,2,4-Trichlorobenzene	230	**181**	**79**	60-135	
91-20-3	Naphthalene	218	**181**	**83**	63-142	
87-68-3	Hexachlorobutadiene	230	**167**	**73**	65-127	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.
L = Laboratory control sample recovery outside the specified limits, results may be biased low.

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LABORATORY REPORT

December 2, 2015

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: BNSF Mission Wye / 60334021

Dear Shelly:

Your report number P1504149 has been amended for the samples submitted to our laboratory on October 5, 2015. The EPA TO-15 results have been revised to report down to the method detection limits. The revised pages have been indicated by the "Revised Page" footer located at the bottom right of the page.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera

By Kate Aguilera at 10:16 am, Dec 02, 2015

Kate Aguilera
Project Manager

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Client: AECOM Environment
Project: BNSF Mission Wye / 60334021

Service Request No: P1504149

CASE NARRATIVE

The samples were received intact under chain of custody on October 5, 2015 and were stored in accordance with the analytical method requirements. Sample SVE-EV/09292015 was analyzed on a two day rush basis. All the remaining samples were analyzed with standard turnaround time. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen/argon, nitrogen, methane and carbon dioxide) according to ASTM D 1946 (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP or AIHA-LAP accreditation.

Volatile Organic Compound Analysis

The samples were also analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The canisters were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2-R1
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	876241
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-001
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-15-6
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272015-5
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1504149

Project ID: BNSF Mission Wye / 60334021

Date Received: 10/5/2015

Time Received: 09:45

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	3C Modified - Fxd Gases Can	TO-15 Modified - VOC Cans
SVE-1/09292015	P1504149-001	Air	9/29/2015	12:34	SC02090	-3.78	5.01	X	X
SVE-2/09292015	P1504149-002	Air	9/29/2015	13:01	SC00360	-2.70	5.41	X	X
SVE-3/09292015	P1504149-003	Air	9/29/2015	13:15	SC01766	-5.47	5.81	X	X
SVE-4/09292015	P1504149-004	Air	9/29/2015	13:35	SC01660	-3.29	5.12	X	X
SVE-5/09292015	P1504149-005	Air	9/29/2015	13:50	SC00374	-2.57	5.56	X	X
SVE-6/09292015	P1504149-006	Air	9/29/2015	14:12	SC01608	-2.90	5.88	X	X
SVE-DUP/09292015	P1504149-007	Air	9/29/2015	14:30	SC00857	-3.42	5.46	X	X
SVE-7/09292015	P1504149-008	Air	9/29/2015	14:41	SC02053	-2.22	5.18	X	X
SVE-8/09292015	P1504149-009	Air	9/29/2015	15:04	SC01557	-2.85	5.46	X	X
SVE-EV/09292015	P1504149-010	Air	9/29/2015	15:20	SC01574	-4.28	3.76	X	X

ALS ENVIRONMENTAL
Sample Volume Correction for Helium Pressurization for SCAN Analysis

Sample ID	Pi	Pf	Sample Volume (L)	Adjusted Volume (L)
P1504149-010	-4.28	3.76	0.025	0.0290
P1504149-001	-3.78	5.01	0.086	0.100
P1504149-002	-2.70	5.41	0.030	0.0350
P1504149-003	-5.47	5.81	0.033	0.0400
P1504149-004	-3.29	5.12	0.216	0.250
P1504149-005	-2.57	5.56	0.052	0.0600
P1504149-006	-2.90	5.88	0.060	0.0700
P1504149-007	-3.42	5.46	0.034	0.0400
P1504149-008	-2.22	5.18	0.031	0.0350

Air - Chain of Custody Record & Analytical Service Request

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No. P1504149

Company Name & Address (Reporting Information): AECOM, 207 N. Broadway, Billings, MT 59101

Project Name: BNSF - Mission Wye

Project Number: 60334021

ALS Contact: Kate Aguilera

Project Manager: Shelly Young

P.O. # / Billing Information

Phone: 406-855-0945

Fax: —

Email Address for Result Reporting: shelly.young@aecom.com

Sampler (Print & Sign): Cole R. Grover

Analysis Method

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	VOCs (TO-15)	Fixed Atmospheric Gas (D-1946)	Comments e.g. Actual Preservative or specific instructions
SVE-1/09292015	1	9-29-2015	1234	01839	AVG04204	-25.5	-1.0	6l	X	X	
SVE-2/09292015	2		1301	00594	AVG04184	-24.5	-0.5	6l	X	X	
SVE-3/09292015	3		1315	02003	AVG04106	-25.0	-1.0	6l	X	X	
SVE-4/09292015	4		1335	01748	AVG03055	-25.0	-1.5	6l	X	X	
SVE-5/09292015	5		1350	00265	AVG03297	-25.5	-1.0	6l	X	X	
SVE-6/09292015	6		1412	004247	AVG04015	-25.0	-1.0	6l	X	X	
SVE-DUP/09292015	7		1430	01208	AVG04499	-25.0	-1.0	6l	X	X	
SVE-7/09292015	8		1441	12798	AVG04191	-25.0	-1.0	6l	X	X	
SVE-8/09292015	9		1504	3265	AVG02436	-29.0	-5.0	6l	X	X	
SVE-EV/09292015	10		1520	003724	AVG03979	-25.0	-1.5	6l	X	—	

Report Tier Levels - please select

Tier I - Results (Default in not specified) ____
Tier II (Results + QC Summaries ____
Tier III (Results + QC & Calibration Summaries) X
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required: YES No
Type: ____ Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Cole R. Grover	9-29-2015	1640		10/5/15	0945
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1504149
Project: BNSF Mission Wye / 60334021
Sample(s) received on: 10/5/15 Date opened: 10/5/15 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☐	☒
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1504149-001.01	6.0 L Source Can					
P1504149-002.01	6.0 L Source Can					
P1504149-003.01	6.0 L Source Can					
P1504149-004.01	6.0 L Source Can					
P1504149-005.01	6.0 L Source Can					
P1504149-006.01	6.0 L Source Can					
P1504149-007.01	6.0 L Source Can					
P1504149-008.01	6.0 L Source Can					
P1504149-009.01	6.0 L Source Can					
P1504149-010.01	6.0 L Source Can					
P1504149-011.01	6.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-1/09292015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504149
ALS Sample ID: P1504149-001

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC02090

Date Collected: 9/29/15
Date Received: 10/5/15
Date Analyzed: 10/12/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.78 Final Pressure (psig): 5.01

Canister Dilution Factor: 1.80

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,800	
7727-37-9	**Nitrogen**	**778,000**	1,800	
74-82-8	Methane	ND	1,800	
124-38-9	Carbon Dioxide	ND	1,800	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-2/09292015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504149
ALS Sample ID: P1504149-002

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00360

Date Collected: 9/29/15
Date Received: 10/5/15
Date Analyzed: 10/12/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.70 Final Pressure (psig): 5.41

Canister Dilution Factor: 1.68

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,700	
7727-37-9	**Nitrogen**	**778,000**	1,700	
74-82-8	Methane	ND	1,700	
124-38-9	Carbon Dioxide	ND	1,700	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-3/09292015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504149
ALS Sample ID: P1504149-003

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01766

Date Collected: 9/29/15
Date Received: 10/5/15
Date Analyzed: 10/12/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -5.47 Final Pressure (psig): 5.81

Canister Dilution Factor: 2.22

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	2,200	
7727-37-9	**Nitrogen**	**779,000**	2,200	
74-82-8	Methane	ND	2,200	
124-38-9	Carbon Dioxide	ND	2,200	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-4/09292015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504149
ALS Sample ID: P1504149-004

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01660

Date Collected: 9/29/15
Date Received: 10/5/15
Date Analyzed: 10/12/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.29 Final Pressure (psig): 5.12

Canister Dilution Factor: 1.74

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**218,000**	1,700	
7727-37-9	**Nitrogen**	**778,000**	1,700	
74-82-8	Methane	ND	1,700	
124-38-9	**Carbon Dioxide**	**4,180**	1,700	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-5/09292015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504149
ALS Sample ID: P1504149-005

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00374

Date Collected: 9/29/15
Date Received: 10/5/15
Date Analyzed: 10/12/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.57 Final Pressure (psig): 5.56

Canister Dilution Factor: 1.67

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**217,000**	1,700	
7727-37-9	**Nitrogen**	**776,000**	1,700	
74-82-8	Methane	ND	1,700	
124-38-9	**Carbon Dioxide**	**6,250**	1,700	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-6/09292015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504149
ALS Sample ID: P1504149-006

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01608

Date Collected: 9/29/15
Date Received: 10/5/15
Date Analyzed: 10/12/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.90 Final Pressure (psig): 5.88

Canister Dilution Factor: 1.74

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**217,000**	1,700	
7727-37-9	**Nitrogen**	**776,000**	1,700	
74-82-8	Methane	ND	1,700	
124-38-9	**Carbon Dioxide**	**7,840**	1,700	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/09292015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504149
ALS Sample ID: P1504149-007

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00857

Date Collected: 9/29/15
Date Received: 10/5/15
Date Analyzed: 10/12/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.42 Final Pressure (psig): 5.46

Canister Dilution Factor: 1.79

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,800	
7727-37-9	**Nitrogen**	**777,000**	1,800	
74-82-8	Methane	ND	1,800	
124-38-9	Carbon Dioxide	ND	1,800	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-7/09292015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504149
ALS Sample ID: P1504149-008

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC02053

Date Collected: 9/29/15
Date Received: 10/5/15
Date Analyzed: 10/12/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.22 Final Pressure (psig): 5.18

Canister Dilution Factor: 1.59

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,600	
7727-37-9	**Nitrogen**	**777,000**	1,600	
74-82-8	Methane	ND	1,600	
124-38-9	Carbon Dioxide	ND	1,600	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-8/09292015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504149
ALS Sample ID: P1504149-009

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01557

Date Collected: 9/29/15
Date Received: 10/5/15
Date Analyzed: 10/12/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.85 Final Pressure (psig): 5.46

Canister Dilution Factor: 1.70

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**202,000**	1,700	
7727-37-9	**Nitrogen**	**782,000**	1,700	
74-82-8	Methane	ND	1,700	
124-38-9	**Carbon Dioxide**	**16,100**	1,700	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/09292015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504149
ALS Sample ID: P1504149-010

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01574

Date Collected: 9/29/15
Date Received: 10/5/15
Date Analyzed: 10/6/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.28 Final Pressure (psig): 3.76

Canister Dilution Factor: 1.77

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**209,000**	1,800	
7727-37-9	**Nitrogen**	**780,000**	1,800	
74-82-8	Methane	ND	1,800	
124-38-9	**Carbon Dioxide**	**10,200**	1,800	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
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ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504149
ALS Sample ID: P151006-MB

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 10/06/15
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504149
ALS Sample ID: P151012-MB

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 10/12/15
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
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ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151006-LCS

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 10/06/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen*	50,000	**56,000**	**112**	84-121	
7727-37-9	Nitrogen	50,000	**56,100**	**112**	88-122	
74-82-8	Methane	40,000	**43,700**	**109**	85-116	
124-38-9	Carbon Dioxide	50,000	**53,700**	**107**	84-117	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151012-LCS

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Nalini Lall Date Analyzed: 10/12/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen*	50,000	**56,600**	**113**	84-121	
7727-37-9	Nitrogen	50,000	**54,700**	**109**	88-122	
74-82-8	Methane	40,000	**44,200**	**111**	85-116	
124-38-9	Carbon Dioxide	50,000	**55,300**	**111**	84-117	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

Response Factor Report GC01

Method Path : I:\GC01\METHODS\
Method File : 3C112914.M
Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
Last Update : Mon Dec 01 13:41:04 2014
Response Via : Initial Calibration

Calibration Files
1 =11291412.D 2 =11291410.D 3 =11291413.D
4 =11291414.D 5 =11291415.D 6 =11291421.D

	Compound	1	2	3	4	5	6	Avg		%RSD
1)	Hydrogen	1.258	1.246	1.311	1.308	1.519		1.328	E1	8.32
2)	Oxygen	1.420	1.594	1.603	1.604	1.561	1.649	1.572	E1	5.07
3)	Nitrogen	2.029	1.951	1.833	1.829	1.803		1.829	E1	9.36
4)	Carbon Monoxide	1.712	1.637	1.814	1.800	1.763		1.745	E1	4.14
5)	Methane	1.370	1.329	1.353	1.359	1.332		1.348	E1	1.17
6)	Carbon Dioxide	2.104	2.103	2.082	2.080	2.018		2.102	E1	3.20

(#) = Out of Range ### Number of calibration levels exceeded format ###

Modified EPA Method 3C Daily QC Summary

Client : AECOM Environment
Analyst : MC
Method Name : EPA 3C, ASTM D 1946-90, VOA-EPA3C

Instrument : GC01_FXG
Date Analyzed : 10/6/2015

RT Summaries and QC Check (minutes)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ICAL Mean RT	**0.708**	**2.188**	**2.368**	**3.076**	**5.045**	**6.707**		
RT Windows (+/- min)	**0.072**	**0.133**	**0.146**	**0.034**	**0.130**	**0.145**		
std s30-08311502	0.704	2.222	2.398	3.087	5.078	6.738	10061501.D	08:07
+/- 0.33min of ICAL Mean RT	Pass	Pass	Pass	Pass	Pass	Pass		
mb							10061502.D	08:35
lab air		2.171 Pass	2.309 Pass			6.738 Pass	10061503.D	08:53
lcs s30-08131504	0.707 Pass	2.223 Pass	2.399 Pass	3.087 Pass	5.077 Pass	6.738 Pass	10061504.D	09:32
lcsd s30-08131504	0.707 Pass	2.220 Pass	2.397 Pass	3.085 Pass	5.074 Pass	6.734 Pass	10061505.D	09:52
4149-010		2.175 Pass	2.319 Pass			6.734 Pass	10061509.D	14:33
std s30-08311502	0.709 Pass	2.229 Pass	2.405 Pass	3.093 Pass	5.084 Pass	6.747 Pass	10061516.D	18:05

Continuing Calibration Standards Summary (ppm)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ACTUAL	39980.0	40030.0	50000.0	49990.0	40020.0	50040.0		
CCV Criteria (+/- %D)	**15.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**		
std s30-08311502	39044.7 2.3%	40525.6 1.2%	51634.2 3.3%	50299.0 0.6%	39031.9 2.5%	48382.7 3.3%	10061501.D	08:07
std s30-08311502	39049.4 2.3%	39950.5 0.2%	49612.5 0.8%	50434.8 0.9%	39256.5 1.9%	48596.6 2.9%	10061516.D	18:05

Lab Dup Summary (ppm, without DF correction and nomalization)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time

LCS / LCS Dup Summary (ppm, without DF correction)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
LCS Actual Conc. (ppm)	40000.0	50000.0	50000.0	50000.0	40000.0	50000.0		
LCS Criteria (% Range)	**83%-114%**	**84%-121%**	**88%-122%**	**87%-118%**	**85%-116%**	**84%-117%**		
lcs s30-08131504	42385.8	55990.9	56115.3	55606.7	43685.6	53720.6	10061504.D	09:32
LCS % Recovery	106% Pass	112% Pass	112% Pass	111% Pass	109% Pass	107% Pass		
lcsd s30-08131504	43184.8	56124.0	54427.5	56251.8	44454.3	54465.8	10061505.D	09:52
LCS % Recovery	108% Pass	112% Pass	109% Pass	113% Pass	111% Pass	109% Pass		
Duplicate % RPD	1.9%	0.2%	3.1%	1.2%	1.7%	1.4%		
Duplicate Criteria % RPD	**16%** Pass	**16%** Pass	**21%** Pass	**16%** Pass	**16%** Pass	**16%** Pass		

Lab Air QC Summary

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxid	Methane	Carbon Dioxide	Lab Air Criteria Total (90%-110%)
lab air		208172.2	740049.6			440.3	94.9% Pass
Lab Air Normalized (%)		21.94%	78.00%			0.05%	100.0%

Modified EPA Method 3C Daily QC Summary

Client : AECOM Environment
Analyst : NL
Method Name : EPA 3C, ASTM D 1946-90, VOA-EPA3C

Instrument : GC01_FXG
Date Analyzed : 10/12/2015

RT Summaries and QC Check (minutes)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ICAL Mean RT	**0.708**	**2.188**	**2.368**	**3.076**	**5.045**	**6.707**		
RT Windows (+/- min)	**0.072**	**0.133**	**0.146**	**0.034**	**0.130**	**0.145**		
std s30-08311502	0.717	2.243	2.419	3.106	5.094	6.752	10121501.D	07:27
+/- 0.33min of ICAL Mean RT	Pass	Pass	Pass	Pass	Pass	Pass		
mb							10121502.D	08:07
lab air		2.163 Pass	2.300 Pass			6.754 Pass	10121503.D	08:23
lcs s30-081311504	0.711 Pass	2.228 Pass	2.404 Pass	3.091 Pass	5.081 Pass	6.741 Pass	10121505.D	09:06
lcsd s30-081311504	0.710 Pass	2.224 Pass	2.401 Pass	3.087 Pass	5.077 Pass	6.737 Pass	10121506.D	09:23
4149-001		2.199 Pass	2.346 Pass			6.757 Pass	10121519.D	13:35
4149-002		2.181 Pass	2.326 Pass			6.748 Pass	10121520.D	13:50
4149-003		2.191 Pass	2.341 Pass			6.749 Pass	10121521.D	14:06
4149-004		2.181 Pass	2.326 Pass			6.743 Pass	10121522.D	14:22
4149-005		2.196 Pass	2.346 Pass			6.745 Pass	10121523.D	14:38
4149-006		2.186 Pass	2.331 Pass			6.742 Pass	10121524.D	14:51
4149-007		2.188 Pass	2.338 Pass			6.744 Pass	10121525.D	15:04
4149-008		2.209 Pass	2.360 Pass			6.739 Pass	10121526.D	15:37
4149-009		2.184 Pass	2.331 Pass			6.742 Pass	10121527.D	15:51
4149-010		2.193 Pass	2.339 Pass			6.741 Pass	10121528.D	16:07
std s30-08311502	0.707 Pass	2.216 Pass	2.391 Pass	3.079 Pass	5.072 Pass	6.734 Pass	10121530.D	16:39

Continuing Calibration Standards Summary (ppm)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ACTUAL	39980.0	40030.0	50000.0	49990.0	40020.0	50040.0		
CCV Criteria (+/- %D)	**15.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**		
std s30-08311502	40683.2 1.8%	41859.1 4.6%	53368.1 6.7%	52204.0 4.4%	40596.3 1.4%	49892.4 0.3%	10121501.D	07:27
std s30-08311502	38874.7 2.8%	40555.0 1.3%	52566.0 5.1%	49979.4 0.0%	38841.8 2.9%	47855.8 4.4%	10121530.D	16:39

Lab Dup Summary (ppm, without DF correction and nomalization)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time

LCS / LCS Dup Summary (ppm, without DF correction)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
LCS Actual Conc. (ppm)	40000.0	50000.0	50000.0	50000.0	40000.0	50000.0		
LCS Criteria (% Range)	**83%-114%**	**84%-121%**	**88%-122%**	**87%-118%**	**85%-116%**	**84%-117%**		
lcs s30-081311504	43776.6	56580.2	54737.6	56424.1	44234.8	55278.7	10121505.D	09:06
LCS % Recovery	109% Pass	113% Pass	109% Pass	113% Pass	111% Pass	111% Pass		
lcsd s30-081311504	44748.0	57423.4	55373.7	57640.5	45259.9	55647.4	10121506.D	09:23
LCS % Recovery	112% Pass	115% Pass	111% Pass	115% Pass	113% Pass	111% Pass		
Duplicate % RPD	2.2%	1.5%	1.2%	2.1%	2.3%	0.7%		
Duplicate Criteria % RPD	**16%** Pass	**16%** Pass	**21%** Pass	**16%** Pass	**16%** Pass	**16%** Pass		

Lab Air QC Summary

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxid	Methane	Carbon Dioxide	Lab Air Criteria Total (90%-110%)
lab air		211829.6	751543.2			529.5	96.4% Pass
Lab Air Normalized (%)		21.97%	77.96%			0.05%	100.0%

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-1/09292015** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504149-001

Test Code: EPA TO-15 Date Collected: 9/29/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 10/5/15
Analyst: Wida Ang Date Analyzed: 10/9/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.10 Liter(s)
Test Notes:
Container ID: SC02090

Initial Pressure (psig): -3.78 Final Pressure (psig): 5.01

Canister Dilution Factor: 1.80

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	9.0	3.4	ND	2.3	0.86	
79-01-6	Trichloroethene	**110**	9.0	2.5	**21**	1.7	0.47	
127-18-4	Tetrachloroethene	**1,700**	9.0	2.5	**240**	1.3	0.37	
95-63-6	1,2,4-Trimethylbenzene	ND	9.0	2.7	ND	1.8	0.55	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-2/09292015** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504149-002

Test Code: EPA TO-15 Date Collected: 9/29/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 10/5/15
Analyst: Wida Ang Date Analyzed: 10/9/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.035 Liter(s)
Test Notes:
Container ID: SC00360

Initial Pressure (psig): -2.70 Final Pressure (psig): 5.41

Canister Dilution Factor: 1.68

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	24	9.1	ND	6.1	2.3	
79-01-6	Trichloroethene	**660**	24	6.7	**120**	4.5	1.3	
127-18-4	Tetrachloroethene	**3,900**	24	6.7	**580**	3.5	0.99	
95-63-6	1,2,4-Trimethylbenzene	ND	24	7.2	ND	4.9	1.5	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-3/09292015** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504149-003

Test Code: EPA TO-15 Date Collected: 9/29/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 10/5/15
Analyst: Wida Ang Date Analyzed: 10/9/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.040 Liter(s)
Test Notes:
Container ID: SC01766

Initial Pressure (psig): -5.47 Final Pressure (psig): 5.81

Canister Dilution Factor: 2.22

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**20**	28	11	**5.1**	7.0	2.7	**J**
79-01-6	Trichloroethene	**1,000**	28	7.8	**190**	5.2	1.4	
127-18-4	Tetrachloroethene	**4,700**	28	7.8	**690**	4.1	1.1	
95-63-6	1,2,4-Trimethylbenzene	ND	28	8.3	ND	5.6	1.7	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-4/09292015** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504149-004

Test Code: EPA TO-15 Date Collected: 9/29/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 10/5/15
Analyst: Wida Ang Date Analyzed: 10/9/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.25 Liter(s)
Test Notes:
Container ID: SC01660

Initial Pressure (psig): -3.29 Final Pressure (psig): 5.12

Canister Dilution Factor: 1.74

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	3.5	1.3	ND	0.88	0.33	
79-01-6	Trichloroethene	**230**	3.5	0.97	**42**	0.65	0.18	
127-18-4	Tetrachloroethene	**650**	3.5	0.97	**96**	0.51	0.14	
95-63-6	1,2,4-Trimethylbenzene	**1.1**	3.5	1.0	**0.22**	0.71	0.21	**J**

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-5/09292015** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504149-005

Test Code: EPA TO-15 Date Collected: 9/29/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 10/5/15
Analyst: Wida Ang Date Analyzed: 10/9/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.060 Liter(s)
Test Notes:
Container ID: SC00374

Initial Pressure (psig): -2.57 Final Pressure (psig): 5.56

Canister Dilution Factor: 1.67

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	14	5.3	ND	3.5	1.3	
79-01-6	Trichloroethene	**200**	14	3.9	**36**	2.6	0.73	
127-18-4	Tetrachloroethene	**2,500**	14	3.9	**370**	2.1	0.57	
95-63-6	1,2,4-Trimethylbenzene	ND	14	4.2	ND	2.8	0.85	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-6/09292015** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504149-006

Test Code: EPA TO-15 Date Collected: 9/29/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 10/5/15
Analyst: Wida Ang Date Analyzed: 10/9/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.070 Liter(s)
Test Notes:
Container ID: SC01608

Initial Pressure (psig): -2.90 Final Pressure (psig): 5.88

Canister Dilution Factor: 1.74

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	12	4.7	ND	3.1	1.2	
79-01-6	Trichloroethene	**170**	12	3.5	**31**	2.3	0.65	
127-18-4	Tetrachloroethene	**2,300**	12	3.5	**340**	1.8	0.51	
95-63-6	1,2,4-Trimethylbenzene	ND	12	3.7	ND	2.5	0.76	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/09292015** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504149-007

Test Code: EPA TO-15 Date Collected: 9/29/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 10/5/15
Analyst: Wida Ang Date Analyzed: 10/9/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.040 Liter(s)
Test Notes:
Container ID: SC00857

Initial Pressure (psig): -3.42 Final Pressure (psig): 5.46

Canister Dilution Factor: 1.79

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	22	8.5	ND	5.6	2.1	
79-01-6	Trichloroethene	**73**	22	6.3	**14**	4.2	1.2	
127-18-4	Tetrachloroethene	**950**	22	6.3	**140**	3.3	0.92	
95-63-6	1,2,4-Trimethylbenzene	ND	22	6.7	ND	4.6	1.4	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-7/09292015** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504149-008

Test Code: EPA TO-15 Date Collected: 9/29/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 10/5/15
Analyst: Wida Ang Date Analyzed: 10/9/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.035 Liter(s)
Test Notes:
Container ID: SC02053

Initial Pressure (psig): -2.22 Final Pressure (psig): 5.18

Canister Dilution Factor: 1.59

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	23	8.6	ND	5.7	2.2	
79-01-6	Trichloroethene	**69**	23	6.4	**13**	4.2	1.2	
127-18-4	Tetrachloroethene	**870**	23	6.4	**130**	3.4	0.94	
95-63-6	1,2,4-Trimethylbenzene	ND	23	6.8	ND	4.6	1.4	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-8/09292015** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504149-009

Test Code: EPA TO-15 Date Collected: 9/29/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 10/5/15
Analyst: Wida Ang Date Analyzed: 10/9/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.0075 Liter(s)
Test Notes:
Container ID: SC01557

Initial Pressure (psig): -2.85 Final Pressure (psig): 5.46

Canister Dilution Factor: 1.70

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	110	43	ND	29	11	
79-01-6	Trichloroethene	**1,300**	110	32	**230**	21	5.9	
127-18-4	Tetrachloroethene	**19,000**	110	32	**2,800**	17	4.7	
95-63-6	1,2,4-Trimethylbenzene	ND	110	34	ND	23	6.9	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/09292015** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504149-010

Test Code: EPA TO-15 Date Collected: 9/29/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 10/5/15
Analyst: Wida Ang Date Analyzed: 10/6/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.029 Liter(s)
Test Notes:
Container ID: SC01574

Initial Pressure (psig): -4.28 Final Pressure (psig): 3.76

Canister Dilution Factor: 1.77

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	ND	31	8.5	ND	18	5.0	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	31	10	ND	6.2	2.1	
74-87-3	Chloromethane	ND	31	9.2	ND	15	4.4	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	31	12	ND	4.4	1.7	
75-01-4	Vinyl Chloride	ND	31	10	ND	12	4.1	
106-99-0	1,3-Butadiene	ND	31	13	ND	14	6.1	
74-83-9	Bromomethane	ND	31	12	ND	7.9	3.0	
75-00-3	Chloroethane	ND	31	10	ND	12	3.9	
64-17-5	Ethanol	ND	310	49	ND	160	26	
75-05-8	Acetonitrile	ND	31	11	ND	18	6.5	
107-02-8	Acrolein	ND	120	10	ND	53	4.5	
67-64-1	Acetone	ND	310	47	ND	130	20	
75-69-4	Trichlorofluoromethane	ND	31	10	ND	5.4	1.8	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	310	26	ND	120	10	
107-13-1	Acrylonitrile	ND	31	10	ND	14	4.8	
75-35-4	1,1-Dichloroethene	ND	31	10	ND	7.7	2.6	
75-09-2	Methylene Chloride	ND	31	10	ND	8.8	3.0	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	31	9.8	ND	9.8	3.1	
76-13-1	Trichlorotrifluoroethane	ND	31	10	ND	4.0	1.4	
75-15-0	Carbon Disulfide	ND	310	9.2	ND	98	2.9	
156-60-5	trans-1,2-Dichloroethene	ND	31	12	ND	7.7	2.9	
75-34-3	1,1-Dichloroethane	ND	31	9.8	ND	7.5	2.4	
1634-04-4	Methyl tert-Butyl Ether	ND	31	10	ND	8.5	2.9	
108-05-4	Vinyl Acetate	ND	310	40	ND	87	11	
78-93-3	2-Butanone (MEK)	ND	310	13	ND	100	4.3	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/09292015** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504149-010

Test Code: EPA TO-15 Date Collected: 9/29/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 10/5/15
Analyst: Wida Ang Date Analyzed: 10/6/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.029 Liter(s)
Test Notes:
Container ID: SC01574

Initial Pressure (psig): -4.28 Final Pressure (psig): 3.76

Canister Dilution Factor: 1.77

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	31	9.8	ND	7.7	2.5	
141-78-6	Ethyl Acetate	ND	61	21	ND	17	5.9	
110-54-3	n-Hexane	ND	31	9.2	ND	8.7	2.6	
67-66-3	Chloroform	ND	31	10	ND	6.3	2.1	
109-99-9	Tetrahydrofuran (THF)	ND	31	12	ND	10	4.1	
107-06-2	1,2-Dichloroethane	ND	31	9.8	ND	7.5	2.4	
71-55-6	1,1,1-Trichloroethane	**70**	31	10	**13**	5.6	1.9	
71-43-2	Benzene	ND	31	9.8	ND	9.6	3.1	
56-23-5	Carbon Tetrachloride	ND	31	9.2	ND	4.9	1.5	
110-82-7	Cyclohexane	ND	61	18	ND	18	5.1	
78-87-5	1,2-Dichloropropane	ND	31	9.8	ND	6.6	2.1	
75-27-4	Bromodichloromethane	ND	31	9.2	ND	4.6	1.4	
79-01-6	Trichloroethene	**29**	31	8.5	**5.4**	5.7	1.6	**J**
123-91-1	1,4-Dioxane	ND	31	9.8	ND	8.5	2.7	
80-62-6	Methyl Methacrylate	ND	61	19	ND	15	4.6	
142-82-5	n-Heptane	ND	31	10	ND	7.4	2.5	
10061-01-5	cis-1,3-Dichloropropene	ND	31	8.5	ND	6.7	1.9	
108-10-1	4-Methyl-2-pentanone	ND	31	9.8	ND	7.4	2.4	
10061-02-6	trans-1,3-Dichloropropene	ND	31	9.8	ND	6.7	2.2	
79-00-5	1,1,2-Trichloroethane	ND	31	9.8	ND	5.6	1.8	
108-88-3	Toluene	ND	31	10	ND	8.1	2.8	
591-78-6	2-Hexanone	ND	31	9.8	ND	7.5	2.4	
124-48-1	Dibromochloromethane	ND	31	9.8	ND	3.6	1.1	
106-93-4	1,2-Dibromoethane	ND	31	9.8	ND	4.0	1.3	
123-86-4	n-Butyl Acetate	ND	31	9.8	ND	6.4	2.1	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/09292015** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504149-010

Test Code: EPA TO-15 Date Collected: 9/29/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 10/5/15
Analyst: Wida Ang Date Analyzed: 10/6/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.029 Liter(s)
Test Notes:
Container ID: SC01574

Initial Pressure (psig): -4.28 Final Pressure (psig): 3.76

Canister Dilution Factor: 1.77

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
111-65-9	n-Octane	ND	31	11	ND	6.5	2.4	
127-18-4	Tetrachloroethene	**5,300**	31	8.5	**780**	4.5	1.3	
108-90-7	Chlorobenzene	ND	31	9.8	ND	6.6	2.1	
100-41-4	Ethylbenzene	ND	31	9.8	ND	7.0	2.2	
179601-23-1	m,p-Xylenes	ND	61	18	ND	14	4.2	
75-25-2	Bromoform	ND	31	9.2	ND	3.0	0.89	
100-42-5	Styrene	ND	31	9.2	ND	7.2	2.2	
95-47-6	o-Xylene	ND	31	9.2	ND	7.0	2.1	
111-84-2	n-Nonane	ND	31	9.2	ND	5.8	1.7	
79-34-5	1,1,2,2-Tetrachloroethane	ND	31	9.2	ND	4.4	1.3	
98-82-8	Cumene	ND	31	9.2	ND	6.2	1.9	
80-56-8	alpha-Pinene	ND	31	8.5	ND	5.5	1.5	
103-65-1	n-Propylbenzene	ND	31	9.8	ND	6.2	2.0	
622-96-8	4-Ethyltoluene	ND	31	9.8	ND	6.2	2.0	
108-67-8	1,3,5-Trimethylbenzene	ND	31	9.8	ND	6.2	2.0	
95-63-6	1,2,4-Trimethylbenzene	**10**	31	9.2	**2.1**	6.2	1.9	**J**
100-44-7	Benzyl Chloride	ND	31	6.7	ND	5.9	1.3	
541-73-1	1,3-Dichlorobenzene	ND	31	9.2	ND	5.1	1.5	
106-46-7	1,4-Dichlorobenzene	ND	31	8.5	ND	5.1	1.4	
95-50-1	1,2-Dichlorobenzene	ND	31	9.2	ND	5.1	1.5	
5989-27-5	d-Limonene	**120**	31	8.5	**22**	5.5	1.5	
96-12-8	1,2-Dibromo-3-chloropropane	ND	31	6.0	ND	3.2	0.63	
120-82-1	1,2,4-Trichlorobenzene	ND	31	9.8	ND	4.1	1.3	
91-20-3	Naphthalene	ND	31	11	ND	5.8	2.1	
87-68-3	Hexachlorobutadiene	ND	31	8.5	ND	2.9	0.80	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504149
ALS Sample ID: P151006-MB

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 10/6/15
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	ND	0.50	0.14	ND	0.29	0.081	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.50	0.17	ND	0.10	0.034	
74-87-3	Chloromethane	ND	0.50	0.15	ND	0.24	0.073	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.50	0.19	ND	0.072	0.027	
75-01-4	Vinyl Chloride	ND	0.50	0.17	ND	0.20	0.067	
106-99-0	1,3-Butadiene	ND	0.50	0.22	ND	0.23	0.099	
74-83-9	Bromomethane	ND	0.50	0.19	ND	0.13	0.049	
75-00-3	Chloroethane	ND	0.50	0.17	ND	0.19	0.064	
64-17-5	Ethanol	ND	5.0	0.80	ND	2.7	0.42	
75-05-8	Acetonitrile	ND	0.50	0.18	ND	0.30	0.11	
107-02-8	Acrolein	ND	2.0	0.17	ND	0.87	0.074	
67-64-1	Acetone	ND	5.0	0.77	ND	2.1	0.32	
75-69-4	Trichlorofluoromethane	ND	0.50	0.17	ND	0.089	0.030	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	5.0	0.42	ND	2.0	0.17	
107-13-1	Acrylonitrile	ND	0.50	0.17	ND	0.23	0.078	
75-35-4	1,1-Dichloroethene	ND	0.50	0.17	ND	0.13	0.043	
75-09-2	Methylene Chloride	**0.25**	0.50	0.17	**0.072**	0.14	0.049	**J**
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.50	0.16	ND	0.16	0.051	
76-13-1	Trichlorotrifluoroethane	ND	0.50	0.17	ND	0.065	0.022	
75-15-0	Carbon Disulfide	ND	5.0	0.15	ND	1.6	0.048	
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
75-34-3	1,1-Dichloroethane	ND	0.50	0.16	ND	0.12	0.040	
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	0.17	ND	0.14	0.047	
108-05-4	Vinyl Acetate	ND	5.0	0.65	ND	1.4	0.18	
78-93-3	2-Butanone (MEK)	ND	5.0	0.21	ND	1.7	0.071	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151006-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 10/6/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.50	0.16	ND	0.13	0.040	
141-78-6	Ethyl Acetate	ND	1.0	0.35	ND	0.28	0.097	
110-54-3	n-Hexane	ND	0.50	0.15	ND	0.14	0.043	
67-66-3	Chloroform	ND	0.50	0.17	ND	0.10	0.035	
109-99-9	Tetrahydrofuran (THF)	ND	0.50	0.20	ND	0.17	0.068	
107-06-2	1,2-Dichloroethane	ND	0.50	0.16	ND	0.12	0.040	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.17	ND	0.092	0.031	
71-43-2	Benzene	ND	0.50	0.16	ND	0.16	0.050	
56-23-5	Carbon Tetrachloride	ND	0.50	0.15	ND	0.080	0.024	
110-82-7	Cyclohexane	ND	1.0	0.29	ND	0.29	0.084	
78-87-5	1,2-Dichloropropane	ND	0.50	0.16	ND	0.11	0.035	
75-27-4	Bromodichloromethane	ND	0.50	0.15	ND	0.075	0.022	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
123-91-1	1,4-Dioxane	ND	0.50	0.16	ND	0.14	0.044	
80-62-6	Methyl Methacrylate	ND	1.0	0.31	ND	0.24	0.076	
142-82-5	n-Heptane	ND	0.50	0.17	ND	0.12	0.041	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.14	ND	0.11	0.031	
108-10-1	4-Methyl-2-pentanone	ND	0.50	0.16	ND	0.12	0.039	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.16	ND	0.11	0.035	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.16	ND	0.092	0.029	
108-88-3	Toluene	ND	0.50	0.17	ND	0.13	0.045	
591-78-6	2-Hexanone	ND	0.50	0.16	ND	0.12	0.039	
124-48-1	Dibromochloromethane	ND	0.50	0.16	ND	0.059	0.019	
106-93-4	1,2-Dibromoethane	ND	0.50	0.16	ND	0.065	0.021	
123-86-4	n-Butyl Acetate	ND	0.50	0.16	ND	0.11	0.034	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151006-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 10/6/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.50	0.18	ND	0.11	0.039	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
108-90-7	Chlorobenzene	ND	0.50	0.16	ND	0.11	0.035	
100-41-4	Ethylbenzene	ND	0.50	0.16	ND	0.12	0.037	
179601-23-1	m,p-Xylenes	ND	1.0	0.30	ND	0.23	0.069	
75-25-2	Bromoform	ND	0.50	0.15	ND	0.048	0.015	
100-42-5	Styrene	ND	0.50	0.15	ND	0.12	0.035	
95-47-6	o-Xylene	ND	0.50	0.15	ND	0.12	0.035	
111-84-2	n-Nonane	ND	0.50	0.15	ND	0.095	0.029	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.15	ND	0.073	0.022	
98-82-8	Cumene	ND	0.50	0.15	ND	0.10	0.031	
80-56-8	alpha-Pinene	ND	0.50	0.14	ND	0.090	0.025	
103-65-1	n-Propylbenzene	ND	0.50	0.16	ND	0.10	0.033	
622-96-8	4-Ethyltoluene	ND	0.50	0.16	ND	0.10	0.033	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	0.16	ND	0.10	0.033	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	
100-44-7	Benzyl Chloride	ND	0.50	0.11	ND	0.097	0.021	
541-73-1	1,3-Dichlorobenzene	ND	0.50	0.15	ND	0.083	0.025	
106-46-7	1,4-Dichlorobenzene	ND	0.50	0.14	ND	0.083	0.023	
95-50-1	1,2-Dichlorobenzene	ND	0.50	0.15	ND	0.083	0.025	
5989-27-5	d-Limonene	ND	0.50	0.14	ND	0.090	0.025	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.50	0.099	ND	0.052	0.010	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	0.16	ND	0.067	0.022	
91-20-3	Naphthalene	ND	0.50	0.18	ND	0.095	0.034	
87-68-3	Hexachlorobutadiene	ND	0.50	0.14	ND	0.047	0.013	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504149
ALS Sample ID: P151009-MB

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 10/9/15
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **BNSF Mission Wye / 60334021** ALS Project ID: P1504149

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date(s) Collected: 9/29/15
Analyst: Wida Ang Date(s) Received: 10/5/15
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 10/6 - 10/9/15
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P151006-MB	**103**	**101**	**95**	70-130	
Method Blank	P151009-MB	**107**	**101**	**96**	70-130	
Lab Control Sample	P151006-LCS	**103**	**100**	**98**	70-130	
Lab Control Sample	P151009-LCS	**106**	**99**	**100**	70-130	
SVE-1/09292015	P1504149-001	**103**	**100**	**97**	70-130	
SVE-2/09292015	P1504149-002	**104**	**99**	**96**	70-130	
SVE-3/09292015	P1504149-003	**103**	**101**	**97**	70-130	
SVE-3/09292015	P1504149-003DUP	**105**	**101**	**96**	70-130	
SVE-4/09292015	P1504149-004	**105**	**102**	**95**	70-130	
SVE-5/09292015	P1504149-005	**105**	**101**	**94**	70-130	
SVE-6/09292015	P1504149-006	**106**	**102**	**95**	70-130	
SVE-DUP/09292015	P1504149-007	**104**	**100**	**96**	70-130	
SVE-7/09292015	P1504149-008	**105**	**98**	**99**	70-130	
SVE-8/09292015	P1504149-009	**107**	**100**	**96**	70-130	
SVE-EV/09292015	P1504149-010	**99**	**101**	**94**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151009-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 10/9/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**196**	**93**	69-129	
79-01-6	Trichloroethene	216	**175**	**81**	71-121	
127-18-4	Tetrachloroethene	202	**174**	**86**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**194**	**89**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151006-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 10/6/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
115-07-1	Propene	196	**179**	**91**	49-131	
75-71-8	Dichlorodifluoromethane (CFC 12)	188	**163**	**87**	65-117	
74-87-3	Chloromethane	200	**153**	**77**	48-132	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	204	**182**	**89**	65-122	
75-01-4	Vinyl Chloride	200	**176**	**88**	65-128	
106-99-0	1,3-Butadiene	206	**174**	**84**	62-143	
74-83-9	Bromomethane	202	**202**	**100**	65-130	
75-00-3	Chloroethane	200	**150**	**75**	69-126	
64-17-5	Ethanol	998	**706**	**71**	57-126	
75-05-8	Acetonitrile	212	**160**	**75**	51-134	
107-02-8	Acrolein	214	**162**	**76**	55-146	
67-64-1	Acetone	1,080	**907**	**84**	57-120	
75-69-4	Trichlorofluoromethane	216	**172**	**80**	59-139	
67-63-0	2-Propanol (Isopropyl Alcohol)	418	**380**	**91**	59-129	
107-13-1	Acrylonitrile	212	**189**	**89**	64-136	
75-35-4	1,1-Dichloroethene	216	**184**	**85**	72-123	
75-09-2	Methylene Chloride	222	**192**	**86**	63-117	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	218	**200**	**92**	50-141	
76-13-1	Trichlorotrifluoroethane	220	**186**	**85**	68-118	
75-15-0	Carbon Disulfide	210	**168**	**80**	55-143	
156-60-5	trans-1,2-Dichloroethene	210	**192**	**91**	69-129	
75-34-3	1,1-Dichloroethane	212	**187**	**88**	66-122	
1634-04-4	Methyl tert-Butyl Ether	216	**195**	**90**	55-128	
108-05-4	Vinyl Acetate	1,040	**1160**	**112**	66-140	
78-93-3	2-Butanone (MEK)	220	**200**	**91**	62-127	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151006-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 10/6/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	218	**196**	**90**	65-125	
141-78-6	Ethyl Acetate	428	**385**	**90**	64-132	
110-54-3	n-Hexane	212	**185**	**87**	58-126	
67-66-3	Chloroform	224	**191**	**85**	68-117	
109-99-9	Tetrahydrofuran (THF)	220	**205**	**93**	64-123	
107-06-2	1,2-Dichloroethane	214	**197**	**92**	63-124	
71-55-6	1,1,1-Trichloroethane	210	**192**	**91**	68-120	
71-43-2	Benzene	226	**201**	**89**	61-110	
56-23-5	Carbon Tetrachloride	230	**210**	**91**	65-137	
110-82-7	Cyclohexane	424	**390**	**92**	68-122	
78-87-5	1,2-Dichloropropane	216	**190**	**88**	67-122	
75-27-4	Bromodichloromethane	218	**204**	**94**	71-124	
79-01-6	Trichloroethene	216	**173**	**80**	71-121	
123-91-1	1,4-Dioxane	210	**195**	**93**	67-122	
80-62-6	Methyl Methacrylate	422	**403**	**95**	76-130	
142-82-5	n-Heptane	216	**191**	**88**	67-125	
10061-01-5	cis-1,3-Dichloropropene	208	**196**	**94**	73-131	
108-10-1	4-Methyl-2-pentanone	220	**207**	**94**	66-132	
10061-02-6	trans-1,3-Dichloropropene	210	**236**	**112**	76-135	
79-00-5	1,1,2-Trichloroethane	216	**196**	**91**	73-121	
108-88-3	Toluene	218	**202**	**93**	67-117	
591-78-6	2-Hexanone	220	**222**	**101**	59-128	
124-48-1	Dibromochloromethane	220	**212**	**96**	73-132	
106-93-4	1,2-Dibromoethane	218	**203**	**93**	73-128	
123-86-4	n-Butyl Acetate	226	**216**	**96**	61-136	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151006-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 10/6/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
111-65-9	n-Octane	210	**190**	**90**	67-124	
127-18-4	Tetrachloroethene	202	**174**	**86**	65-126	
108-90-7	Chlorobenzene	220	**186**	**85**	68-120	
100-41-4	Ethylbenzene	218	**196**	**90**	69-123	
179601-23-1	m,p-Xylenes	428	**386**	**90**	67-125	
75-25-2	Bromoform	228	**208**	**91**	68-153	
100-42-5	Styrene	222	**205**	**92**	68-132	
95-47-6	o-Xylene	210	**187**	**89**	67-124	
111-84-2	n-Nonane	204	**184**	**90**	60-130	
79-34-5	1,1,2,2-Tetrachloroethane	210	**194**	**92**	72-128	
98-82-8	Cumene	208	**183**	**88**	67-124	
80-56-8	alpha-Pinene	212	**195**	**92**	67-129	
103-65-1	n-Propylbenzene	204	**178**	**87**	67-125	
622-96-8	4-Ethyltoluene	214	**195**	**91**	66-128	
108-67-8	1,3,5-Trimethylbenzene	214	**193**	**90**	65-125	
95-63-6	1,2,4-Trimethylbenzene	218	**191**	**88**	62-134	
100-44-7	Benzyl Chloride	220	**294**	**134**	74-145	
541-73-1	1,3-Dichlorobenzene	228	**194**	**85**	63-133	
106-46-7	1,4-Dichlorobenzene	208	**187**	**90**	62-129	
95-50-1	1,2-Dichlorobenzene	220	**183**	**83**	62-134	
5989-27-5	d-Limonene	210	**202**	**96**	66-137	
96-12-8	1,2-Dibromo-3-chloropropane	218	**216**	**99**	71-147	
120-82-1	1,2,4-Trichlorobenzene	230	**174**	**76**	60-145	
91-20-3	Naphthalene	218	**163**	**75**	56-158	
87-68-3	Hexachlorobutadiene	230	**173**	**75**	56-139	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **AECOM Environment**
Client Sample ID: **SVE-3/09292015** ALS Project ID: P1504149
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504149-003DUP

Test Code: EPA TO-15 Date Collected: 9/29/15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 10/5/15
Analyst: Wida Ang Date Analyzed: 10/9/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.040 Liter(s)
Test Notes:
Container ID: SC01766

Initial Pressure (psig): -5.47 Final Pressure (psig): 5.81

Canister Dilution Factor: 2.22

Compound	Sample Result µg/m³	Sample Result ppbV	**Duplicate Sample Result µg/m³**	**Duplicate Sample Result** ppbV	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
trans-1,2-Dichloroethene	20.0	5.06	20.3	5.13	20.15	**1**	25	**J**
Trichloroethene	996	185	996	185	996	**0**	25	
Tetrachloroethene	4,690	692	4,660	687	4675	**0.6**	25	
1,2,4-Trimethylbenzene	ND	ND	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

Response Factor Report Instrument #MS08

Method Path : I:\MS08\Methods\
Method File : R8082615.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Thu Aug 27 07:19:54 2015
Response Via : Initial Calibration

Calibration Files
0.08=08261523.D 0.10=08261524.D 0.20=08261525.D 0.40=08261526.D 1.0 =08261527.D 5.0 =08261528.D 25 =08261529.D
50 =08261530.D 100 =08261531.D

		Compound	0.08	0.10	0.20	0.40	1.0	5.0	25	50	100	Avg	%RSD
1)	IR	Bromochloromethane...	----------ISTD----------										
2)	T	Propene		0.858	0.812	0.762	0.821	0.651	0.627	0.473	0.372	0.672	26.17
3)	T	Dichlorodifluo...	3.994	3.880	3.335	3.234	3.308	2.687	2.743	2.351	1.785	3.035	23.51
4)	T	Chloromethane	1.523	1.354	1.193	1.116	1.223	1.009	1.057	0.856	0.648	1.109	23.43
5)	T	1,2-Dichloro-1...	1.707	1.571	1.499	1.325	1.377	1.060	1.106	1.034	0.905	1.287	21.38
6)	T	Vinyl Chloride	1.412	1.303	1.180	1.154	1.165	0.977	1.012	0.948	0.850	1.111	16.21
7)	T	1,3-Butadiene	1.019	0.984	0.900	0.854	0.914	0.745	0.768	0.695	0.640	0.835	15.68
8)	T	Bromomethane			1.093	0.988	0.986	0.748	0.985	0.794	0.763	0.908	15.04
9)	T	Chloroethane	0.864	0.975	0.779	0.785	0.833	0.728	0.708	0.622	0.571	0.763	16.17
10)	T	Ethanol	0.688	0.673	0.618	0.548	0.571	0.461	0.463	0.393	0.362	0.531	22.23
11)	T	Acetonitrile	1.671	1.603	1.395	1.253	1.323	1.115	1.214	1.075	1.008	1.295	17.66
12)	T	Acrolein	0.667	0.667	0.672	0.563	0.596	0.516	0.546	0.492	0.458	0.575	14.01
13)	T	Acetone			0.812	0.733	0.759	0.614	0.567	0.478	0.431	0.628	23.21
14)	T	Trichlorofluor...	3.385	3.533	3.183	2.860	3.001	2.417	2.585	2.504	2.311	2.864	15.38
15)	T	2-Propanol (Is...	2.627	2.114	2.235	2.113	2.283	1.946	2.024	1.806	1.465	2.068	15.67
16)	T	Acrylonitrile	1.197	1.079	1.001	0.994	1.158	1.012	1.093	0.976	0.906	1.046	8.87
17)	T	1,1-Dichloroet...	1.520	1.421	1.302	1.174	1.331	1.080	1.114	1.005	0.916	1.207	16.55
18)	T	2-Methyl-2-Pro...	3.600	3.370	3.005	2.951	3.109	2.609	2.735	2.544	2.316	2.915	14.07
19)	T	Methylene Chlo...				1.464	1.346	0.998	1.016	0.891	0.779	1.083	24.62
20)	T	3-Chloro-1-pro...	1.164	1.010	1.079	1.033	1.105	0.994	1.088	0.970	0.904	1.038	7.60
21)	T	Trichlorotrifl...	1.631	1.461	1.261	1.195	1.295	1.003	1.037	0.963	0.866	1.190	20.98
22)	T	Carbon Disulfide				4.967	4.985	3.862	3.826	3.318	2.955	3.985	21.02
23)	T	trans-1,2-Dich...	1.659	1.745	1.535	1.360	1.523	1.323	1.418	1.317	1.225	1.456	11.81
24)	T	1,1-Dichloroet...	2.270	2.243	2.034	1.807	1.965	1.664	1.725	1.587	1.463	1.862	15.27
25)	T	Methyl tert-Bu...	4.678	4.710	4.182	3.829	3.880	3.333	3.544	3.334	3.064	3.839	15.35
26)	T	Vinyl Acetate	0.214	0.262	0.239	0.238	0.268	0.260	0.257	0.229	0.222	0.243	8.00
27)	T	2-Butanone (MEK)	0.771	0.650	0.744	0.736	0.716	0.669	0.697	0.619	0.561	0.685	9.75
28)	T	cis-1,2-Dichlo...	1.723	1.670	1.474	1.441	1.471	1.236	1.338	1.242	1.167	1.418	13.58
29)	T	Diisopropyl Ether			1.370	1.081	1.075	0.864	0.778	0.694	0.665	0.932	27.38
30)	T	Ethyl Acetate	0.278	0.266	0.302	0.307	0.319	0.265	0.224	0.194	0.199	0.262	17.73
31)	T	n-Hexane			1.562	1.460	1.400	1.159	0.952	0.830	0.861	1.175	25.75
32)	T	Chloroform	3.054	2.815	2.471	2.243	2.347	1.931	2.060	1.973	1.839	2.304	18.04
33)	S	1,2-Dichloroet...	1.810	1.835	1.852	1.863	1.766	1.797	1.815	1.881	1.827	1.827	1.93
34)	T	Tetrahydrofura...	0.706	0.669	0.659	0.622	0.740	0.645	0.666	0.608	0.562	0.653	8.05
35)	T	Ethyl tert-But...	2.081	1.817	1.648	1.620	1.690	1.501	1.547	1.440	1.313	1.628	13.79
36)	T	1,2-Dichloroet...	2.220	2.191	1.805	1.801	1.840	1.500	1.666	1.644	1.557	1.803	14.18
37)	IR	1,4-Difluorobenzen...	----------ISTD----------										
38)	T	1,1,1-Trichlor...	0.684	0.622	0.561	0.506	0.539	0.439	0.478	0.454	0.414	0.522	17.06
39)	T	Isopropyl Acetate	0.120	0.114	0.118	0.113	0.117	0.097	0.085	0.072	0.067	0.100	20.89
40)	T	1-Butanol	0.185	0.193	0.196	0.184	0.205	0.167	0.169	0.147	0.137	0.176	12.97
41)	T	Benzene			1.080	0.889	0.937	0.753	0.758	0.665	0.603	0.812	20.41
42)	T	Carbon Tetrach...	0.494	0.460	0.461	0.418	0.472	0.380	0.428	0.410	0.373	0.433	9.64

WA 8/28/15

Method Path : I:\MS08\Methods\
Method File : R8082615.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

43)	T	Cyclohexane			0.459	0.388	0.434	0.345	0.326	0.281	0.252	0.355	21.57
44)	T	tert-Amyl Meth...	0.918	0.885	0.752	0.735	0.794	0.668	0.702	0.635	0.562	0.739	15.55
45)	T	1,2-Dichloropr...	0.236	0.214	0.195	0.188	0.207	0.174	0.176	0.155	0.139	0.187	16.06
46)	T	Bromodichlorom...	0.458	0.441	0.383	0.363	0.408	0.330	0.364	0.341	0.309	0.378	13.29
47)	T	Trichloroethene	0.436	0.434	0.325	0.330	0.352	0.273	0.276	0.247	0.221	0.322	23.81
48)	T	1,4-Dioxane	0.252	0.228	0.232	0.194	0.223	0.183	0.187	0.160	0.139	0.200	18.45
49)	T	2,2,4-Trimethy...	1.068	0.995	0.871	0.831	0.936	0.753	0.749	0.641	0.566	0.823	19.87
50)	T	Methyl Methacr...	0.110	0.134	0.096	0.092	0.115	0.095	0.096	0.086	0.078	0.100	16.94
51)	T	n-Heptane	0.263	0.218	0.238	0.206	0.241	0.188	0.186	0.162	0.146	0.205	18.80
52)	T	cis-1,3-Dichlo...	0.428	0.443	0.392	0.341	0.401	0.334	0.359	0.328	0.296	0.369	13.46
53)	T	4-Methyl-2-pen...	0.193	0.191	0.161	0.163	0.200	0.160	0.163	0.141	0.126	0.167	14.63
54)	T	trans-1,3-Dich...	0.338	0.315	0.274	0.289	0.336	0.316	0.378	0.357	0.326	0.325	9.85
55)	T	1,1,2-Trichlor...	0.320	0.258	0.256	0.237	0.271	0.218	0.233	0.209	0.189	0.244	15.89
56)	IR	Chlorobenzene-d5 (...	----------ISTD----------										
57)	S	Toluene-d8 (SS2)	2.212	2.174	2.168	2.150	2.161	2.154	2.129	2.120	2.194	2.163	1.34
58)	T	Toluene			2.540	2.257	2.518	1.999	2.002	1.801	1.677	2.113	15.93
59)	T	2-Hexanone	0.832	0.829	0.767	0.742	0.912	0.779	0.797	0.718	0.678	0.784	8.86
60)	T	Dibromochlorom...	0.978	0.797	0.714	0.726	0.803	0.686	0.773	0.725	0.672	0.764	12.11
61)	T	1,2-Dibromoethane	0.771	0.803	0.656	0.682	0.741	0.617	0.670	0.611	0.568	0.680	11.50
62)	T	n-Butyl Acetate	1.016	0.854	0.846	0.859	0.936	0.814	0.849	0.759	0.709	0.849	10.59
63)	T	n-Octane	0.422	0.436	0.345	0.377	0.401	0.333	0.335	0.295	0.276	0.358	15.45
64)	T	Tetrachloroethene	0.896	1.034	0.857	0.866	0.905	0.706	0.731	0.657	0.606	0.807	17.20
65)	T	Chlorobenzene	2.338	2.040	1.862	1.767	1.902	1.503	1.534	1.378	1.248	1.730	20.02
66)	T	Ethylbenzene	3.623	3.260	2.835	2.681	2.983	2.400	2.572	2.332	2.136	2.758	17.18
67)	T	m- & p-Xylenes	2.907	2.651	2.336	2.235	2.429	1.985	2.044	1.858	1.719	2.240	17.14
68)	T	Bromoform	0.719	0.698	0.665	0.602	0.692	0.612	0.697	0.649	0.595	0.659	7.06
69)	T	Styrene	2.002	1.934	1.690	1.606	1.854	1.599	1.653	1.456	1.328	1.680	13.05
70)	T	o-Xylene	3.217	2.838	2.462	2.370	2.614	2.125	2.215	2.010	1.828	2.409	17.96
71)	T	n-Nonane	0.815	0.848	0.805	0.726	0.792	0.675	0.666	0.590	0.557	0.719	14.47
72)	T	1,1,2,2-Tetrac...	1.095	0.967	0.912	0.887	1.008	0.876	0.903	0.787	0.718	0.906	12.38
73)	S	Bromofluoroben...	1.023	1.022	1.041	1.023	1.040	1.030	1.048	1.046	1.024	1.033	1.04
74)	T	Cumene	4.200	3.717	3.518	3.025	3.435	2.827	2.991	2.668	2.396	3.197	17.71
75)	T	alpha-Pinene	1.870	1.631	1.552	1.496	1.578	1.393	1.456	1.290	1.178	1.494	13.47
76)	T	n-Propylbenzene	4.850	4.433	3.934	3.586	3.908	3.310	3.427	3.005	2.709	3.685	18.36
77)	T	3-Ethyltoluene	3.729	3.582	3.222	3.086	3.245	2.894	2.937	2.546	2.345	3.065	14.58
78)	T	4-Ethyltoluene	3.759	3.400	3.086	2.763	3.380	2.587	2.774	2.538	2.244	2.948	16.65
79)	T	1,3,5-Trimethy...	3.272	2.972	2.767	2.600	2.886	2.380	2.528	2.255	2.073	2.637	14.30
80)	T	alpha-Methylst...	1.564	1.509	1.307	1.336	1.555	1.348	1.362	1.175	1.037	1.355	12.87
81)	T	2-Ethyltoluene	3.683	3.715	2.991	2.954	3.311	2.778	2.859	2.505	2.249	3.005	16.45
82)	T	1,2,4-Trimethy...	3.255	2.971	2.676	2.586	2.878	2.413	2.399	2.167	2.022	2.596	15.21
83)	T	n-Decane	1.195	1.116	1.012	0.972	1.150	0.950	0.905	0.773	0.724	0.977	16.55
84)	T	Benzyl Chloride			1.111	1.131	1.357	1.549	2.020	1.889	1.763	1.546	23.43
85)	T	1,3-Dichlorobe...	1.745	1.850	1.622	1.502	1.763	1.388	1.418	1.221	1.078	1.510	17.23
86)	T	1,4-Dichlorobe...	2.135	1.852	1.659	1.570	1.768	1.436	1.503	1.305	1.145	1.597	18.69
87)	T	sec-Butylbenzene	4.059	3.729	3.489	3.226	3.775	3.157	3.248	2.826	2.495	3.334	14.67
88)	T	4-Isopropyltol...	4.024	3.848	3.432	3.291	3.707	3.091	3.055	2.684	2.487	3.291	15.76
89)	T	1,2,3-Trimethy...	3.248	3.044	2.835	2.649	3.082	2.535	2.549	2.295	2.128	2.707	13.85
90)	T	1,2-Dichlorobe...	1.850	1.808	1.705	1.478	1.687	1.356	1.346	1.140	1.026	1.488	19.76
91)	T	d-Limonene	0.803	0.697	0.693	0.715	0.832	0.731	0.719	0.629	0.612	0.715	9.95
92)	T	1,2-Dibromo-3-...	0.461	0.494	0.467	0.453	0.548	0.523	0.613	0.541	0.482	0.509	10.23
93)	T	n-Undecane	1.011	1.065	0.968	0.969	1.143	0.981	0.999	0.844	0.782	0.974	11.05
94)	T	1,2,4-Trichlor...	1.336	1.225	1.134	1.122	1.223	1.018	1.139	0.974	0.848	1.113	13.24

Method Path : I:\MS08\Methods\
Method File : R8082615.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

95)	T	Naphthalene	4.026	4.018	3.756	3.541	3.841	3.316	3.462	2.948	2.610	3.502	13.77
96)	T	n-Dodecane	1.020	1.064	0.963	0.996	1.054	0.908	0.935	0.807	0.816	0.952	9.93
97)	T	Hexachlorobuta...	0.826	0.786	0.754	0.741	0.777	0.642	0.726	0.632	0.554	0.715	12.24
98)	T	Cyclohexanone	0.626	0.589	0.620	0.566	0.634	0.546	0.584	0.515	0.472	0.572	9.48
99)	T	tert-Butylbenzene	3.273	3.189	2.850	2.649	2.938	2.392	2.358	2.105	1.961	2.635	17.61
100)	T	n-Butylbenzene	2.916	2.611	2.629	2.432	2.832	2.401	2.524	2.201	1.958	2.501	11.92

(#) = Out of Range

Evaluate Continuing Calibration Report

Data File: I:\MS08\Data\2015 10\06\10061501.D
Acq On : 6 Oct 2015 4:01 Operator: WA
Sample : CCV R8100615 5ng
Misc : S29-09171501/S29-09121501 (10/10)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Oct 06 06:28:33 2015
Quant Method : I:\MS08\Methods\R8082615.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Aug 27 07:19:54 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

WA 10/6/15

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	84	-0.03
2	T	Propene	0.672	0.638	5.1	82	0.00
3	T	Dichlorodifluoromethane (CF	3.035	2.696	11.2	84	0.00
4	T	Chloromethane	1.109	0.907	18.2	75	-0.02
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.287	1.164	9.6	92	-0.01
6	T	Vinyl Chloride	1.111	1.070	3.7	92	-0.02
7	T	1,3-Butadiene	0.835	0.806	3.5	91	-0.02
8	T	Bromomethane	0.908	1.037	-14.2	116	-0.02
9	T	Chloroethane	0.763	0.687	10.0	79	-0.02
10	T	Ethanol	0.531	0.490	7.7	89	-0.10
11	T	Acetonitrile	1.295	1.106	14.6	83	-0.07
12	T	Acrolein	0.575	0.475	17.4	77	-0.05
13	T	Acetone	0.628	0.587	6.5	80	-0.06
14	T	Trichlorofluoromethane	2.864	2.439	14.8	85	-0.02
15	T	2-Propanol (Isopropanol)	2.068	1.982	4.2	85	-0.08
16	T	Acrylonitrile	1.046	0.953	8.9	79	-0.06
17	T	1,1-Dichloroethene	1.207	1.055	12.6	82	-0.02
18	T	2-Methyl-2-Propanol (tert-B	2.915	2.713	6.9	87	-0.08
19	T	Methylene Chloride	1.083	1.009	6.8	85	-0.05
20	T	3-Chloro-1-propene (Allyl C	1.038	0.942	9.2	79	-0.03
21	T	Trichlorotrifluoroethane	1.190	1.014	14.8	85	-0.02
22	T	Carbon Disulfide	3.985	3.904	2.0	85	-0.02
23	T	trans-1,2-Dichloroethene	1.456	1.334	8.4	85	-0.03
24	T	1,1-Dichloroethane	1.862	1.663	10.7	84	-0.03
25	T	Methyl tert-Butyl Ether	3.839	3.483	9.3	88	-0.03
26	T	Vinyl Acetate	0.243	0.278	-14.4	90	-0.05
27	T	2-Butanone (MEK)	0.685	0.637	7.0	80	-0.04
28	T	cis-1,2-Dichloroethene	1.418	1.262	11.0	86	-0.03
29	T	Diisopropyl Ether	0.932	0.862	7.5	84	-0.03
30	T	Ethyl Acetate	0.262	0.265	-1.1	84	-0.03
31	T	n-Hexane	1.175	1.160	1.3	84	-0.02
32	T	Chloroform	2.304	1.961	14.9	85	-0.04
33	S	1,2-Dichloroethane-d4(SS1)	1.827	1.785	2.3	83	-0.03
34	T	Tetrahydrofuran (THF)	0.653	0.631	3.4	82	-0.02
35	T	Ethyl tert-Butyl Ether	1.628	1.501	7.8	84	-0.02
36	T	1,2-Dichloroethane	1.803	1.559	13.5	87	-0.03
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	81	-0.02
38	T	1,1,1-Trichloroethane	0.522	0.464	11.1	86	-0.02
39	T	Isopropyl Acetate	0.100	0.100	0.0	83	-0.03
40	T	1-Butanol	0.176	0.175	0.6	85	-0.05
41	T	Benzene	0.812	0.770	5.2	83	-0.02
42	T	Carbon Tetrachloride	0.433	0.395	8.8	85	-0.02
43	T	Cyclohexane	0.355	0.358	-0.8	85	-0.02
44	T	tert-Amyl Methyl Ether	0.739	0.699	5.4	85	-0.02
45	T	1,2-Dichloropropane	0.187	0.177	5.3	83	-0.02
46	T	Bromodichloromethane	0.378	0.350	7.4	86	-0.02
47	T	Trichloroethene	0.322	0.282	12.4	84	-0.02
48	T	1,4-Dioxane	0.200	0.189	5.5	84	-0.02
49	T	2,2,4-Trimethylpentane (Iso	0.823	0.760	7.7	82	-0.02
50	T	Methyl Methacrylate	0.100	0.105	-5.0	90	-0.02
51	T	n-Heptane	0.205	0.197	3.9	85	-0.02
52	T	cis-1,3-Dichloropropene	0.369	0.356	3.5	87	-0.02
53	T	4-Methyl-2-pentanone	0.167	0.165	1.2	84	-0.02
54	T	trans-1,3-Dichloropropene	0.325	0.351	-8.0	90	-0.02

Evaluate Continuing Calibration Report

Data File: I:\MS08\Data\2015 10\06\10061501.D
Acq On : 6 Oct 2015 4:01 Operator: WA
Sample : CCV R8100615 5ng
Misc : S29-09171501/S29-09121501 (10/10)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Oct 06 06:28:33 2015
Quant Method : I:\MS08\Methods\R8082615.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Aug 27 07:19:54 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
55	T	1,1,2-Trichloroethane	0.244	0.230	5.7	86	-0.02
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	85	-0.01
57	S	Toluene-d8 (SS2)	2.163	2.150	0.6	85	-0.02
58	T	Toluene	2.113	2.034	3.7	86	-0.01
59	T	2-Hexanone	0.784	0.774	1.3	84	-0.02
60	T	Dibromochloromethane	0.764	0.700	8.4	87	-0.02
61	T	1,2-Dibromoethane	0.680	0.631	7.2	87	-0.01
62	T	n-Butyl Acetate	0.849	0.828	2.5	86	-0.02
63	T	n-Octane	0.358	0.335	6.4	85	-0.02
64	T	Tetrachloroethene	0.807	0.708	12.3	85	-0.02
65	T	Chlorobenzene	1.730	1.508	12.8	85	-0.01
66	T	Ethylbenzene	2.758	2.527	8.4	89	-0.01
67	T	m- & p-Xylenes	2.240	2.040	8.9	87	-0.02
68	T	Bromoform	0.659	0.607	7.9	84	-0.01
69	T	Styrene	1.680	1.574	6.3	84	-0.02
70	T	o-Xylene	2.409	2.166	10.1	87	-0.02
71	T	n-Nonane	0.719	0.664	7.6	84	-0.01
72	T	1,1,2,2-Tetrachloroethane	0.906	0.890	1.8	86	-0.01
73	S	Bromofluorobenzene (SS3)	1.033	0.999	3.3	82	0.00
74	T	Cumene	3.197	2.913	8.9	87	-0.01
75	T	alpha-Pinene	1.494	1.381	7.6	84	0.00
76	T	n-Propylbenzene	3.685	3.311	10.1	85	-0.01
77	T	3-Ethyltoluene	3.065	2.908	5.1	85	-0.01
78	T	4-Ethyltoluene	2.948	2.687	8.9	88	-0.01
79	T	1,3,5-Trimethylbenzene	2.637	2.451	7.1	87	-0.01
80	T	alpha-Methylstyrene	1.355	1.283	5.3	81	-0.02
81	T	2-Ethyltoluene	3.005	2.769	7.9	85	-0.02
82	T	1,2,4-Trimethylbenzene	2.596	2.437	6.1	86	-0.02
83	T	n-Decane	0.977	0.911	6.8	81	-0.01
84	T	Benzyl Chloride	1.546	1.879	-21.5	103	-0.02
85	T	1,3-Dichlorobenzene	1.510	1.382	8.5	85	-0.02
86	T	1,4-Dichlorobenzene	1.597	1.426	10.7	84	-0.02
87	T	sec-Butylbenzene	3.334	3.103	6.9	83	-0.01
88	T	4-Isopropyltoluene (p-Cymen	3.291	3.081	6.4	85	-0.02
89	T	1,2,3-Trimethylbenzene	2.707	2.548	5.9	85	-0.02
90	T	1,2-Dichlorobenzene	1.488	1.336	10.2	84	-0.01
91	T	d-Limonene	0.715	0.710	0.7	82	-0.01
92	T	1,2-Dibromo-3-Chloropropane	0.509	0.514	-1.0	83	-0.01
93	T	n-Undecane	0.974	0.980	-0.6	85	0.00
94	T	1,2,4-Trichlorobenzene	1.113	1.034	7.1	86	-0.01
95	T	Naphthalene	3.502	3.397	3.0	87	-0.01
96	T	n-Dodecane	0.952	0.953	-0.1	89	0.00
97	T	Hexachlorobutadiene	0.715	0.624	12.7	83	-0.01
98	T	Cyclohexanone	0.572	0.536	6.3	83	-0.02
99	T	tert-Butylbenzene	2.635	2.404	8.8	85	-0.02
100	T	n-Butylbenzene	2.501	2.382	4.8	84	-0.01

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Evaluate Continuing Calibration Report

Data File: I:\MS08\Data\2015 10\09\10091502.D
Acq On : 9 Oct 2015 2:45 Operator: WA
Sample : CCV R8100915 25ng
Misc : S29-09171501/S29-09121502 (10/10)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Oct 09 06:28:16 2015
Quant Method : I:\MS08\Methods\R8082615.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Aug 27 07:19:54 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

10/9/15

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	79	-0.02
2	T	Propene	0.672	0.544	19.0	69	-0.01
3	T	Dichlorodifluoromethane (CF	3.035	2.514	17.2	73	0.00
4	T	Chloromethane	1.109	0.831	25.1	62	-0.01
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.287	1.147	10.9	82	-0.01
6	T	Vinyl Chloride	1.111	1.076	3.2	84	-0.01
7	T	1,3-Butadiene	0.835	0.774	7.3	80	-0.02
8	T	Bromomethane	0.908	1.011	-11.3	82	-0.02
9	T	Chloroethane	0.763	0.661	13.4	74	-0.02
10	T	Ethanol	0.531	0.443	16.6	76	-0.05
11	T	Acetonitrile	1.295	1.062	18.0	69	-0.04
12	T	Acrolein	0.575	0.459	20.2	67	-0.03
13	T	Acetone	0.628	0.542	13.7	76	-0.04
14	T	Trichlorofluoromethane	2.864	2.531	11.6	78	-0.01
15	T	2-Propanol (Isopropanol)	2.068	1.931	6.6	76	-0.04
16	T	Acrylonitrile	1.046	0.968	7.5	70	-0.04
17	T	1,1-Dichloroethene	1.207	1.037	14.1	74	-0.02
18	T	2-Methyl-2-Propanol (tert-B	2.915	2.673	8.3	78	-0.05
19	T	Methylene Chloride	1.083	0.960	11.4	75	-0.03
20	T	3-Chloro-1-propene (Allyl C	1.038	0.970	6.6	71	-0.02
21	T	Trichlorotrifluoroethane	1.190	1.029	13.5	79	-0.02
22	T	Carbon Disulfide	3.985	3.588	10.0	75	-0.02
23	T	trans-1,2-Dichloroethene	1.456	1.366	6.2	77	-0.02
24	T	1,1-Dichloroethane	1.862	1.652	11.3	76	-0.02
25	T	Methyl tert-Butyl Ether	3.839	3.500	8.8	78	-0.02
26	T	Vinyl Acetate	0.243	0.267	-9.9	82	-0.03
27	T	2-Butanone (MEK)	0.685	0.633	7.6	72	-0.03
28	T	cis-1,2-Dichloroethene	1.418	1.288	9.2	77	-0.02
29	T	Diisopropyl Ether	0.932	0.813	12.8	83	-0.02
30	T	Ethyl Acetate	0.262	0.242	7.6	86	-0.02
31	T	n-Hexane	1.175	1.055	10.2	88	-0.01
32	T	Chloroform	2.304	2.032	11.8	78	-0.03
33	S	1,2-Dichloroethane-d4(SS1)	1.827	1.884	-3.1	82	-0.02
34	T	Tetrahydrofuran (THF)	0.653	0.619	5.2	74	-0.02
35	T	Ethyl tert-Butyl Ether	1.628	1.499	7.9	77	-0.02
36	T	1,2-Dichloroethane	1.803	1.692	6.2	81	-0.02
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	80	-0.02
38	T	1,1,1-Trichloroethane	0.522	0.479	8.2	80	-0.02
39	T	Isopropyl Acetate	0.100	0.088	12.0	83	-0.02
40	T	1-Butanol	0.176	0.176	0.0	83	-0.04
41	T	Benzene	0.812	0.722	11.1	76	-0.02
42	T	Carbon Tetrachloride	0.433	0.417	3.7	78	-0.02
43	T	Cyclohexane	0.355	0.326	8.2	80	-0.02
44	T	tert-Amyl Methyl Ether	0.739	0.683	7.6	78	-0.02
45	T	1,2-Dichloropropane	0.187	0.164	12.3	74	-0.02
46	T	Bromodichloromethane	0.378	0.360	4.8	79	-0.02
47	T	Trichloroethene	0.322	0.269	16.5	78	-0.02
48	T	1,4-Dioxane	0.200	0.180	10.0	77	-0.02
49	T	2,2,4-Trimethylpentane (Iso	0.823	0.709	13.9	76	-0.01
50	T	Methyl Methacrylate	0.100	0.099	1.0	83	-0.02
51	T	n-Heptane	0.205	0.184	10.2	79	-0.01
52	T	cis-1,3-Dichloropropene	0.369	0.354	4.1	79	-0.01
53	T	4-Methyl-2-pentanone	0.167	0.158	5.4	77	-0.02
54	T	trans-1,3-Dichloropropene	0.325	0.376	-15.7	79	-0.01

Evaluate Continuing Calibration Report

Data File: I:\MS08\Data\2015 10\09\10091502.D
Acq On : 9 Oct 2015 2:45 Operator: WA
Sample : CCV R8100915 25ng
Misc : S29-09171501/S29-09121502 (10/10)
ALS Vial : 1 Sample Multiplier: 1

Quant Time: Oct 09 06:28:16 2015
Quant Method : I:\MS08\Methods\R8082615.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Aug 27 07:19:54 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
55	T	1,1,2-Trichloroethane	0.244	0.224	8.2	77	-0.02
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	81	-0.01
57	S	Toluene-d8 (SS2)	2.163	2.139	1.1	81	-0.01
58	T	Toluene	2.113	1.967	6.9	79	-0.01
59	T	2-Hexanone	0.784	0.792	-1.0	80	-0.02
60	T	Dibromochloromethane	0.764	0.733	4.1	77	-0.01
61	T	1,2-Dibromoethane	0.680	0.637	6.3	77	-0.01
62	T	n-Butyl Acetate	0.849	0.786	7.4	75	-0.02
63	T	n-Octane	0.358	0.321	10.3	77	-0.02
64	T	Tetrachloroethene	0.807	0.693	14.1	77	-0.01
65	T	Chlorobenzene	1.730	1.461	15.5	77	-0.01
66	T	Ethylbenzene	2.758	2.498	9.4	78	-0.01
67	T	m- & p-Xylenes	2.240	2.014	10.1	80	-0.01
68	T	Bromoform	0.659	0.655	0.6	76	-0.01
69	T	Styrene	1.680	1.566	6.8	76	-0.01
70	T	o-Xylene	2.409	2.144	11.0	78	-0.02
71	T	n-Nonane	0.719	0.647	10.0	78	-0.01
72	T	1,1,2,2-Tetrachloroethane	0.906	0.855	5.6	76	-0.01
73	S	Bromofluorobenzene (SS3)	1.033	1.031	0.2	79	0.00
74	T	Cumene	3.197	2.830	11.5	76	-0.01
75	T	alpha-Pinene	1.494	1.370	8.3	76	0.00
76	T	n-Propylbenzene	3.685	3.236	12.2	76	-0.01
77	T	3-Ethyltoluene	3.065	2.764	9.8	76	-0.01
78	T	4-Ethyltoluene	2.948	2.654	10.0	77	-0.01
79	T	1,3,5-Trimethylbenzene	2.637	2.393	9.3	76	-0.01
80	T	alpha-Methylstyrene	1.355	1.247	8.0	74	-0.02
81	T	2-Ethyltoluene	3.005	2.683	10.7	76	-0.02
82	T	1,2,4-Trimethylbenzene	2.596	2.318	10.7	78	-0.01
83	T	n-Decane	0.977	0.855	12.5	76	-0.01
84	T	Benzyl Chloride	1.546	2.079	-34.5#	83	-0.01
85	T	1,3-Dichlorobenzene	1.510	1.310	13.2	75	-0.01
86	T	1,4-Dichlorobenzene	1.597	1.390	13.0	75	-0.02
87	T	sec-Butylbenzene	3.334	2.986	10.4	74	-0.01
88	T	4-Isopropyltoluene (p-Cymen	3.291	2.877	12.6	76	-0.01
89	T	1,2,3-Trimethylbenzene	2.707	2.417	10.7	77	-0.02
90	T	1,2-Dichlorobenzene	1.488	1.241	16.6	74	-0.01
91	T	d-Limonene	0.715	0.678	5.2	76	-0.01
92	T	1,2-Dibromo-3-Chloropropane	0.509	0.536	-5.3	71	-0.01
93	T	n-Undecane	0.974	0.905	7.1	73	0.00
94	T	1,2,4-Trichlorobenzene	1.113	1.012	9.1	72	-0.01
95	T	Naphthalene	3.502	3.273	6.5	76	-0.01
96	T	n-Dodecane	0.952	0.839	11.9	72	0.00
97	T	Hexachlorobutadiene	0.715	0.616	13.8	69	-0.01
98	T	Cyclohexanone	0.572	0.526	8.0	73	-0.02
99	T	tert-Butylbenzene	2.635	2.248	14.7	77	-0.01
100	T	n-Butylbenzene	2.501	2.301	8.0	74	-0.01

(#) = Out of Range SPCC's out = 0 CCC's out = 0

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LABORATORY REPORT

December 2, 2015

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: BNSF Mission Wye / 60334021

Dear Shelly:

Your report number P1504466 has been amended for the samples submitted to our laboratory on October 21, 2015. The EPA TO-15 results have been revised to report down to the method detection limits. The revised pages have been indicated by the "Revised Page" footer located at the bottom right of the page.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera

By Kate Aguilera at 9:41 am, Dec 04, 2015

Kate Aguilera
Project Manager

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Client: AECOM Environment
Project: BNSF Mission Wye / 60334021

Service Request No: P1504466

CASE NARRATIVE

The samples were received intact under chain of custody on October 21, 2015 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

Two of the samples were analyzed for fixed gases (hydrogen, oxygen, nitrogen, methane and carbon dioxide) according to ASTM D1946 (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP or AIHA-LAP accreditation.

Volatile Organic Compound Analysis

All of the samples were analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The spike recoveries of ethanol, 1,4-dioxane, and 2-hexanone in the Laboratory Control Sample (LCS) analyzed on October 23, 2015 were outside the Laboratory generated control criteria. The recovery errors equate to a potential high bias. However, the recoveries in question were within the method criteria, therefore the data quality is not significantly affected. No corrective action was taken.

The canisters were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

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Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2-R1
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	876241
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-001
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-15-6
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272015-5
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1504466

Project ID: BNSF Mission Wye / 60334021

Date Received: 10/21/2015

Time Received: 09:30

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	ASTM D1946-90(2006) - Fxd Gases Can	TO-15 - VOC Cans
SVE-CEV/10162015	P1504466-001	Air	10/16/2015	10:58	1SC00951	-2.49	9.98	X	X
SVE-DUP/10162015	P1504466-002	Air	10/16/2015	11:00	1SC00619	-2.58	11.05	X	X
SVE-Pre-T/10162015	P1504466-003	Air	10/16/2015	11:15	1SC01314	-4.87	5.93		X
SVE-Mid-T/10162015	P1504466-004	Air	10/16/2015	11:28	1SC00107	-2.96	5.50		X
SVE-EV/10162015	P1504466-005	Air	10/16/2015	11:48	1SC00561	-3.34	6.79		X

Air - Chain of Custody Record & Analytical Service Request

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No P1504466

Company Name & Address (Reporting Information): AECOM, 207 N. Broadway, Ste. 315, Billings, MT 59101

Project Name: BNSF - Mission Wye

Project Number: 60334021

Project Manager: Shelly Young

P.O. # / Billing Information

Phone: 406-855-0945

Fax: —

Email Address for Result Reporting: shelly.young@aecom.com

Sampler (Print & Sign): Cole R. Grover

ALS Contact:

Analysis Method

Client Sample ID -	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	TO-15 (VOCs)	D-1946 (Fixed gasses)	Comments e.g. Actual Preservative or specific instructions
SUE-CEV/10162015	1	10-16-15	1058	005110	AVG0553	-28.0	-3.0	1l	X	X	4COCs only
SUE-~~Inf~~/10162015	2		1100	003931	AVG07402	-25.0	-1.0	1l	X	X	4 COCs only
SUE-Pre-T/10162015	3		1115	4284	AVG04531	-25.0	-6.0	1l	X		Full TO-15
SUE-Mid-T/10162015	4		1128	003000	AVG03930	-27.0	-3.0	1l	X		
SUE-EV/10162015	5		1148	003902	AVG03658	-26.0	-3.0	1l	X		

Report Tier Levels - please select

Tier I - Results (Default in not specified) ____
Tier II (Results + QC Summaries ____
Tier III (Results + QC & Calibration Summaries) X
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required YES / No
Type: ____ Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Cole R. Grover	10-16-2015	1300	[signature]	10/21/15	0930
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____°C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1504466
Project: BNSF Mission Wye / 60334021
Sample(s) received on: 10/21/15 Date opened: 10/21/15 by: KKELPE

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1504466-001.01	1.0 L Source Can					
P1504466-002.01	1.0 L Source Can					
P1504466-003.01	1.0 L Source Can					
P1504466-004.01	1.0 L Source Can					
P1504466-005.01	1.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/10162015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504466
ALS Sample ID: P1504466-001

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 1.0 L Summa Canister
Test Notes:
Container ID: 1SC00951

Date Collected: 10/16/15
Date Received: 10/21/15
Date Analyzed: 10/22/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.49 Final Pressure (psig): 9.98

Canister Dilution Factor: 2.02

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
1333-74-0	Hydrogen	ND	2,000	
7782-44-7	**Oxygen***	**221,000**	2,000	
7727-37-9	**Nitrogen**	**778,000**	2,000	
74-82-8	Methane	ND	2,000	
124-38-9	**Carbon Dioxide**	**1,490**	2,000	**K**

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.
K = Analyte was detected above the method reporting limit prior to normalization.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/10162015**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504466
ALS Sample ID: P1504466-002

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 1.0 L Summa Canister
Test Notes:
Container ID: 1SC00619

Date Collected: 10/16/15
Date Received: 10/21/15
Date Analyzed: 10/22/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.58 Final Pressure (psig): 11.05

Canister Dilution Factor: 2.12

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
1333-74-0	Hydrogen	ND	2,100	
7782-44-7	**Oxygen***	**221,000**	2,100	
7727-37-9	**Nitrogen**	**777,000**	2,100	
74-82-8	Methane	ND	2,100	
124-38-9	Carbon Dioxide	ND	2,100	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF Mission Wye / 60334021**

ALS Project ID: P1504466
ALS Sample ID: P151022-MB

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 1.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 10/22/15
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
1333-74-0	Hydrogen	ND	1,000	
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151022-LCS

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Nalini Lall Date Analyzed: 10/22/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
1333-74-0	Hydrogen	40,000	**44,200**	**111**	83-114	
7782-44-7	Oxygen*	50,000	**58,600**	**117**	84-121	
7727-37-9	Nitrogen	50,000	**60,200**	**120**	88-122	
74-82-8	Methane	40,000	**45,200**	**113**	85-116	
124-38-9	Carbon Dioxide	50,000	**55,700**	**111**	84-117	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

Method Path : I:\GC01\METHODS\
Method File : 3C112914.M
Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
Last Update : Mon Dec 01 13:41:04 2014
Response Via : Initial Calibration

Calibration Files
1 =11291412.D 2 =11291410.D 3 =11291413.D
4 =11291414.D 5 =11291415.D 6 =11291421.D

	Compound	1	2	3	4	5	6	Avg	%RSD
1)	Hydrogen	1.258	1.246	1.311	1.308	1.519		1.328 E1	8.32
2)	Oxygen	1.420	1.594	1.603	1.604	1.561	1.649	1.572 E1	5.07
3)	Nitrogen	2.029	1.951	1.833	1.829	1.803		1.829 E1	9.36
4)	Carbon Monoxide	1.712	1.637	1.814	1.800	1.763		1.745 E1	4.14
5)	Methane	1.370	1.329	1.353	1.359	1.332		1.348 E1	1.17
6)	Carbon Dioxide	2.104	2.103	2.082	2.080	2.018		2.102 E1	3.20

(#) = Out of Range ### Number of calibration levels exceeded format ###

Modified EPA Method 3C Daily QC Summary

Client : AECOM Environment
Analyst : NL
Method Name : EPA 3C, ASTM D 1946-90, VOA-EPA3C

Instrument : GC01_FXG
Date Analyzed : 10/22/2015

RT Summaries and QC Check (minutes)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ICAL Mean RT	**0.708**	**2.188**	**2.368**	**3.076**	**5.045**	**6.707**		
RT Windows (+/- min)	**0.072**	**0.133**	**0.146**	**0.034**	**0.130**	**0.145**		
std s30-10141501	0.711	2.229	2.404	3.091	5.079	6.739	10221502.D	08:19
+/- 0.33min of ICAL Mean RT	Pass	Pass	Pass	Pass	Pass	Pass		
mb							10221503.D	08:35
lab air		2.161 Pass	2.298 Pass			6.732 Pass	10221504.D	08:53
4466-001		2.175 Pass	2.316 Pass			6.737 Pass	10221507.D	09:42
4466-002		2.192 Pass	2.339 Pass			6.752 Pass	10221508.D	10:16
lcs	0.707 Pass	2.219 Pass	2.395 Pass	3.082 Pass	5.073 Pass	6.734 Pass	10221515.D	12:34
std	0.710 Pass	2.224 Pass	2.399 Pass	3.086 Pass	5.076 Pass	6.736 Pass	10221516.D	12:52

Continuing Calibration Standards Summary (ppm)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ACTUAL	39980.0	40030.0	50000.0	49990.0	40020.0	50040.0		
CCV Criteria (+/- %D)	**15.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**		
std s30-10141501	39829.6 0.4%	40778.9 1.9%	50955.8 1.9%	51056.1 2.1%	39812.9 0.5%	48843.8 2.4%	10221502.D	08:19
std	40497.3 1.3%	41646.1 4.0%	52962.6 5.9%	51734.8 3.5%	40110.1 0.2%	49407.9 1.3%	10221516.D	12:52

Lab Dup Summary (ppm, without DF correction and nomalization)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time

LCS / LCS Dup Summary (ppm, without DF correction)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
LCS Actual Conc. (ppm)	40000.0	50000.0	50000.0	50000.0	40000.0	50000.0		
LCS Criteria (% Range)	**83%-114%**	**84%-121%**	**88%-122%**	**87%-118%**	**85%-116%**	**84%-117%**		
lcs	44235.3	58591.4	60160.2	57518.3	45184.6	55702.7	10221515.D	12:34
LCS % Recovery	111% Pass	117% Pass	120% Pass	115% Pass	113% Pass	111% Pass		

Lab Air QC Summary

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxid	Methane	Carbon Dioxide	Lab Air Criteria Total (90%-110%)
lab air		208873.2	743662.5			437.4	95.3% Pass
Lab Air Normalized (%)		21.92%	78.03%			0.05%	100.0%

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/10162015** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504466-001

Test Code: EPA TO-15 Modified Date Collected: 10/16/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/21/15
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.036 Liter(s)
Test Notes:
Container ID: 1SC00951

Initial Pressure (psig): -2.49 Final Pressure (psig): 9.98

Canister Dilution Factor: 2.02

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	28	11	ND	7.1	2.7	
79-01-6	Trichloroethene	**490**	28	7.9	**90**	5.2	1.5	
127-18-4	Tetrachloroethene	**2,600**	28	7.9	**390**	4.1	1.2	
95-63-6	1,2,4-Trimethylbenzene	ND	28	8.4	ND	5.7	1.7	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/10162015** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504466-002

Test Code: EPA TO-15 Modified Date Collected: 10/16/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/21/15
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.036 Liter(s)
Test Notes:
Container ID: 1SC00619

Initial Pressure (psig): -2.58 Final Pressure (psig): 11.05

Canister Dilution Factor: 2.12

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	29	11	ND	7.4	2.8	
79-01-6	Trichloroethene	**480**	29	8.2	**89**	5.5	1.5	
127-18-4	Tetrachloroethene	**2,700**	29	8.2	**400**	4.3	1.2	
95-63-6	1,2,4-Trimethylbenzene	ND	29	8.8	ND	6.0	1.8	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-Pre-T/10162015** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504466-003

Test Code: EPA TO-15 Date Collected: 10/16/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/21/15
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.015 Liter(s)
Test Notes:
Container ID: 1SC01314

Initial Pressure (psig): -4.87 Final Pressure (psig): 5.93

Canister Dilution Factor: 2.10

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	ND	70	20	ND	41	11	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	70	24	ND	14	4.8	
74-87-3	Chloromethane	ND	70	21	ND	34	10	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	70	27	ND	10	3.8	
75-01-4	Vinyl Chloride	ND	70	24	ND	27	9.3	
106-99-0	1,3-Butadiene	ND	70	31	ND	32	14	
74-83-9	Bromomethane	ND	70	27	ND	18	6.9	
75-00-3	Chloroethane	ND	70	24	ND	27	9.0	
64-17-5	Ethanol	ND	700	110	ND	370	59	
75-05-8	Acetonitrile	ND	70	25	ND	42	15	
107-02-8	Acrolein	ND	280	24	ND	120	10	
67-64-1	Acetone	ND	700	110	ND	290	45	
75-69-4	Trichlorofluoromethane	ND	70	24	ND	12	4.2	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	700	59	ND	280	24	
107-13-1	Acrylonitrile	ND	70	24	ND	32	11	
75-35-4	1,1-Dichloroethene	ND	70	24	ND	18	6.0	
75-09-2	Methylene Chloride	ND	70	24	ND	20	6.9	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	70	22	ND	22	7.2	
76-13-1	Trichlorotrifluoroethane	ND	70	24	ND	9.1	3.1	
75-15-0	Carbon Disulfide	ND	700	21	ND	220	6.7	
156-60-5	trans-1,2-Dichloroethene	ND	70	27	ND	18	6.7	
75-34-3	1,1-Dichloroethane	ND	70	22	ND	17	5.5	
1634-04-4	Methyl tert-Butyl Ether	ND	70	24	ND	19	6.6	
108-05-4	Vinyl Acetate	ND	700	91	ND	200	26	
78-93-3	2-Butanone (MEK)	ND	700	29	ND	240	10	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-Pre-T/10162015** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504466-003

Test Code: EPA TO-15 Date Collected: 10/16/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/21/15
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.015 Liter(s)
Test Notes:
Container ID: 1SC01314

Initial Pressure (psig): -4.87 Final Pressure (psig): 5.93

Canister Dilution Factor: 2.10

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	**590**	70	22	**150**	18	5.7	
141-78-6	Ethyl Acetate	ND	140	49	ND	39	14	
110-54-3	n-Hexane	ND	70	21	ND	20	6.0	
67-66-3	Chloroform	ND	70	24	ND	14	4.9	
109-99-9	Tetrahydrofuran (THF)	ND	70	28	ND	24	9.5	
107-06-2	1,2-Dichloroethane	ND	70	22	ND	17	5.5	
71-55-6	1,1,1-Trichloroethane	**31**	70	24	**5.7**	13	4.4	**J**
71-43-2	Benzene	ND	70	22	ND	22	7.0	
56-23-5	Carbon Tetrachloride	ND	70	21	ND	11	3.3	
110-82-7	Cyclohexane	ND	140	41	ND	41	12	
78-87-5	1,2-Dichloropropane	ND	70	22	ND	15	4.8	
75-27-4	Bromodichloromethane	ND	70	21	ND	10	3.1	
79-01-6	Trichloroethene	**1,300**	70	20	**240**	13	3.6	
123-91-1	1,4-Dioxane	ND	70	22	ND	19	6.2	
80-62-6	Methyl Methacrylate	ND	140	43	ND	34	11	
142-82-5	n-Heptane	ND	70	24	ND	17	5.8	
10061-01-5	cis-1,3-Dichloropropene	ND	70	20	ND	15	4.3	
108-10-1	4-Methyl-2-pentanone	ND	70	22	ND	17	5.5	
10061-02-6	trans-1,3-Dichloropropene	ND	70	22	ND	15	4.9	
79-00-5	1,1,2-Trichloroethane	ND	70	22	ND	13	4.1	
108-88-3	Toluene	ND	70	24	ND	19	6.3	
591-78-6	2-Hexanone	ND	70	22	ND	17	5.5	
124-48-1	Dibromochloromethane	ND	70	22	ND	8.2	2.6	
106-93-4	1,2-Dibromoethane	ND	70	22	ND	9.1	2.9	
123-86-4	n-Butyl Acetate	ND	70	22	ND	15	4.7	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-Pre-T/10162015** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504466-003

Test Code: EPA TO-15 Date Collected: 10/16/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/21/15
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.015 Liter(s)
Test Notes:
Container ID: 1SC01314

Initial Pressure (psig): -4.87 Final Pressure (psig): 5.93

Canister Dilution Factor: 2.10

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
111-65-9	n-Octane	ND	70	25	ND	15	5.4	
127-18-4	Tetrachloroethene	**7,600**	70	20	**1,100**	10	2.9	
108-90-7	Chlorobenzene	ND	70	22	ND	15	4.9	
100-41-4	Ethylbenzene	ND	70	22	ND	16	5.2	
179601-23-1	m,p-Xylenes	ND	140	42	ND	32	9.7	
75-25-2	Bromoform	ND	70	21	ND	6.8	2.0	
100-42-5	Styrene	ND	70	21	ND	16	4.9	
95-47-6	o-Xylene	ND	70	21	ND	16	4.8	
111-84-2	n-Nonane	ND	70	21	ND	13	4.0	
79-34-5	1,1,2,2-Tetrachloroethane	ND	70	21	ND	10	3.1	
98-82-8	Cumene	ND	70	21	ND	14	4.3	
80-56-8	alpha-Pinene	ND	70	20	ND	13	3.5	
103-65-1	n-Propylbenzene	ND	70	22	ND	14	4.6	
622-96-8	4-Ethyltoluene	ND	70	22	ND	14	4.6	
108-67-8	1,3,5-Trimethylbenzene	ND	70	22	ND	14	4.6	
95-63-6	1,2,4-Trimethylbenzene	ND	70	21	ND	14	4.3	
100-44-7	Benzyl Chloride	ND	70	15	ND	14	3.0	
541-73-1	1,3-Dichlorobenzene	ND	70	21	ND	12	3.5	
106-46-7	1,4-Dichlorobenzene	ND	70	20	ND	12	3.3	
95-50-1	1,2-Dichlorobenzene	ND	70	21	ND	12	3.5	
5989-27-5	d-Limonene	ND	70	20	ND	13	3.5	
96-12-8	1,2-Dibromo-3-chloropropane	ND	70	14	ND	7.2	1.4	
120-82-1	1,2,4-Trichlorobenzene	ND	70	22	ND	9.4	3.0	
91-20-3	Naphthalene	ND	70	25	ND	13	4.8	
87-68-3	Hexachlorobutadiene	ND	70	20	ND	6.6	1.8	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-Mid-T/10162015** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504466-004

Test Code: EPA TO-15 Date Collected: 10/16/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/21/15
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.015 Liter(s)
Test Notes:
Container ID: 1SC00107

Initial Pressure (psig): -2.96 Final Pressure (psig): 5.50

Canister Dilution Factor: 1.72

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	ND	57	16	ND	33	9.3	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	57	19	ND	12	3.9	
74-87-3	Chloromethane	ND	57	17	ND	28	8.3	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	57	22	ND	8.2	3.1	
75-01-4	Vinyl Chloride	ND	57	19	ND	22	7.6	
106-99-0	1,3-Butadiene	ND	57	25	ND	26	11	
74-83-9	Bromomethane	ND	57	22	ND	15	5.6	
75-00-3	Chloroethane	ND	57	19	ND	22	7.4	
64-17-5	Ethanol	ND	570	92	ND	300	49	
75-05-8	Acetonitrile	ND	57	21	ND	34	12	
107-02-8	Acrolein	ND	230	19	ND	100	8.5	
67-64-1	Acetone	ND	570	88	ND	240	37	
75-69-4	Trichlorofluoromethane	ND	57	19	ND	10	3.5	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	570	48	ND	230	20	
107-13-1	Acrylonitrile	ND	57	19	ND	26	9.0	
75-35-4	1,1-Dichloroethene	ND	57	19	ND	14	4.9	
75-09-2	Methylene Chloride	ND	57	19	ND	17	5.6	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	57	18	ND	18	5.9	
76-13-1	Trichlorotrifluoroethane	ND	57	19	ND	7.5	2.5	
75-15-0	Carbon Disulfide	ND	570	17	ND	180	5.5	
156-60-5	trans-1,2-Dichloroethene	ND	57	22	ND	14	5.5	
75-34-3	1,1-Dichloroethane	ND	57	18	ND	14	4.5	
1634-04-4	Methyl tert-Butyl Ether	ND	57	19	ND	16	5.4	
108-05-4	Vinyl Acetate	ND	570	75	ND	160	21	
78-93-3	2-Butanone (MEK)	ND	570	24	ND	190	8.2	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-Mid-T/10162015** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504466-004

Test Code: EPA TO-15 Date Collected: 10/16/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/21/15
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.015 Liter(s)
Test Notes:
Container ID: 1SC00107

Initial Pressure (psig): -2.96 Final Pressure (psig): 5.50

Canister Dilution Factor: 1.72

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	**120**	57	18	**31**	14	4.6	
141-78-6	Ethyl Acetate	ND	110	40	ND	32	11	
110-54-3	n-Hexane	ND	57	17	ND	16	4.9	
67-66-3	Chloroform	ND	57	19	ND	12	4.0	
109-99-9	Tetrahydrofuran (THF)	ND	57	23	ND	19	7.8	
107-06-2	1,2-Dichloroethane	ND	57	18	ND	14	4.5	
71-55-6	1,1,1-Trichloroethane	**37**	57	19	**6.8**	11	3.6	**J**
71-43-2	Benzene	ND	57	18	ND	18	5.7	
56-23-5	Carbon Tetrachloride	ND	57	17	ND	9.1	2.7	
110-82-7	Cyclohexane	ND	110	33	ND	33	9.7	
78-87-5	1,2-Dichloropropane	ND	57	18	ND	12	4.0	
75-27-4	Bromodichloromethane	ND	57	17	ND	8.6	2.6	
79-01-6	Trichloroethene	**630**	57	16	**120**	11	3.0	
123-91-1	1,4-Dioxane	ND	57	18	ND	16	5.1	
80-62-6	Methyl Methacrylate	ND	110	36	ND	28	8.7	
142-82-5	n-Heptane	ND	57	19	ND	14	4.8	
10061-01-5	cis-1,3-Dichloropropene	ND	57	16	ND	13	3.5	
108-10-1	4-Methyl-2-pentanone	ND	57	18	ND	14	4.5	
10061-02-6	trans-1,3-Dichloropropene	ND	57	18	ND	13	4.0	
79-00-5	1,1,2-Trichloroethane	ND	57	18	ND	11	3.4	
108-88-3	Toluene	ND	57	19	ND	15	5.2	
591-78-6	2-Hexanone	ND	57	18	ND	14	4.5	
124-48-1	Dibromochloromethane	ND	57	18	ND	6.7	2.2	
106-93-4	1,2-Dibromoethane	ND	57	18	ND	7.5	2.4	
123-86-4	n-Butyl Acetate	ND	57	18	ND	12	3.9	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-Mid-T/10162015** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504466-004

Test Code: EPA TO-15 Date Collected: 10/16/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/21/15
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.015 Liter(s)
Test Notes:
Container ID: 1SC00107

Initial Pressure (psig): -2.96 Final Pressure (psig): 5.50

Canister Dilution Factor: 1.72

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
111-65-9	n-Octane	ND	57	21	ND	12	4.4	
127-18-4	Tetrachloroethene	**8,300**	57	16	**1,200**	8.5	2.4	
108-90-7	Chlorobenzene	ND	57	18	ND	12	4.0	
100-41-4	Ethylbenzene	ND	57	18	ND	13	4.2	
179601-23-1	m,p-Xylenes	ND	110	34	ND	26	7.9	
75-25-2	Bromoform	ND	57	17	ND	5.5	1.7	
100-42-5	Styrene	ND	57	17	ND	13	4.0	
95-47-6	o-Xylene	ND	57	17	ND	13	4.0	
111-84-2	n-Nonane	ND	57	17	ND	11	3.3	
79-34-5	1,1,2,2-Tetrachloroethane	ND	57	17	ND	8.4	2.5	
98-82-8	Cumene	ND	57	17	ND	12	3.5	
80-56-8	alpha-Pinene	ND	57	16	ND	10	2.9	
103-65-1	n-Propylbenzene	ND	57	18	ND	12	3.7	
622-96-8	4-Ethyltoluene	ND	57	18	ND	12	3.7	
108-67-8	1,3,5-Trimethylbenzene	ND	57	18	ND	12	3.7	
95-63-6	1,2,4-Trimethylbenzene	ND	57	17	ND	12	3.5	
100-44-7	Benzyl Chloride	ND	57	13	ND	11	2.4	
541-73-1	1,3-Dichlorobenzene	ND	57	17	ND	9.5	2.9	
106-46-7	1,4-Dichlorobenzene	ND	57	16	ND	9.5	2.7	
95-50-1	1,2-Dichlorobenzene	ND	57	17	ND	9.5	2.9	
5989-27-5	d-Limonene	ND	57	16	ND	10	2.9	
96-12-8	1,2-Dibromo-3-chloropropane	ND	57	11	ND	5.9	1.2	
120-82-1	1,2,4-Trichlorobenzene	ND	57	18	ND	7.7	2.5	
91-20-3	Naphthalene	ND	57	21	ND	11	3.9	
87-68-3	Hexachlorobutadiene	ND	57	16	ND	5.4	1.5	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/10162015** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504466-005

Test Code: EPA TO-15 Date Collected: 10/16/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/21/15
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.020 Liter(s)
Test Notes:
Container ID: 1SC00561

Initial Pressure (psig): -3.34 Final Pressure (psig): 6.79

Canister Dilution Factor: 1.89

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	ND	47	13	ND	27	7.7	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	47	16	ND	9.6	3.3	
74-87-3	Chloromethane	ND	47	14	ND	23	6.9	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	47	18	ND	6.8	2.6	
75-01-4	Vinyl Chloride	ND	47	16	ND	18	6.3	
106-99-0	1,3-Butadiene	ND	47	21	ND	21	9.4	
74-83-9	Bromomethane	ND	47	18	ND	12	4.6	
75-00-3	Chloroethane	ND	47	16	ND	18	6.1	
64-17-5	Ethanol	ND	470	76	ND	250	40	
75-05-8	Acetonitrile	ND	47	17	ND	28	10	
107-02-8	Acrolein	ND	190	16	ND	82	7.0	
67-64-1	Acetone	**140**	470	73	**60**	200	31	**J, B**
75-69-4	Trichlorofluoromethane	ND	47	16	ND	8.4	2.9	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	470	40	ND	190	16	
107-13-1	Acrylonitrile	ND	47	16	ND	22	7.4	
75-35-4	1,1-Dichloroethene	ND	47	16	ND	12	4.1	
75-09-2	Methylene Chloride	ND	47	16	ND	14	4.6	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	47	15	ND	15	4.8	
76-13-1	Trichlorotrifluoroethane	ND	47	16	ND	6.2	2.1	
75-15-0	Carbon Disulfide	ND	470	14	ND	150	4.6	
156-60-5	trans-1,2-Dichloroethene	ND	47	18	ND	12	4.5	
75-34-3	1,1-Dichloroethane	ND	47	15	ND	12	3.7	
1634-04-4	Methyl tert-Butyl Ether	ND	47	16	ND	13	4.5	
108-05-4	Vinyl Acetate	ND	470	61	ND	130	17	
78-93-3	2-Butanone (MEK)	ND	470	20	ND	160	6.7	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
B = Analyte detected in both the sample and associated method blank.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/10162015** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504466-005

Test Code: EPA TO-15 Date Collected: 10/16/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/21/15
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.020 Liter(s)
Test Notes:
Container ID: 1SC00561

Initial Pressure (psig): -3.34 Final Pressure (psig): 6.79

Canister Dilution Factor: 1.89

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	**55**	47	15	**14**	12	3.8	
141-78-6	Ethyl Acetate	ND	95	33	ND	26	9.2	
110-54-3	n-Hexane	ND	47	14	ND	13	4.0	
67-66-3	Chloroform	ND	47	16	ND	9.7	3.3	
109-99-9	Tetrahydrofuran (THF)	ND	47	19	ND	16	6.4	
107-06-2	1,2-Dichloroethane	ND	47	15	ND	12	3.7	
71-55-6	1,1,1-Trichloroethane	**41**	47	16	**7.5**	8.7	2.9	**J**
71-43-2	Benzene	ND	47	15	ND	15	4.7	
56-23-5	Carbon Tetrachloride	ND	47	14	ND	7.5	2.3	
110-82-7	Cyclohexane	ND	95	27	ND	27	8.0	
78-87-5	1,2-Dichloropropane	ND	47	15	ND	10	3.3	
75-27-4	Bromodichloromethane	ND	47	14	ND	7.1	2.1	
79-01-6	Trichloroethene	**440**	47	13	**82**	8.8	2.5	
123-91-1	1,4-Dioxane	ND	47	15	ND	13	4.2	
80-62-6	Methyl Methacrylate	ND	95	29	ND	23	7.2	
142-82-5	n-Heptane	ND	47	16	ND	12	3.9	
10061-01-5	cis-1,3-Dichloropropene	ND	47	13	ND	10	2.9	
108-10-1	4-Methyl-2-pentanone	ND	47	15	ND	12	3.7	
10061-02-6	trans-1,3-Dichloropropene	ND	47	15	ND	10	3.3	
79-00-5	1,1,2-Trichloroethane	ND	47	15	ND	8.7	2.8	
108-88-3	Toluene	ND	47	16	ND	13	4.3	
591-78-6	2-Hexanone	ND	47	15	ND	12	3.7	
124-48-1	Dibromochloromethane	ND	47	15	ND	5.5	1.8	
106-93-4	1,2-Dibromoethane	ND	47	15	ND	6.2	2.0	
123-86-4	n-Butyl Acetate	ND	47	15	ND	9.9	3.2	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/10162015** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504466-005

Test Code: EPA TO-15 Date Collected: 10/16/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/21/15
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.020 Liter(s)
Test Notes:
Container ID: 1SC00561

Initial Pressure (psig): -3.34 Final Pressure (psig): 6.79

Canister Dilution Factor: 1.89

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
111-65-9	n-Octane	ND	47	17	ND	10	3.6	
127-18-4	Tetrachloroethene	**9,300**	47	13	**1,400**	7.0	2.0	
108-90-7	Chlorobenzene	ND	47	15	ND	10	3.3	
100-41-4	Ethylbenzene	ND	47	15	ND	11	3.5	
179601-23-1	m,p-Xylenes	ND	95	28	ND	22	6.5	
75-25-2	Bromoform	ND	47	14	ND	4.6	1.4	
100-42-5	Styrene	ND	47	14	ND	11	3.3	
95-47-6	o-Xylene	ND	47	14	ND	11	3.3	
111-84-2	n-Nonane	ND	47	14	ND	9.0	2.7	
79-34-5	1,1,2,2-Tetrachloroethane	ND	47	14	ND	6.9	2.1	
98-82-8	Cumene	**32**	47	14	**6.6**	9.6	2.9	**J**
80-56-8	alpha-Pinene	ND	47	13	ND	8.5	2.4	
103-65-1	n-Propylbenzene	ND	47	15	ND	9.6	3.1	
622-96-8	4-Ethyltoluene	ND	47	15	ND	9.6	3.1	
108-67-8	1,3,5-Trimethylbenzene	ND	47	15	ND	9.6	3.1	
95-63-6	1,2,4-Trimethylbenzene	ND	47	14	ND	9.6	2.9	
100-44-7	Benzyl Chloride	ND	47	10	ND	9.1	2.0	
541-73-1	1,3-Dichlorobenzene	ND	47	14	ND	7.9	2.4	
106-46-7	1,4-Dichlorobenzene	ND	47	13	ND	7.9	2.2	
95-50-1	1,2-Dichlorobenzene	ND	47	14	ND	7.9	2.4	
5989-27-5	d-Limonene	**27**	47	13	**4.9**	8.5	2.4	**J**
96-12-8	1,2-Dibromo-3-chloropropane	ND	47	9.4	ND	4.9	0.97	
120-82-1	1,2,4-Trichlorobenzene	ND	47	15	ND	6.4	2.0	
91-20-3	Naphthalene	ND	47	17	ND	9.0	3.2	
87-68-3	Hexachlorobutadiene	ND	47	13	ND	4.4	1.2	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151022-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 10/22/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	ND	0.50	0.14	ND	0.29	0.081	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.50	0.17	ND	0.10	0.034	
74-87-3	Chloromethane	ND	0.50	0.15	ND	0.24	0.073	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.50	0.19	ND	0.072	0.027	
75-01-4	Vinyl Chloride	ND	0.50	0.17	ND	0.20	0.067	
106-99-0	1,3-Butadiene	ND	0.50	0.22	ND	0.23	0.099	
74-83-9	Bromomethane	ND	0.50	0.19	ND	0.13	0.049	
75-00-3	Chloroethane	ND	0.50	0.17	ND	0.19	0.064	
64-17-5	Ethanol	ND	5.0	0.80	ND	2.7	0.42	
75-05-8	Acetonitrile	ND	0.50	0.18	ND	0.30	0.11	
107-02-8	Acrolein	ND	2.0	0.17	ND	0.87	0.074	
67-64-1	Acetone	**0.78**	5.0	0.77	**0.33**	2.1	0.32	**J**
75-69-4	Trichlorofluoromethane	ND	0.50	0.17	ND	0.089	0.030	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	5.0	0.42	ND	2.0	0.17	
107-13-1	Acrylonitrile	ND	0.50	0.17	ND	0.23	0.078	
75-35-4	1,1-Dichloroethene	ND	0.50	0.17	ND	0.13	0.043	
75-09-2	Methylene Chloride	**0.24**	0.50	0.17	**0.069**	0.14	0.049	**J**
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.50	0.16	ND	0.16	0.051	
76-13-1	Trichlorotrifluoroethane	ND	0.50	0.17	ND	0.065	0.022	
75-15-0	Carbon Disulfide	ND	5.0	0.15	ND	1.6	0.048	
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
75-34-3	1,1-Dichloroethane	ND	0.50	0.16	ND	0.12	0.040	
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	0.17	ND	0.14	0.047	
108-05-4	Vinyl Acetate	ND	5.0	0.65	ND	1.4	0.18	
78-93-3	2-Butanone (MEK)	ND	5.0	0.21	ND	1.7	0.071	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151022-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 10/22/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.50	0.16	ND	0.13	0.040	
141-78-6	Ethyl Acetate	ND	1.0	0.35	ND	0.28	0.097	
110-54-3	n-Hexane	ND	0.50	0.15	ND	0.14	0.043	
67-66-3	Chloroform	ND	0.50	0.17	ND	0.10	0.035	
109-99-9	Tetrahydrofuran (THF)	ND	0.50	0.20	ND	0.17	0.068	
107-06-2	1,2-Dichloroethane	ND	0.50	0.16	ND	0.12	0.040	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.17	ND	0.092	0.031	
71-43-2	Benzene	ND	0.50	0.16	ND	0.16	0.050	
56-23-5	Carbon Tetrachloride	ND	0.50	0.15	ND	0.080	0.024	
110-82-7	Cyclohexane	ND	1.0	0.29	ND	0.29	0.084	
78-87-5	1,2-Dichloropropane	ND	0.50	0.16	ND	0.11	0.035	
75-27-4	Bromodichloromethane	ND	0.50	0.15	ND	0.075	0.022	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
123-91-1	1,4-Dioxane	ND	0.50	0.16	ND	0.14	0.044	
80-62-6	Methyl Methacrylate	ND	1.0	0.31	ND	0.24	0.076	
142-82-5	n-Heptane	ND	0.50	0.17	ND	0.12	0.041	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.14	ND	0.11	0.031	
108-10-1	4-Methyl-2-pentanone	ND	0.50	0.16	ND	0.12	0.039	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.16	ND	0.11	0.035	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.16	ND	0.092	0.029	
108-88-3	Toluene	ND	0.50	0.17	ND	0.13	0.045	
591-78-6	2-Hexanone	ND	0.50	0.16	ND	0.12	0.039	
124-48-1	Dibromochloromethane	ND	0.50	0.16	ND	0.059	0.019	
106-93-4	1,2-Dibromoethane	ND	0.50	0.16	ND	0.065	0.021	
123-86-4	n-Butyl Acetate	ND	0.50	0.16	ND	0.11	0.034	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151022-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 10/22/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.50	0.18	ND	0.11	0.039	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
108-90-7	Chlorobenzene	ND	0.50	0.16	ND	0.11	0.035	
100-41-4	Ethylbenzene	ND	0.50	0.16	ND	0.12	0.037	
179601-23-1	m,p-Xylenes	ND	1.0	0.30	ND	0.23	0.069	
75-25-2	Bromoform	ND	0.50	0.15	ND	0.048	0.015	
100-42-5	Styrene	ND	0.50	0.15	ND	0.12	0.035	
95-47-6	o-Xylene	ND	0.50	0.15	ND	0.12	0.035	
111-84-2	n-Nonane	ND	0.50	0.15	ND	0.095	0.029	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.15	ND	0.073	0.022	
98-82-8	Cumene	ND	0.50	0.15	ND	0.10	0.031	
80-56-8	alpha-Pinene	ND	0.50	0.14	ND	0.090	0.025	
103-65-1	n-Propylbenzene	ND	0.50	0.16	ND	0.10	0.033	
622-96-8	4-Ethyltoluene	ND	0.50	0.16	ND	0.10	0.033	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	0.16	ND	0.10	0.033	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	
100-44-7	Benzyl Chloride	ND	0.50	0.11	ND	0.097	0.021	
541-73-1	1,3-Dichlorobenzene	ND	0.50	0.15	ND	0.083	0.025	
106-46-7	1,4-Dichlorobenzene	ND	0.50	0.14	ND	0.083	0.023	
95-50-1	1,2-Dichlorobenzene	ND	0.50	0.15	ND	0.083	0.025	
5989-27-5	d-Limonene	ND	0.50	0.14	ND	0.090	0.025	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.50	0.099	ND	0.052	0.010	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	0.16	ND	0.067	0.022	
91-20-3	Naphthalene	ND	0.50	0.18	ND	0.095	0.034	
87-68-3	Hexachlorobutadiene	ND	0.50	0.14	ND	0.047	0.013	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151023-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
115-07-1	Propene	ND	0.50	0.14	ND	0.29	0.081	
75-71-8	Dichlorodifluoromethane (CFC 12)	ND	0.50	0.17	ND	0.10	0.034	
74-87-3	Chloromethane	ND	0.50	0.15	ND	0.24	0.073	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	ND	0.50	0.19	ND	0.072	0.027	
75-01-4	Vinyl Chloride	ND	0.50	0.17	ND	0.20	0.067	
106-99-0	1,3-Butadiene	ND	0.50	0.22	ND	0.23	0.099	
74-83-9	Bromomethane	ND	0.50	0.19	ND	0.13	0.049	
75-00-3	Chloroethane	ND	0.50	0.17	ND	0.19	0.064	
64-17-5	Ethanol	ND	5.0	0.80	ND	2.7	0.42	
75-05-8	Acetonitrile	ND	0.50	0.18	ND	0.30	0.11	
107-02-8	Acrolein	ND	2.0	0.17	ND	0.87	0.074	
67-64-1	Acetone	ND	5.0	0.77	ND	2.1	0.32	
75-69-4	Trichlorofluoromethane	ND	0.50	0.17	ND	0.089	0.030	
67-63-0	2-Propanol (Isopropyl Alcohol)	ND	5.0	0.42	ND	2.0	0.17	
107-13-1	Acrylonitrile	ND	0.50	0.17	ND	0.23	0.078	
75-35-4	1,1-Dichloroethene	ND	0.50	0.17	ND	0.13	0.043	
75-09-2	Methylene Chloride	ND	0.50	0.17	ND	0.14	0.049	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	ND	0.50	0.16	ND	0.16	0.051	
76-13-1	Trichlorotrifluoroethane	ND	0.50	0.17	ND	0.065	0.022	
75-15-0	Carbon Disulfide	ND	5.0	0.15	ND	1.6	0.048	
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
75-34-3	1,1-Dichloroethane	ND	0.50	0.16	ND	0.12	0.040	
1634-04-4	Methyl tert-Butyl Ether	ND	0.50	0.17	ND	0.14	0.047	
108-05-4	Vinyl Acetate	ND	5.0	0.65	ND	1.4	0.18	
78-93-3	2-Butanone (MEK)	ND	5.0	0.21	ND	1.7	0.071	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151023-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	ND	0.50	0.16	ND	0.13	0.040	
141-78-6	Ethyl Acetate	ND	1.0	0.35	ND	0.28	0.097	
110-54-3	n-Hexane	ND	0.50	0.15	ND	0.14	0.043	
67-66-3	Chloroform	ND	0.50	0.17	ND	0.10	0.035	
109-99-9	Tetrahydrofuran (THF)	ND	0.50	0.20	ND	0.17	0.068	
107-06-2	1,2-Dichloroethane	ND	0.50	0.16	ND	0.12	0.040	
71-55-6	1,1,1-Trichloroethane	ND	0.50	0.17	ND	0.092	0.031	
71-43-2	Benzene	ND	0.50	0.16	ND	0.16	0.050	
56-23-5	Carbon Tetrachloride	ND	0.50	0.15	ND	0.080	0.024	
110-82-7	Cyclohexane	ND	1.0	0.29	ND	0.29	0.084	
78-87-5	1,2-Dichloropropane	ND	0.50	0.16	ND	0.11	0.035	
75-27-4	Bromodichloromethane	ND	0.50	0.15	ND	0.075	0.022	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
123-91-1	1,4-Dioxane	ND	0.50	0.16	ND	0.14	0.044	
80-62-6	Methyl Methacrylate	ND	1.0	0.31	ND	0.24	0.076	
142-82-5	n-Heptane	ND	0.50	0.17	ND	0.12	0.041	
10061-01-5	cis-1,3-Dichloropropene	ND	0.50	0.14	ND	0.11	0.031	
108-10-1	4-Methyl-2-pentanone	ND	0.50	0.16	ND	0.12	0.039	
10061-02-6	trans-1,3-Dichloropropene	ND	0.50	0.16	ND	0.11	0.035	
79-00-5	1,1,2-Trichloroethane	ND	0.50	0.16	ND	0.092	0.029	
108-88-3	Toluene	ND	0.50	0.17	ND	0.13	0.045	
591-78-6	2-Hexanone	ND	0.50	0.16	ND	0.12	0.039	
124-48-1	Dibromochloromethane	ND	0.50	0.16	ND	0.059	0.019	
106-93-4	1,2-Dibromoethane	ND	0.50	0.16	ND	0.065	0.021	
123-86-4	n-Butyl Acetate	ND	0.50	0.16	ND	0.11	0.034	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151023-MB

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
111-65-9	n-Octane	ND	0.50	0.18	ND	0.11	0.039	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
108-90-7	Chlorobenzene	ND	0.50	0.16	ND	0.11	0.035	
100-41-4	Ethylbenzene	ND	0.50	0.16	ND	0.12	0.037	
179601-23-1	m,p-Xylenes	ND	1.0	0.30	ND	0.23	0.069	
75-25-2	Bromoform	ND	0.50	0.15	ND	0.048	0.015	
100-42-5	Styrene	ND	0.50	0.15	ND	0.12	0.035	
95-47-6	o-Xylene	ND	0.50	0.15	ND	0.12	0.035	
111-84-2	n-Nonane	ND	0.50	0.15	ND	0.095	0.029	
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.50	0.15	ND	0.073	0.022	
98-82-8	Cumene	ND	0.50	0.15	ND	0.10	0.031	
80-56-8	alpha-Pinene	ND	0.50	0.14	ND	0.090	0.025	
103-65-1	n-Propylbenzene	ND	0.50	0.16	ND	0.10	0.033	
622-96-8	4-Ethyltoluene	ND	0.50	0.16	ND	0.10	0.033	
108-67-8	1,3,5-Trimethylbenzene	ND	0.50	0.16	ND	0.10	0.033	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	
100-44-7	Benzyl Chloride	ND	0.50	0.11	ND	0.097	0.021	
541-73-1	1,3-Dichlorobenzene	ND	0.50	0.15	ND	0.083	0.025	
106-46-7	1,4-Dichlorobenzene	ND	0.50	0.14	ND	0.083	0.023	
95-50-1	1,2-Dichlorobenzene	ND	0.50	0.15	ND	0.083	0.025	
5989-27-5	d-Limonene	ND	0.50	0.14	ND	0.090	0.025	
96-12-8	1,2-Dibromo-3-chloropropane	ND	0.50	0.099	ND	0.052	0.010	
120-82-1	1,2,4-Trichlorobenzene	ND	0.50	0.16	ND	0.067	0.022	
91-20-3	Naphthalene	ND	0.50	0.18	ND	0.095	0.034	
87-68-3	Hexachlorobutadiene	ND	0.50	0.14	ND	0.047	0.013	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **BNSF Mission Wye / 60334021** ALS Project ID: P1504466

Test Code: EPA TO-15 / EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date(s) Collected: 10/16/15
Analyst: Evelyn Alvarez Date(s) Received: 10/21/15
Sample Type: 1.0 L Summa Canister(s) Date(s) Analyzed: 10/22 - 10/23/15
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P151022-MB	**112**	**99**	**87**	70-130	
Method Blank	P151023-MB	**112**	**98**	**88**	70-130	
Lab Control Sample	P151022-LCS	**103**	**98**	**100**	70-130	
Lab Control Sample	P151023-LCS	**107**	**97**	**96**	70-130	
SVE-CEV/10162015	P1504466-001	**107**	**97**	**89**	70-130	
SVE-CEV/10162015	P1504466-001DUP	**113**	**97**	**86**	70-130	
SVE-DUP/10162015	P1504466-002	**116**	**97**	**85**	70-130	
SVE-Pre-T/10162015	P1504466-003	**111**	**97**	**88**	70-130	
SVE-Mid-T/10162015	P1504466-004	**115**	**97**	**86**	70-130	
SVE-EV/10162015	P1504466-005	**120**	**96**	**84**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151022-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 10/22/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
115-07-1	Propene	196	**162**	**83**	49-131	
75-71-8	Dichlorodifluoromethane (CFC 12)	188	**172**	**91**	65-117	
74-87-3	Chloromethane	200	**198**	**99**	48-132	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	204	**181**	**89**	65-122	
75-01-4	Vinyl Chloride	200	**191**	**96**	65-128	
106-99-0	1,3-Butadiene	206	**225**	**109**	62-143	
74-83-9	Bromomethane	202	**191**	**95**	65-130	
75-00-3	Chloroethane	200	**185**	**93**	69-126	
64-17-5	Ethanol	998	**1110**	**111**	57-126	
75-05-8	Acetonitrile	212	**185**	**87**	51-134	
107-02-8	Acrolein	214	**211**	**99**	55-146	
67-64-1	Acetone	1,080	**1020**	**94**	57-120	
75-69-4	Trichlorofluoromethane	216	**180**	**83**	59-139	
67-63-0	2-Propanol (Isopropyl Alcohol)	418	**482**	**115**	59-129	
107-13-1	Acrylonitrile	212	**218**	**103**	64-136	
75-35-4	1,1-Dichloroethene	216	**208**	**96**	72-123	
75-09-2	Methylene Chloride	222	**194**	**87**	63-117	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	218	**215**	**99**	50-141	
76-13-1	Trichlorotrifluoroethane	220	**204**	**93**	68-118	
75-15-0	Carbon Disulfide	210	**152**	**72**	55-143	
156-60-5	trans-1,2-Dichloroethene	210	**207**	**99**	69-129	
75-34-3	1,1-Dichloroethane	212	**198**	**93**	66-122	
1634-04-4	Methyl tert-Butyl Ether	216	**212**	**98**	55-128	
108-05-4	Vinyl Acetate	1,040	**1170**	**113**	66-140	
78-93-3	2-Butanone (MEK)	220	**220**	**100**	62-127	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151022-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 10/22/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	218	**214**	**98**	65-125	
141-78-6	Ethyl Acetate	428	**465**	**109**	64-132	
110-54-3	n-Hexane	212	**204**	**96**	58-126	
67-66-3	Chloroform	224	**208**	**93**	68-117	
109-99-9	Tetrahydrofuran (THF)	220	**218**	**99**	64-123	
107-06-2	1,2-Dichloroethane	214	**211**	**99**	63-124	
71-55-6	1,1,1-Trichloroethane	210	**197**	**94**	68-120	
71-43-2	Benzene	226	**220**	**97**	61-110	
56-23-5	Carbon Tetrachloride	230	**211**	**92**	65-137	
110-82-7	Cyclohexane	424	**422**	**100**	68-122	
78-87-5	1,2-Dichloropropane	216	**208**	**96**	67-122	
75-27-4	Bromodichloromethane	218	**218**	**100**	71-124	
79-01-6	Trichloroethene	216	**204**	**94**	71-121	
123-91-1	1,4-Dioxane	210	**248**	**118**	67-122	
80-62-6	Methyl Methacrylate	422	**435**	**103**	76-130	
142-82-5	n-Heptane	216	**211**	**98**	67-125	
10061-01-5	cis-1,3-Dichloropropene	208	**223**	**107**	73-131	
108-10-1	4-Methyl-2-pentanone	220	**222**	**101**	66-132	
10061-02-6	trans-1,3-Dichloropropene	210	**232**	**110**	76-135	
79-00-5	1,1,2-Trichloroethane	216	**216**	**100**	73-121	
108-88-3	Toluene	218	**205**	**94**	67-117	
591-78-6	2-Hexanone	220	**252**	**115**	59-128	
124-48-1	Dibromochloromethane	220	**228**	**104**	73-132	
106-93-4	1,2-Dibromoethane	218	**222**	**102**	73-128	
123-86-4	n-Butyl Acetate	226	**249**	**110**	61-136	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151022-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 10/22/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
111-65-9	n-Octane	210	**210**	**100**	67-124	
127-18-4	Tetrachloroethene	202	**192**	**95**	65-126	
108-90-7	Chlorobenzene	220	**210**	**95**	68-120	
100-41-4	Ethylbenzene	218	**219**	**100**	69-123	
179601-23-1	m,p-Xylenes	428	**445**	**104**	67-125	
75-25-2	Bromoform	228	**204**	**89**	68-153	
100-42-5	Styrene	222	**225**	**101**	68-132	
95-47-6	o-Xylene	210	**220**	**105**	67-124	
111-84-2	n-Nonane	204	**217**	**106**	60-130	
79-34-5	1,1,2,2-Tetrachloroethane	210	**226**	**108**	72-128	
98-82-8	Cumene	208	**210**	**101**	67-124	
80-56-8	alpha-Pinene	212	**223**	**105**	67-129	
103-65-1	n-Propylbenzene	204	**213**	**104**	67-125	
622-96-8	4-Ethyltoluene	214	**227**	**106**	66-128	
108-67-8	1,3,5-Trimethylbenzene	214	**228**	**107**	65-125	
95-63-6	1,2,4-Trimethylbenzene	218	**243**	**111**	62-134	
100-44-7	Benzyl Chloride	220	**249**	**113**	74-145	
541-73-1	1,3-Dichlorobenzene	228	**241**	**106**	63-133	
106-46-7	1,4-Dichlorobenzene	208	**211**	**101**	62-129	
95-50-1	1,2-Dichlorobenzene	220	**245**	**111**	62-134	
5989-27-5	d-Limonene	210	**231**	**110**	66-137	
96-12-8	1,2-Dibromo-3-chloropropane	218	**221**	**101**	71-147	
120-82-1	1,2,4-Trichlorobenzene	230	**221**	**96**	60-145	
91-20-3	Naphthalene	218	**232**	**106**	56-158	
87-68-3	Hexachlorobutadiene	230	**210**	**91**	56-139	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151023-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
115-07-1	Propene	196	**197**	**101**	49-131	
75-71-8	Dichlorodifluoromethane (CFC 12)	188	**189**	**101**	65-117	
74-87-3	Chloromethane	200	**228**	**114**	48-132	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane (CFC 114)	204	**195**	**96**	65-122	
75-01-4	Vinyl Chloride	200	**220**	**110**	65-128	
106-99-0	1,3-Butadiene	206	**257**	**125**	62-143	
74-83-9	Bromomethane	202	**205**	**101**	65-130	
75-00-3	Chloroethane	200	**202**	**101**	69-126	
64-17-5	Ethanol	998	**1270**	**127**	57-126	**L**
75-05-8	Acetonitrile	212	**213**	**100**	51-134	
107-02-8	Acrolein	214	**234**	**109**	55-146	
67-64-1	Acetone	1,080	**1170**	**108**	57-120	
75-69-4	Trichlorofluoromethane	216	**193**	**89**	59-139	
67-63-0	2-Propanol (Isopropyl Alcohol)	418	**524**	**125**	59-129	
107-13-1	Acrylonitrile	212	**247**	**117**	64-136	
75-35-4	1,1-Dichloroethene	216	**222**	**103**	72-123	
75-09-2	Methylene Chloride	222	**210**	**95**	63-117	
107-05-1	3-Chloro-1-propene (Allyl Chloride)	218	**244**	**112**	50-141	
76-13-1	Trichlorotrifluoroethane	220	**213**	**97**	68-118	
75-15-0	Carbon Disulfide	210	**167**	**80**	55-143	
156-60-5	trans-1,2-Dichloroethene	210	**230**	**110**	69-129	
75-34-3	1,1-Dichloroethane	212	**220**	**104**	66-122	
1634-04-4	Methyl tert-Butyl Ether	216	**233**	**108**	55-128	
108-05-4	Vinyl Acetate	1,040	**1320**	**127**	66-140	
78-93-3	2-Butanone (MEK)	220	**242**	**110**	62-127	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.
L = Laboratory control sample recovery outside the specified limits, results may be biased high.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151023-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-59-2	cis-1,2-Dichloroethene	218	**240**	**110**	65-125	
141-78-6	Ethyl Acetate	428	**540**	**126**	64-132	
110-54-3	n-Hexane	212	**234**	**110**	58-126	
67-66-3	Chloroform	224	**229**	**102**	68-117	
109-99-9	Tetrahydrofuran (THF)	220	**241**	**110**	64-123	
107-06-2	1,2-Dichloroethane	214	**234**	**109**	63-124	
71-55-6	1,1,1-Trichloroethane	210	**213**	**101**	68-120	
71-43-2	Benzene	226	**245**	**108**	61-110	
56-23-5	Carbon Tetrachloride	230	**227**	**99**	65-137	
110-82-7	Cyclohexane	424	**470**	**111**	68-122	
78-87-5	1,2-Dichloropropane	216	**232**	**107**	67-122	
75-27-4	Bromodichloromethane	218	**238**	**109**	71-124	
79-01-6	Trichloroethene	216	**216**	**100**	71-121	
123-91-1	1,4-Dioxane	210	**269**	**128**	67-122	**L**
80-62-6	Methyl Methacrylate	422	**468**	**111**	76-130	
142-82-5	n-Heptane	216	**237**	**110**	67-125	
10061-01-5	cis-1,3-Dichloropropene	208	**244**	**117**	73-131	
108-10-1	4-Methyl-2-pentanone	220	**250**	**114**	66-132	
10061-02-6	trans-1,3-Dichloropropene	210	**254**	**121**	76-135	
79-00-5	1,1,2-Trichloroethane	216	**233**	**108**	73-121	
108-88-3	Toluene	218	**220**	**101**	67-117	
591-78-6	2-Hexanone	220	**285**	**130**	59-128	**L**
124-48-1	Dibromochloromethane	220	**237**	**108**	73-132	
106-93-4	1,2-Dibromoethane	218	**233**	**107**	73-128	
123-86-4	n-Butyl Acetate	226	**281**	**124**	61-136	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.
L = Laboratory control sample recovery outside the specified limits, results may be biased high.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P151023-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
111-65-9	n-Octane	210	**233**	**111**	67-124	
127-18-4	Tetrachloroethene	202	**196**	**97**	65-126	
108-90-7	Chlorobenzene	220	**221**	**100**	68-120	
100-41-4	Ethylbenzene	218	**236**	**108**	69-123	
179601-23-1	m,p-Xylenes	428	**484**	**113**	67-125	
75-25-2	Bromoform	228	**211**	**93**	68-153	
100-42-5	Styrene	222	**240**	**108**	68-132	
95-47-6	o-Xylene	210	**239**	**114**	67-124	
111-84-2	n-Nonane	204	**247**	**121**	60-130	
79-34-5	1,1,2,2-Tetrachloroethane	210	**248**	**118**	72-128	
98-82-8	Cumene	208	**227**	**109**	67-124	
80-56-8	alpha-Pinene	212	**241**	**114**	67-129	
103-65-1	n-Propylbenzene	204	**233**	**114**	67-125	
622-96-8	4-Ethyltoluene	214	**248**	**116**	66-128	
108-67-8	1,3,5-Trimethylbenzene	214	**247**	**115**	65-125	
95-63-6	1,2,4-Trimethylbenzene	218	**269**	**123**	62-134	
100-44-7	Benzyl Chloride	220	**276**	**125**	74-145	
541-73-1	1,3-Dichlorobenzene	228	**258**	**113**	63-133	
106-46-7	1,4-Dichlorobenzene	208	**226**	**109**	62-129	
95-50-1	1,2-Dichlorobenzene	220	**264**	**120**	62-134	
5989-27-5	d-Limonene	210	**261**	**124**	66-137	
96-12-8	1,2-Dibromo-3-chloropropane	218	**234**	**107**	71-147	
120-82-1	1,2,4-Trichlorobenzene	230	**235**	**102**	60-145	
91-20-3	Naphthalene	218	**255**	**117**	56-158	
87-68-3	Hexachlorobutadiene	230	**222**	**97**	56-139	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/10162015** ALS Project ID: P1504466
Client Project ID: **BNSF Mission Wye / 60334021** ALS Sample ID: P1504466-001DUP

Test Code: EPA TO-15 Modified Date Collected: 10/16/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 10/21/15
Analyst: Evelyn Alvarez Date Analyzed: 10/23/15
Sample Type: 1.0 L Summa Canister Volume(s) Analyzed: 0.036 Liter(s)
Test Notes:
Container ID: 1SC00951

Initial Pressure (psig): -2.49 Final Pressure (psig): 9.98

Canister Dilution Factor: 2.02

Compound	Sample Result µg/m³	Sample Result ppbV	**Duplicate Sample Result µg/m³**	**Duplicate Sample Result** ppbV	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
trans-1,2-Dichloroethene	ND	ND	ND	ND	-	-	25	
Trichloroethene	485	90.3	477	88.8	481	**2**	25	
Tetrachloroethene	2,620	387	2,680	396	2650	**2**	25	
1,2,4-Trimethylbenzene	ND	ND	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

Response Factor Report MS13

Method Path : I:\MS13\METHODS\
Method File : R13093015.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Thu Oct 01 10:08:37 2015
Response Via : Initial Calibration

EA 10/1/15

Calibration Files
0.08=09301512.D 0.10=09301513.D 0.20=09301514.D 0.40=09301515.D 1.0 =09301516.D 5.0 =09301517.D 25 =09301518.D
50 =09301519.D 100 =09301520.D

		Compound	0.08	0.10	0.20	0.40	1.0	5.0	25	50	100	Avg	%RSD
1)	IR	Bromochloromethane...	----------ISTD----------										
2)	T	Propene	2.218	2.474	2.167	2.507	2.311	2.711	2.608	2.576	2.312	2.432	7.72
3)	T	Dichlorodifluo...	3.742	4.367	3.906	4.136	4.094	3.912	3.958	3.724	3.094	3.881	9.19
4)	T	Chloromethane	3.414	4.058	3.534	3.456	3.757	3.367	3.339	2.989	1.940	3.317	17.92
5)	T	1,2-Dichloro-1...	1.739	1.979	1.855	1.945	1.838	1.745	1.783	1.725	1.527	1.793	7.49
6)	T	Vinyl Chloride	3.003	3.503	3.064	3.263	3.338	3.212	3.223	2.956	2.455	3.113	9.63
7)	T	1,3-Butadiene	1.836	2.133	2.048	2.074	2.312	2.174	2.464	2.269	1.779	2.121	10.34
8)	T	Bromomethane	1.662	1.878	1.685	1.679	1.776	1.629	1.738	1.652	1.348	1.672	8.59
9)	T	Chloroethane	1.438	1.593	1.588	1.618	1.646	1.563	1.602	1.543	1.353	1.549	6.10
10)	T	Ethanol	1.627	1.235	1.167	1.207	1.786	1.726	1.690	1.504	1.173	1.457	17.87
11)	T	Acetonitrile	4.788	4.818	4.236	4.211	4.744	4.614	4.549	4.251	3.652	4.429	8.55
12)	T	Acrolein	0.947	0.813	0.998	1.110	1.268	1.291	1.380	1.322	1.167	1.144	16.80
13)	T	Acetone	1.690	1.593	1.467	1.521	1.558	1.524	1.496	1.276	0.886	1.446	16.42
14)	T	Trichlorofluor...	2.753	3.379	3.021	3.167	3.128	2.989	3.046	2.953	2.583	3.002	7.70
15)	T	2-Propanol (Is...	4.491	4.585	4.559	4.524	5.479	4.686	5.113	4.295	2.913	4.516	15.54
16)	T	Acrylonitrile		1.748	2.125	2.427	2.822	2.892	3.014	2.862	2.456	2.543	17.28
17)	T	1,1-Dichloroet...	1.314	1.711	1.405	1.566	1.578	1.531	1.643	1.621	1.460	1.536	8.11
18)	T	2-Methyl-2-Pro...	4.108	4.540	4.251	4.338	4.849	4.438	4.647	3.926	2.162	4.140	19.14
19)	T	Methylene Chlo...				2.202	1.971	1.716	1.778	1.727	1.507	1.817	13.21
20)	T	3-Chloro-1-pro...	2.457	2.940	2.896	3.120	3.145	3.155	3.342	3.136	2.659	2.983	9.32
21)	T	Trichlorotrifl...	0.969	1.374	1.234	1.265	1.298	1.213	1.318	1.330	1.245	1.250	9.36
22)	T	Carbon Disulfide	1.077	1.021	0.799	0.808	0.772	0.721	0.746	0.709	0.599	0.806	E1 18.82
23)	T	trans-1,2-Dich...	2.392	2.655	2.596	2.806	2.833	2.825	2.980	2.828	2.404	2.702	7.57
24)	T	1,1-Dichloroet...	3.159	3.732	3.452	3.604	3.616	3.495	3.610	3.417	2.905	3.443	7.55
25)	T	Methyl tert-Bu...	4.431	5.170	4.746	5.082	5.290	5.222	5.587	5.325	4.308	5.018	8.58
26)	T	Vinyl Acetate		0.311	0.299	0.355	0.394	0.416	0.459	0.403	0.286	0.365	17.10
27)	T	2-Butanone (MEK)				0.957	1.183	1.215	1.301	1.253	1.080	1.165	10.83
28)	T	cis-1,2-Dichlo...	2.326	2.679	2.407	2.626	2.627	2.616	2.765	2.605	2.196	2.538	7.33
29)	T	Diisopropyl Ether	1.296	1.557	1.445	1.642	1.652	1.646	1.751	1.551	1.111	1.517	13.32
30)	T	Ethyl Acetate			0.573	0.651	0.743	0.753	0.771	0.632	0.410	0.648	19.72
31)	T	n-Hexane	3.045	3.490	3.192	3.415	3.445	3.392	3.351	2.843	2.014	3.132	15.00
32)	T	Chloroform	2.823	3.191	2.894	2.954	3.010	2.861	2.986	2.830	2.372	2.880	7.71
33)	S	1,2-Dichloroet...	2.062	2.093	2.107	2.090	2.092	2.073	2.018	1.928	1.820	2.032	4.76
34)	T	Tetrahydrofura...	1.071	1.061	1.051	1.102	1.174	1.171	1.275	1.229	1.068	1.133	7.21
35)	T	Ethyl tert-But...	1.446	1.816	1.735	1.896	1.950	1.950	2.135	2.067	1.753	1.861	11.02
36)	T	1,2-Dichloroet...	2.151	2.480	2.278	2.436	2.444	2.361	2.437	2.276	1.910	2.308	7.94
37)	IR	1,4-Difluorobenzen...	----------ISTD----------										
38)	T	1,1,1-Trichlor...	0.421	0.487	0.450	0.476	0.468	0.446	0.471	0.458	0.399	0.453	6.17
39)	T	Isopropyl Acetate	0.173	0.197	0.188	0.206	0.225	0.229	0.233	0.199	0.139	0.199	15.09
40)	T	1-Butanol				0.214	0.322	0.357	0.378	0.317	0.213	0.300	23.66
41)	T	Benzene	1.200	1.351	1.227	1.240	1.268	1.226	1.261	1.120	0.737	1.181	15.01
42)	T	Carbon Tetrach...	0.329	0.380	0.350	0.369	0.372	0.364	0.393	0.388	0.343	0.365	5.79

Method Path : I:\MS13\METHODS\
Method File : R13093015.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

43)	T	Cyclohexane	0.433	0.483	0.459	0.476	0.492	0.485	0.514	0.468	0.339	0.461	11.05
44)	T	tert-Amyl Meth...	0.857	0.929	0.881	0.909	0.936	0.943	1.009	0.960	0.786	0.912	7.08
45)	T	1,2-Dichloropr...	0.302	0.357	0.349	0.365	0.373	0.362	0.377	0.357	0.299	0.349	8.23
46)	T	Bromodichlorom...	0.347	0.426	0.388	0.411	0.428	0.419	0.448	0.431	0.367	0.407	8.12
47)	T	Trichloroethene	0.264	0.305	0.295	0.299	0.304	0.298	0.327	0.326	0.282	0.300	6.49
48)	T	1,4-Dioxane	0.176	0.195	0.169	0.203	0.241	0.249	0.273	0.266	0.222	0.222	17.32
49)	T	2,2,4-Trimethy...	1.401	1.605	1.491	1.572	1.600	1.588	1.633	1.486	1.125	1.500	10.61
50)	T	Methyl Methacr...				0.096	0.108	0.117	0.132	0.128	0.104	0.114	12.37
51)	T	n-Heptane	0.277	0.337	0.311	0.331	0.334	0.339	0.353	0.334	0.267	0.320	9.20
52)	T	cis-1,3-Dichlo...	0.373	0.442	0.421	0.462	0.508	0.519	0.563	0.539	0.450	0.475	12.86
53)	T	4-Methyl-2-pen...				0.272	0.323	0.340	0.361	0.334	0.267	0.316	12.06
54)	T	trans-1,3-Dich...	0.306	0.360	0.362	0.394	0.444	0.468	0.512	0.491	0.418	0.417	16.25
55)	T	1,1,2-Trichlor...	0.239	0.283	0.266	0.271	0.291	0.289	0.313	0.305	0.264	0.280	8.14
56)	IR	Chlorobenzene-d5 (... ----------ISTD----------											
57)	S	Toluene-d8 (SS2)	2.180	2.170	2.167	2.162	2.165	2.155	2.152	2.190	2.225	2.174	1.03
58)	T	Toluene	2.524	2.735	2.495	2.605	2.681	2.638	2.816	2.720	2.256	2.608	6.39
59)	T	2-Hexanone	1.134	1.232	1.263	1.483	1.770	1.882	1.957	1.799	1.424	1.549	19.93
60)	T	Dibromochlorom...	0.490	0.552	0.517	0.591	0.622	0.633	0.729	0.741	0.679	0.617	14.41
61)	T	1,2-Dibromoethane	0.519	0.575	0.559	0.610	0.657	0.672	0.739	0.742	0.682	0.639	12.29
62)	T	n-Butyl Acetate	1.337	1.457	1.421	1.633	1.938	2.072	2.194	2.019	1.594	1.741	18.28
63)	T	n-Octane	0.512	0.647	0.591	0.629	0.675	0.691	0.729	0.676	0.531	0.631	11.63
64)	T	Tetrachloroethene	0.583	0.649	0.579	0.642	0.646	0.640	0.734	0.762	0.711	0.661	9.59
65)	T	Chlorobenzene	1.477	1.675	1.489	1.558	1.633	1.613	1.749	1.731	1.484	1.601	6.60
66)	T	Ethylbenzene	2.543	2.753	2.563	2.671	2.896	2.940	3.219	3.043	2.427	2.784	9.34
67)	T	m- & p-Xylenes	2.042	2.194	1.964	2.132	2.364	2.400	2.623	2.406	1.805	2.214	11.60
68)	T	Bromoform				0.423	0.494	0.524	0.641	0.668	0.629	0.563	17.25
69)	T	Styrene				1.273	1.565	1.694	1.928	1.877	1.542	1.646	14.67
70)	T	o-Xylene	1.984	2.206	1.989	2.140	2.429	2.485	2.729	2.536	1.935	2.270	12.53
71)	T	n-Nonane	1.344	1.480	1.402	1.567	1.747	1.790	1.836	1.590	1.132	1.543	14.91
72)	T	1,1,2,2-Tetrac...	0.926	0.998	0.932	1.003	1.271	1.287	1.398	1.312	1.014	1.127	16.52
73)	S	Bromofluoroben...	0.720	0.704	0.694	0.703	0.707	0.724	0.746	0.776	0.819	0.733	5.64
74)	T	Cumene	2.505	2.793	2.447	2.623	2.904	2.964	3.274	3.060	2.385	2.773	10.95
75)	T	alpha-Pinene	1.174	1.296	1.201	1.292	1.430	1.528	1.696	1.609	1.276	1.389	13.36
76)	T	n-Propylbenzene	3.134	3.345	3.060	3.272	3.783	3.902	4.191	3.808	2.876	3.486	12.86
77)	T	3-Ethyltoluene	2.456	2.376	2.177	2.385	2.851	3.005	3.249	3.159	2.316	2.664	15.13
78)	T	4-Ethyltoluene	2.097	2.363	2.127	2.275	2.671	2.749	3.106	2.721	2.185	2.477	14.08
79)	T	1,3,5-Trimethy...	1.891	2.025	1.848	1.980	2.348	2.415	2.700	2.522	1.969	2.188	14.20
80)	T	alpha-Methylst...				0.852	1.120	1.256	1.438	1.385	1.111	1.193	17.94
81)	T	2-Ethyltoluene	2.237	2.361	2.128	2.271	2.771	2.867	3.153	2.906	2.238	2.548	14.72
82)	T	1,2,4-Trimethy...	1.755	1.936	1.715	1.881	2.338	2.510	2.707	2.254	1.564	2.073	18.99
83)	T	n-Decane	1.137	1.303	1.241	1.424	1.687	1.767	1.851	1.563	1.061	1.448	19.63
84)	T	Benzyl Chloride				1.199	1.933	2.230	2.514	2.258	1.626	1.960	24.58
85)	T	1,3-Dichlorobe...	0.988	1.025	0.948	0.982	1.239	1.307	1.483	1.427	1.135	1.170	17.29
86)	T	1,4-Dichlorobe...				1.009	1.287	1.336	1.508	1.493	1.254	1.314	13.92
87)	T	sec-Butylbenzene	2.436	2.642	2.400	2.575	3.146	3.290	3.589	3.258	2.463	2.867	15.76
88)	T	4-Isopropyltol...				2.244	2.843	3.013	3.250	2.668	1.809	2.638	20.07
89)	T	1,2,3-Trimethy...	1.826	1.921	1.759	1.887	2.444	2.597	2.829	2.339	1.611	2.135	19.94
90)	T	1,2-Dichlorobe...	0.939	0.908	0.861	0.951	1.227	1.271	1.450	1.334	0.988	1.103	19.69
91)	T	d-Limonene				0.766	0.973	1.111	1.193	0.995	0.658	0.949	21.41
92)	T	1,2-Dibromo-3-...				0.232	0.398	0.452	0.534	0.549	0.507	0.445	26.58
93)	T	n-Undecane				1.216	1.674	1.819	1.891	1.637	1.148	1.564	19.88
94)	T	1,2,4-Trichlor...				0.479	0.801	0.882	0.994	1.020	0.908	0.847	23.25

Method Path : I:\MS13\METHODS\
Method File : R13093015.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

95)	T	Naphthalene				1.657	2.910	3.279	3.488	3.082	2.158	2.762	25.63
96)	T	n-Dodecane				0.957	1.653	1.801	1.743	1.376	0.871	1.400	28.90
97)	T	Hexachlorobuta...				0.368	0.463	0.512	0.618	0.646	0.581	0.531	19.71
98)	T	Cyclohexanone				0.709	1.005	1.059	1.159	1.100	0.902	0.989	16.44
99)	T	tert-Butylbenzene	1.812	1.805	1.728	1.861	2.200	2.314	2.501	2.098	1.485	1.978	16.24
100)	T	n-Butylbenzene	1.837	1.934	1.819	1.963	2.584	2.736	2.946	2.645	1.972	2.271	19.70

(#) = Out of Range

Evaluate Continuing Calibration Report

Data File : I:\MS13\DATA\2015 10\22\10221501.D Vial: 16
Acq On : 22 Oct 2015 5:09 Operator: EA
Sample : CCV R13102215 25ng Inst : MS13
Misc : S29-10121504/S29-09251510 (10/24)

EA 10/22/15

Quant Time: Oct 22 09:02:38 2015
Quant Method : I:\MS13\METHODS\R13093015.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Oct 01 10:08:37 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	81	0.00
2	T	Propene	2.432	2.793	-14.8	86	0.00
3	T	Dichlorodifluoromethane (CF	3.881	3.705	4.5	75	0.00
4	T	Chloromethane	3.317	2.441	26.4	59	0.00
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.793	1.683	6.1	76	0.00
6	T	Vinyl Chloride	3.113	3.227	-3.7	81	0.00
7	T	1,3-Butadiene	2.121	2.474	-16.6	81	0.00
8	T	Bromomethane	1.672	1.558	6.8	72	0.00
9	T	Chloroethane	1.549	1.483	4.3	75	0.00
10	T	Ethanol	1.457	1.645	-12.9	78	-0.01
11	T	Acetonitrile	4.429	4.264	3.7	75	0.00
12	T	Acrolein	1.144	1.272	-11.2	74	0.00
13	T	Acetone	1.446	1.482	-2.5	80	0.00
14	T	Trichlorofluoromethane	3.002	2.886	3.9	76	0.00
15	T	2-Propanol (Isopropanol)	4.516	4.342	3.9	68	-0.01
16	T	Acrylonitrile	2.543	2.828	-11.2	76	0.00
17	T	1,1-Dichloroethene	1.536	1.515	1.4	74	0.00
18	T	2-Methyl-2-Propanol (tert-B	4.140	3.882	6.2	67	-0.01
19	T	Methylene Chloride	1.817	1.665	8.4	75	0.00
20	T	3-Chloro-1-propene (Allyl C	2.983	3.125	-4.8	75	0.00
21	T	Trichlorotrifluoroethane	1.250	1.188	5.0	73	0.00
22	T	Carbon Disulfide	8.057	6.921	14.1	75	0.00
23	T	trans-1,2-Dichloroethene	2.702	2.803	-3.7	76	0.00
24	T	1,1-Dichloroethane	3.443	3.387	1.6	76	0.00
25	T	Methyl tert-Butyl Ether	5.018	5.189	-3.4	75	0.00
26	T	Vinyl Acetate	0.365	0.439	-20.3	77	0.00
27	T	2-Butanone (MEK)	1.165	1.223	-5.0	76	0.00
28	T	cis-1,2-Dichloroethene	2.538	2.624	-3.4	76	0.00
29	T	Diisopropyl Ether	1.517	1.698	-11.9	78	0.00
30	T	Ethyl Acetate	0.648	0.768	-18.5	80	0.00
31	T	n-Hexane	3.132	3.358	-7.2	81	0.00
32	T	Chloroform	2.880	2.871	0.3	77	0.00
33	S	1,2-Dichloroethane-d4(SS1)	2.032	2.140	-5.3	85	0.00
34	T	Tetrahydrofuran (THF)	1.133	1.181	-4.2	75	0.00
35	T	Ethyl tert-Butyl Ether	1.861	1.977	-6.2	75	0.00
36	T	1,2-Dichloroethane	2.308	2.368	-2.6	78	0.00
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	80	0.00
38	T	1,1,1-Trichloroethane	0.453	0.439	3.1	75	0.00
39	T	Isopropyl Acetate	0.199	0.232	-16.6	80	0.00
40	T	1-Butanol	0.300	0.369	-23.0	78	0.00
41	T	Benzene	1.181	1.213	-2.7	77	0.00
42	T	Carbon Tetrachloride	0.365	0.359	1.6	74	0.00
43	T	Cyclohexane	0.461	0.490	-6.3	77	0.00
44	T	tert-Amyl Methyl Ether	0.912	0.937	-2.7	75	0.00
45	T	1,2-Dichloropropane	0.349	0.357	-2.3	76	0.00
46	T	Bromodichloromethane	0.407	0.427	-4.9	77	0.00
47	T	Trichloroethene	0.300	0.300	0.0	74	0.00
48	T	1,4-Dioxane	0.222	0.251	-13.1	74	0.00
49	T	2,2,4-Trimethylpentane (Iso	1.500	1.553	-3.5	76	0.00
50	T	Methyl Methacrylate	0.114	0.121	-6.1	74	0.00
51	T	n-Heptane	0.320	0.337	-5.3	77	0.00
52	T	cis-1,3-Dichloropropene	0.475	0.530	-11.6	76	0.00
53	T	4-Methyl-2-pentanone	0.316	0.341	-7.9	76	0.00
54	T	trans-1,3-Dichloropropene	0.417	0.476	-14.1	75	0.00
55	T	1,1,2-Trichloroethane	0.280	0.290	-3.6	75	0.00

Evaluate Continuing Calibration Report

Data File : I:\MS13\DATA\2015 10\22\10221501.D Vial: 16
Acq On : 22 Oct 2015 5:09 Operator: EA
Sample : CCV R13102215 25ng Inst : MS13
Misc : S29-10121504/S29-09251510 (10/24)

Quant Time: Oct 22 09:02:38 2015
Quant Method : I:\MS13\METHODS\R13093015.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Oct 01 10:08:37 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	83	0.00
57	S	Toluene-d8 (SS2)	2.174	2.129	2.1	82	0.00
58	T	Toluene	2.608	2.563	1.7	76	0.00
59	T	2-Hexanone	1.549	1.848	-19.3	78	0.00
60	T	Dibromochloromethane	0.617	0.639	-3.6	73	0.00
61	T	1,2-Dibromoethane	0.639	0.660	-3.3	74	0.00
62	T	n-Butyl Acetate	1.741	2.032	-16.7	77	0.00
63	T	n-Octane	0.631	0.681	-7.9	78	0.00
64	T	Tetrachloroethene	0.661	0.630	4.7	71	0.00
65	T	Chlorobenzene	1.601	1.566	2.2	74	0.00
66	T	Ethylbenzene	2.784	2.917	-4.8	75	0.00
67	T	m- & p-Xylenes	2.214	2.419	-9.3	77	0.00
68	T	Bromoform	0.563	0.541	3.9	70	0.00
69	T	Styrene	1.646	1.682	-2.2	72	0.00
70	T	o-Xylene	2.270	2.500	-10.1	76	0.00
71	T	n-Nonane	1.543	1.770	-14.7	80	0.00
72	T	1,1,2,2-Tetrachloroethane	1.127	1.296	-15.0	77	0.00
73	S	Bromofluorobenzene (SS3)	0.733	0.716	2.3	80	0.00
74	T	Cumene	2.773	2.948	-6.3	75	0.00
75	T	alpha-Pinene	1.389	1.493	-7.5	73	0.00
76	T	n-Propylbenzene	3.486	3.829	-9.8	76	0.00
77	T	3-Ethyltoluene	2.664	3.011	-13.0	77	0.00
78	T	4-Ethyltoluene	2.477	2.723	-9.9	73	0.00
79	T	1,3,5-Trimethylbenzene	2.188	2.428	-11.0	75	0.00
80	T	alpha-Methylstyrene	1.193	1.183	0.8	68	0.00
81	T	2-Ethyltoluene	2.548	2.854	-12.0	75	0.00
82	T	1,2,4-Trimethylbenzene	2.073	2.498	-20.5	77	0.00
83	T	n-Decane	1.448	1.774	-22.5	80	0.00
84	T	Benzyl Chloride	1.960	2.189	-11.7	72	0.00
85	T	1,3-Dichlorobenzene	1.170	1.274	-8.9	71	0.00
86	T	1,4-Dichlorobenzene	1.314	1.293	1.6	71	0.00
87	T	sec-Butylbenzene	2.867	3.259	-13.7	75	0.00
88	T	4-Isopropyltoluene (p-Cymen	2.638	2.959	-12.2	76	0.00
89	T	1,2,3-Trimethylbenzene	2.135	2.612	-22.3	77	0.00
90	T	1,2-Dichlorobenzene	1.103	1.263	-14.5	72	0.00
91	T	d-Limonene	0.949	1.070	-12.8	74	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.445	0.449	-0.9	70	0.00
93	T	n-Undecane	1.564	1.790	-14.5	79	0.00
94	T	1,2,4-Trichlorobenzene	0.847	0.806	4.8	67	0.00
95	T	Naphthalene	2.762	2.942	-6.5	70	0.00
96	T	n-Dodecane	1.400	1.682	-20.1	80	0.00
97	T	Hexachlorobutadiene	0.531	0.505	4.9	68	0.00
98	T	Cyclohexanone	0.989	1.028	-3.9	74	0.00
99	T	tert-Butylbenzene	1.978	2.280	-15.3	76	0.00
100	T	n-Butylbenzene	2.271	2.697	-18.8	76	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Evaluate Continuing Calibration Report

Data File : I:\MS13\DATA\2015 10\23\10231501.D Vial: 16
Acq On : 23 Oct 2015 5:09 Operator: EA
Sample : CCV R13102315 25ng Inst : MS13
Misc : S29-10121504/S29-09251510 (10/24)

EA 10/23/15

Quant Time: Oct 23 08:53:08 2015
Quant Method : I:\MS13\METHODS\R13093015.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Oct 01 10:08:37 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	77	0.00
2	T	Propene	2.432	2.731	-12.3	81	-0.01
3	T	Dichlorodifluoromethane (CF	3.881	3.765	3.0	73	-0.01
4	T	Chloromethane	3.317	2.795	15.7	65	-0.01
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.793	1.707	4.8	74	-0.01
6	T	Vinyl Chloride	3.113	3.317	-6.6	79	-0.01
7	T	1,3-Butadiene	2.121	2.584	-21.8	81	-0.01
8	T	Bromomethane	1.672	1.584	5.3	70	-0.01
9	T	Chloroethane	1.549	1.523	1.7	73	-0.01
10	T	Ethanol	1.457	1.703	-16.9	78	-0.02
11	T	Acetonitrile	4.429	4.370	1.3	74	-0.01
12	T	Acrolein	1.144	1.306	-14.2	73	-0.01
13	T	Acetone	1.446	1.530	-5.8	79	-0.01
14	T	Trichlorofluoromethane	3.002	2.915	2.9	74	-0.01
15	T	2-Propanol (Isopropanol)	4.516	4.709	-4.3	71	-0.02
16	T	Acrylonitrile	2.543	2.890	-13.6	74	-0.01
17	T	1,1-Dichloroethene	1.536	1.524	0.8	72	0.00
18	T	2-Methyl-2-Propanol (tert-B	4.140	4.111	0.7	68	-0.01
19	T	Methylene Chloride	1.817	1.682	7.4	73	-0.01
20	T	3-Chloro-1-propene (Allyl C	2.983	3.216	-7.8	74	-0.01
21	T	Trichlorotrifluoroethane	1.250	1.185	5.2	69	0.00
22	T	Carbon Disulfide	8.057	7.099	11.9	73	0.00
23	T	trans-1,2-Dichloroethene	2.702	2.851	-5.5	74	0.00
24	T	1,1-Dichloroethane	3.443	3.461	-0.5	74	0.00
25	T	Methyl tert-Butyl Ether	5.018	5.271	-5.0	73	0.00
26	T	Vinyl Acetate	0.365	0.450	-23.3	76	-0.01
27	T	2-Butanone (MEK)	1.165	1.242	-6.6	74	0.00
28	T	cis-1,2-Dichloroethene	2.538	2.671	-5.2	74	0.00
29	T	Diisopropyl Ether	1.517	1.721	-13.4	76	-0.01
30	T	Ethyl Acetate	0.648	0.794	-22.5	79	0.00
31	T	n-Hexane	3.132	3.433	-9.6	79	0.00
32	T	Chloroform	2.880	2.903	-0.8	75	0.00
33	S	1,2-Dichloroethane-d4(SS1)	2.032	2.183	-7.4	83	0.00
34	T	Tetrahydrofuran (THF)	1.133	1.196	-5.6	72	0.00
35	T	Ethyl tert-Butyl Ether	1.861	1.990	-6.9	72	0.00
36	T	1,2-Dichloroethane	2.308	2.404	-4.2	76	0.00
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	78	0.00
38	T	1,1,1-Trichloroethane	0.453	0.437	3.5	72	0.00
39	T	Isopropyl Acetate	0.199	0.236	-18.6	79	0.00
40	T	1-Butanol	0.300	0.373	-24.3	77	0.00
41	T	Benzene	1.181	1.218	-3.1	75	0.00
42	T	Carbon Tetrachloride	0.365	0.362	0.8	72	0.00
43	T	Cyclohexane	0.461	0.494	-7.2	75	0.00
44	T	tert-Amyl Methyl Ether	0.912	0.943	-3.4	73	0.00
45	T	1,2-Dichloropropane	0.349	0.359	-2.9	74	0.00
46	T	Bromodichloromethane	0.407	0.428	-5.2	74	0.00
47	T	Trichloroethene	0.300	0.297	1.0	71	0.00
48	T	1,4-Dioxane	0.222	0.253	-14.0	72	0.00
49	T	2,2,4-Trimethylpentane (Iso	1.500	1.565	-4.3	74	0.00
50	T	Methyl Methacrylate	0.114	0.121	-6.1	71	0.00
51	T	n-Heptane	0.320	0.339	-5.9	75	0.00
52	T	cis-1,3-Dichloropropene	0.475	0.532	-12.0	73	0.00
53	T	4-Methyl-2-pentanone	0.316	0.346	-9.5	75	0.00
54	T	trans-1,3-Dichloropropene	0.417	0.478	-14.6	72	0.00
55	T	1,1,2-Trichloroethane	0.280	0.289	-3.2	72	0.00

Evaluate Continuing Calibration Report

Data File : I:\MS13\DATA\2015 10\23\10231501.D Vial: 16
Acq On : 23 Oct 2015 5:09 Operator: EA
Sample : CCV R13102315 25ng Inst : MS13
Misc : S29-10121504/S29-09251510 (10/24)

Quant Time: Oct 23 08:53:08 2015
Quant Method : I:\MS13\METHODS\R13093015.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Thu Oct 01 10:08:37 2015
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	81	0.00
57	S	Toluene-d8 (SS2)	2.174	2.116	2.7	80	0.00
58	T	Toluene	2.608	2.529	3.0	73	0.00
59	T	2-Hexanone	1.549	1.859	-20.0	77	0.00
60	T	Dibromochloromethane	0.617	0.633	-2.6	71	0.00
61	T	1,2-Dibromoethane	0.639	0.652	-2.0	72	0.00
62	T	n-Butyl Acetate	1.741	2.048	-17.6	76	0.00
63	T	n-Octane	0.631	0.679	-7.6	76	0.00
64	T	Tetrachloroethene	0.661	0.617	6.7	68	0.00
65	T	Chlorobenzene	1.601	1.540	3.8	72	0.00
66	T	Ethylbenzene	2.784	2.888	-3.7	73	0.00
67	T	m- & p-Xylenes	2.214	2.394	-8.1	74	0.00
68	T	Bromoform	0.563	0.540	4.1	69	0.00
69	T	Styrene	1.646	1.658	-0.7	70	0.00
70	T	o-Xylene	2.270	2.475	-9.0	74	0.00
71	T	n-Nonane	1.543	1.778	-15.2	79	0.00
72	T	1,1,2,2-Tetrachloroethane	1.127	1.289	-14.4	75	0.00
73	S	Bromofluorobenzene (SS3)	0.733	0.711	3.0	78	0.00
74	T	Cumene	2.773	2.906	-4.8	72	0.00
75	T	alpha-Pinene	1.389	1.470	-5.8	71	0.00
76	T	n-Propylbenzene	3.486	3.790	-8.7	74	0.00
77	T	3-Ethyltoluene	2.664	2.983	-12.0	75	0.00
78	T	4-Ethyltoluene	2.477	2.685	-8.4	70	0.00
79	T	1,3,5-Trimethylbenzene	2.188	2.396	-9.5	72	0.00
80	T	alpha-Methylstyrene	1.193	1.163	2.5	66	0.00
81	T	2-Ethyltoluene	2.548	2.832	-11.1	73	0.00
82	T	1,2,4-Trimethylbenzene	2.073	2.484	-19.8	75	0.00
83	T	n-Decane	1.448	1.777	-22.7	78	0.00
84	T	Benzyl Chloride	1.960	2.167	-10.6	70	0.00
85	T	1,3-Dichlorobenzene	1.170	1.262	-7.9	69	0.00
86	T	1,4-Dichlorobenzene	1.314	1.273	3.1	69	0.00
87	T	sec-Butylbenzene	2.867	3.225	-12.5	73	0.00
88	T	4-Isopropyltoluene (p-Cymen	2.638	2.946	-11.7	74	0.00
89	T	1,2,3-Trimethylbenzene	2.135	2.603	-21.9	75	0.00
90	T	1,2-Dichlorobenzene	1.103	1.248	-13.1	70	0.00
91	T	d-Limonene	0.949	1.063	-12.0	73	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.445	0.444	0.2	68	0.00
93	T	n-Undecane	1.564	1.801	-15.2	78	0.00
94	T	1,2,4-Trichlorobenzene	0.847	0.792	6.5	65	0.00
95	T	Naphthalene	2.762	2.920	-5.7	68	0.00
96	T	n-Dodecane	1.400	1.700	-21.4	79	0.00
97	T	Hexachlorobutadiene	0.531	0.496	6.6	65	0.00
98	T	Cyclohexanone	0.989	1.030	-4.1	72	0.00
99	T	tert-Butylbenzene	1.978	2.266	-14.6	74	0.00
100	T	n-Butylbenzene	2.271	2.689	-18.4	74	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

2655 Park Center Dr., Suite A
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LABORATORY REPORT

November 21, 2015

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: Mission Wye BNSF LIV.MT.

Dear Shelly:

Your report number P1504770 has been amended for the samples submitted to our laboratory on November 5, 2015. The EPA TO-15 report list has been reduced to report trans-1,2-dichloroethene, trichloroethene, tetrachloroethene and 1,2,4-trimethylbenzene. The entire report has been revised due to fewer pages. The revised pages have been indicated by the "Revised Page" footer located at the bottom right of the page.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera

By Kate Aguilera at 9:31 am, Nov 21, 2015

Kate Aguilera
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
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www.alsglobal.com

Client: AECOM Environment
Project: Mission Wye BNSF LIV.MT.

Service Request No: P1504770

CASE NARRATIVE

The samples were received intact under chain of custody on November 5, 2015 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen, nitrogen, methane and carbon dioxide) according to ASTM D1946 (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP or AIHA-LAP accreditation.

Volatile Organic Compound Analysis

The samples were also analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The canisters were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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www.alsglobal.com

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2-R1
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	977273
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-001
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-15-6
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272015-5
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1504770

Project ID: Mission Wye BNSF LIV.MT.

Date Received: 11/5/2015

Time Received: 09:20

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	ASTM D1946-90(2006) - Fxd Gases Can	TO-15 Modified - VOC Cans
SVE-CEV/10302015	P1504770-001	Air	10/30/2015	16:38	SC01929	-4.26	4.95	X	X
SVE-DUP/10302015	P1504770-002	Air	10/30/2015	16:45	SC02036	-5.27	4.97	X	X

Revised Page

ALS ENVIRONMENTAL
Sample Volume Correction for Helium Pressurization for SCAN Analysis

Sample ID	Pi	Pf	Sample Volume (L)	Adjusted Volume (L)
P1504770-001	-4.26	4.95	0.017	0.0200
P1504770-002	-5.27	4.97	0.017	0.0200

Air - Chain of Custody Record & Analytical Service Request

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No P150477Ø

Company Name & Address (Reporting Information): BNSF mission wye JOB

Project Name: Mission Wye BNSF Liv.mt.

Project Number:

Project Manager: Cole Grover AECOM

P.O. # / Billing Information:

Phone: 406-896-4588 Fax: Cell 406-670-8571

Email Address for Result Reporting: Cole.grover@aecom.com

Sampler (Print & Sign): W. Chambers W. Chambers (OTS)

ALS Contact:

Analysis Method: TO-15 / D-1946

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	TO-15	D-1946	Comments e.g. Actual Preservative or specific instructions
SVE-CEV/10302015		10-30-15	16:38	SC01929	AVG04805	-25	-6	6L			
SVE-DUP/10302015		10-30-15	16:45	SC02036	AVG03029	-25	-6	6L			

Report Tier Levels - please select
Tier I - Results (Default in not specified) _____
Tier II (Results + QC Summaries _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Date Validation Package) 10% Surcharge _____

EDD required YES / No
Type: _____ Units: _____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
W Chambers OTS	10-30-15	17:15		11/5/15	09:20
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature _____°C

Revised Page

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1504770
Project: Mission Wye BNSF LIV.MT.
Sample(s) received on: 11/5/15 Date opened: 11/5/15 by: KKELPE

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1504770-001.01	6.0 L Source Can					
P1504770-002.01	6.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

Revised Page

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/10302015**
Client Project ID: **Mission Wye BNSF LIV.MT.**

ALS Project ID: P1504770
ALS Sample ID: P1504770-001

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01929

Date Collected: 10/30/15
Date Received: 11/5/15
Date Analyzed: 11/16/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.26 Final Pressure (psig): 4.95

Canister Dilution Factor: 1.88

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,900	
7727-37-9	**Nitrogen**	**777,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	**Carbon Dioxide**	**2,730**	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

Revised Page

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/10302015**
Client Project ID: **Mission Wye BNSF LIV.MT.**

ALS Project ID: P1504770
ALS Sample ID: P1504770-002

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC02036

Date Collected: 10/30/15
Date Received: 11/5/15
Date Analyzed: 11/16/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -5.27 Final Pressure (psig): 4.97

Canister Dilution Factor: 2.09

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	2,100	
7727-37-9	**Nitrogen**	**777,000**	2,100	
74-82-8	Methane	ND	2,100	
124-38-9	**Carbon Dioxide**	**2,730**	2,100	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye BNSF LIV.MT.**

ALS Project ID: P1504770
ALS Sample ID: P151116-MB

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 11/16/15
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504770
Client Project ID: **Mission Wye BNSF LIV.MT.** ALS Sample ID: P151116-LCS

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Nalini Lall Date Analyzed: 11/16/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen*	219,000	**216,000**	**99**	84-121	
7727-37-9	Nitrogen	781,000	**765,000**	**98**	88-122	
74-82-8	Methane	1,600	**1,770**	**111**	85-116	
124-38-9	Carbon Dioxide	2,000	**2,200**	**110**	84-117	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/10302015** ALS Project ID: P1504770
Client Project ID: **Mission Wye BNSF LIV.MT.** ALS Sample ID: P1504770-001

Test Code: EPA TO-15 Modified Date Collected: 10/30/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 11/5/15
Analyst: Lusine Hakobyan Date Analyzed: 11/16/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.020 Liter(s)
Test Notes:
Container ID: SC01929

Initial Pressure (psig): -4.26 Final Pressure (psig): 4.95

Canister Dilution Factor: 1.88

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	47	18	ND	12	4.5	
79-01-6	Trichloroethene	**1,200**	47	13	**220**	8.7	2.4	
127-18-4	Tetrachloroethene	**8,700**	47	13	**1,300**	6.9	1.9	
95-63-6	1,2,4-Trimethylbenzene	ND	47	14	ND	9.6	2.9	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/10302015** ALS Project ID: P1504770
Client Project ID: **Mission Wye BNSF LIV.MT.** ALS Sample ID: P1504770-002

Test Code: EPA TO-15 Modified Date Collected: 10/30/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 11/5/15
Analyst: Lusine Hakobyan Date Analyzed: 11/16/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.020 Liter(s)
Test Notes:
Container ID: SC02036

Initial Pressure (psig): -5.27 Final Pressure (psig): 4.97

Canister Dilution Factor: 2.09

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	52	20	ND	13	5.0	
79-01-6	Trichloroethene	**1,200**	52	15	**220**	9.7	2.7	
127-18-4	Tetrachloroethene	**8,700**	52	15	**1,300**	7.7	2.2	
95-63-6	1,2,4-Trimethylbenzene	ND	52	16	ND	11	3.2	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1504770
Client Project ID: **Mission Wye BNSF LIV.MT.** ALS Sample ID: P151116-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 11/16/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **Mission Wye BNSF LIV.MT.** ALS Project ID: P1504770

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date(s) Collected: 10/30/15
Analyst: Lusine Hakobyan Date(s) Received: 11/5/15
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 11/16/15
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P151116-MB	**99**	**101**	**100**	70-130	
Lab Control Sample	P151116-LCS	**98**	**99**	**105**	70-130	
SVE-CEV/10302015	P1504770-001	**97**	**102**	**101**	70-130	
SVE-DUP/10302015	P1504770-002	**98**	**102**	**100**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1504770
Client Project ID: **Mission Wye BNSF LIV.MT.** ALS Sample ID: P151116-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 11/16/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**205**	**98**	69-129	
79-01-6	Trichloroethene	216	**195**	**90**	71-121	
127-18-4	Tetrachloroethene	202	**197**	**98**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**239**	**110**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

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Simi Valley, CA 93065
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LABORATORY REPORT

December 12, 2015

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: Mission Wye BNSF LIV. MT. / 60436173

Dear Shelly:

Your report number P1505006 has been amended for the samples submitted to our laboratory on November 19, 2015. The EPA TO-15 results have been revised to report down to the method detection limits. The revised pages have been indicated by the "Revised Page" footer located at the bottom right of the page

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

By Kate Aguilera at 10:34 am, Dec 12, 2015

Kate Aguilera
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

Client: AECOM Environment
Project: Mission Wye BNSF LIV. MT. / 60436173

Service Request No: P1505006

CASE NARRATIVE

The samples were received intact under chain of custody on November 19, 2015 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Oxygen, Nitrogen, Methane and Carbon Dioxide Analysis

The samples were analyzed for oxygen, nitrogen, methane and carbon dioxide per ASTM D 1946-90 using a gas chromatograph equipped with a thermal conductivity detector (TCD). This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP or AIHA-LAP accreditation.

Volatile Organic Compound Analysis

The samples were also analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The canisters were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2-R1
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	977273
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-001
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-15-6
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272015-5
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1505006

Project ID: Mission Wye BNSF LIV. MT. / 60436173

Date Received: 11/19/2015

Time Received: 09:30

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	ASTM D1946-90(2006) - Fxd Gases Bag	TO-15 Modified - VOC Cans
SVE-CEV/10302015	P1505006-001	Air	11/13/2015	16:34	SC00983	-4.91	5.37	X	X
SVE-DUP/10302015	P1505006-002	Air	11/13/2015	16:40	SSC00117	-6.26	5.99	X	X

ALS ENVIRONMENTAL
Sample Volume Correction for Helium Pressurization for SCAN Analysis

Sample ID	Pi	Pf	Sample Volume (L)	Adjusted Volume (L)
P1505006-001	-4.91	5.37	0.017	0.0200
P1505006-002	-6.26	5.99	0.021	0.0250

Air - Chain of Custody Record & Analytical Service Request

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No. PH0-5006

Company Name & Address (Reporting Information): BNSF MISSION WYE

Project Name: MISSION WYE BNSF LIV, MT.

Project Number:

ALS Contact:

Analysis Method

Project Manager: Cole Grover AECOM

P.O. # / Billing Information:

Phone: 406-896-4588 Fax: CEW 406-670-8571

Email Address for Result Reporting: cole.grover@aecom.com

Sampler (Print & Sign): W Chambers W Chambers (OTS)

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume			Comments e.g. Actual Preservative or specific instructions
SUE-CEW/10302015	(1)	11-13-15	16:34	SC00983	AVG03540	26.0	8.0	6L			
SUE-DUP/10302015	(2)	11-13-15	16:40	SSC00117	AVG03425	25.5	8.0	6L			

Report Tier Levels - please select
Tier I - Results (Default in not specified) _____
Tier II (Results + QC Summaries _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Date Validation Package) 10% Surcharge _____

EDD required YES / No
Type: _____ Units: _____

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
W Chambers OTS	11-13-15	17:10	[signature]	11/19/15	0930
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature _____°C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1505006
Project: Mission Wye BNSF LIV. MT. / 60436173
Sample(s) received on: 11/19/15 Date opened: 11/19/15 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☐	☒
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1505006-001.01	6.0 L Source Can					
P1505006-002.01	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers):
Chain of Custody is missing analysis

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/10302015**
Client Project ID: **Mission Wye BNSF LIV. MT. / 60436173**

ALS Project ID: P1505006
ALS Sample ID: P1505006-001

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00983

Date Collected: 11/13/15
Date Received: 11/19/15
Date Analyzed: 11/25/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.91 Final Pressure (psig): 5.37

Canister Dilution Factor: 2.05

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	2,100	
7727-37-9	**Nitrogen**	**777,000**	2,100	
74-82-8	Methane	ND	2,100	
124-38-9	**Carbon Dioxide**	**2,430**	2,100	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/10302015**
Client Project ID: **Mission Wye BNSF LIV. MT. / 60436173**

ALS Project ID: P1505006
ALS Sample ID: P1505006-002

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Nalini Lall
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00117

Date Collected: 11/13/15
Date Received: 11/19/15
Date Analyzed: 11/25/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -6.26 Final Pressure (psig): 5.99

Canister Dilution Factor: 2.45

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	2,500	
7727-37-9	**Nitrogen**	**777,000**	2,500	
74-82-8	Methane	ND	2,500	
124-38-9	**Carbon Dioxide**	**2,500**	2,500	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1505006
Client Project ID: **Mission Wye BNSF LIV. MT. / 60436173** ALS Sample ID: P151125-MB

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Nalini Lall Date Analyzed: 11/25/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1505006
Client Project ID: **Mission Wye BNSF LIV. MT. / 60436173** ALS Sample ID: P151125-LCS

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Nalini Lall Date Analyzed: 11/25/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	**Compound**	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen*	219,000	**216,000**	**99**	84-121	
7727-37-9	Nitrogen	781,000	**767,000**	**98**	88-122	
74-82-8	Methane	1,600	**1,800**	**113**	85-116	
124-38-9	Carbon Dioxide	2,000	**2,170**	**109**	84-117	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/11132015** ALS Project ID: P1505006
Client Project ID: **Mission Wye BNSF LIV. MT. / 60436173** ALS Sample ID: P1505006-001

Test Code: EPA TO-15 Modified Date Collected: 11/13/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 11/19/15
Analyst: Evelyn Alvarez Date Analyzed: 11/25/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.020 Liter(s)
Test Notes:
Container ID: SC00983

Initial Pressure (psig): -4.91 Final Pressure (psig): 5.37

Canister Dilution Factor: 2.05

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	51	19	ND	13	4.9	
79-01-6	Trichloroethene	**1,100**	51	14	**210**	9.5	2.7	
127-18-4	Tetrachloroethene	**8,000**	51	14	**1,200**	7.6	2.1	
95-63-6	1,2,4-Trimethylbenzene	ND	51	15	ND	10	3.1	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/11132015** ALS Project ID: P1505006
Client Project ID: **Mission Wye BNSF LIV. MT. / 60436173** ALS Sample ID: P1505006-002

Test Code: EPA TO-15 Modified Date Collected: 11/13/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 11/19/15
Analyst: Evelyn Alvarez Date Analyzed: 11/24/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.025 Liter(s)
Test Notes:
Container ID: SSC00117

Initial Pressure (psig): -6.26 Final Pressure (psig): 5.99

Canister Dilution Factor: 2.45

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	49	19	ND	12	4.7	
79-01-6	Trichloroethene	**1,200**	49	14	**220**	9.1	2.6	
127-18-4	Tetrachloroethene	**9,500**	49	14	**1,400**	7.2	2.0	
95-63-6	1,2,4-Trimethylbenzene	ND	49	15	ND	10	3.0	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye BNSF LIV. MT. / 60436173**

ALS Project ID: P1505006
ALS Sample ID: P151124-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13
Analyst: Evelyn Alvarez
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 11/24/15
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1505006
Client Project ID: **Mission Wye BNSF LIV. MT. / 60436173** ALS Sample ID: P151125-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 11/25/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **Mission Wye BNSF LIV. MT. / 60436173** ALS Project ID: P1505006

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date(s) Collected: 11/13/15
Analyst: Evelyn Alvarez Date(s) Received: 11/19/15
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 11/24 - 11/25/15
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P151124-MB	**104**	**100**	**91**	70-130	
Method Blank	P151125-MB	**108**	**99**	**90**	70-130	
Lab Control Sample	P151124-LCS	**105**	**99**	**94**	70-130	
Lab Control Sample	P151125-LCS	**107**	**98**	**93**	70-130	
SVE-CEV/10302015	P1505006-001	**110**	**98**	**88**	70-130	
SVE-DUP/10302015	P1505006-002	**121**	**96**	**77**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1505006
Client Project ID: **Mission Wye BNSF LIV. MT. / 60436173** ALS Sample ID: P151124-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 11/24/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**208**	**99**	69-129	
79-01-6	Trichloroethene	216	**199**	**92**	71-121	
127-18-4	Tetrachloroethene	202	**186**	**92**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**239**	**110**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1505006
Client Project ID: **Mission Wye BNSF LIV. MT. / 60436173** ALS Sample ID: P151125-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 11/25/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**209**	**100**	69-129	
79-01-6	Trichloroethene	216	**193**	**89**	71-121	
127-18-4	Tetrachloroethene	202	**178**	**88**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**231**	**106**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

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LABORATORY REPORT

December 22, 2015

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: BNSF Mission Wye

Dear Shelly:

Enclosed are the results of the samples submitted to our laboratory on December 8, 2015. For your reference, these analyses have been assigned our service request number P1505308.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

By Kate Aguilera at 3:20 pm, Dec 22, 2015

Kate Aguilera
Project Manager

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www.alsglobal.com

Client: AECOM Environment
Project: BNSF Mission Wye

Service Request No: P1505308

CASE NARRATIVE

The samples were received intact under chain of custody on December 8, 2015 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample(s) at the time of sample receipt.

Fixed Gases Analysis

Ten of the samples were analyzed for fixed gases (oxygen, nitrogen, methane and carbon dioxide) according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP or AIHA-LAP accreditation.

Volatile Organic Compound Analysis

All of the samples were also analyzed for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The canisters were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L14-2-R1
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	977273
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-001
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-15-6
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272015-5
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment
Project ID: BNSF Mission Wye

Service Request: P1505308

Date Received: 12/8/2015
Time Received: 10:15

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	ASTM D1946-90(2006) - Fxd Gases Can	TO-15 Modified - VOC Cans
SVE-1/12022015	P1505308-001	Air	12/2/2015	10:33	SSC00088	-3.81	4.11	X	X
SVE-2/12022015	P1505308-002	Air	12/2/2015	10:38	SC02090	-5.55	3.64	X	X
SVE-3/12022015	P1505308-003	Air	12/2/2015	10:42	AS00030	-9.18	5.39	X	X
SVE-4/12022015	P1505308-004	Air	12/2/2015	10:45	SC01561	-2.90	5.33	X	X
SVE-5/12022015	P1505308-005	Air	12/2/2015	10:48	SSC00125	-7.01	5.34	X	X
SVE-6/12022015	P1505308-006	Air	12/2/2015	10:52	SC01484	-1.61	5.23	X	X
SVE-7/12022015	P1505308-007	Air	12/2/2015	10:55	AC02060	-1.76	5.15	X	X
SVE-8/12022015	P1505308-008	Air	12/2/2015	10:57	SC01480	-3.62	5.42	X	X
SVE-CEV/12022015	P1505308-009	Air	12/2/2015	11:03	SC01850	-2.68	5.35	X	X
SVE-EV/12022015	P1505308-010	Air	12/2/2015	11:12	SC01477	-3.00	5.47		X
SVE-DUP/12022015	P1505308-011	Air	12/2/2015	10:15	SSC00301	-7.11	5.45	X	X

ALS ENVIRONMENTAL
Sample Volume Correction for Helium Pressurization for SCAN Analysis

Sample ID	Pi	Pf	Sample Volume (L)	Adjusted Volume (L)
P1505308-001	-3.81	4.11	0.130	0.150
P1505308-003	-9.81	5.39	0.016	0.0206
P1505308-004	-2.90	5.33	0.347	0.400
P1505308-005	-7.01	5.34	0.407	0.500
P1505308-006	-1.61	5.23	0.884	1.00
P1505308-007	-1.76	5.15	0.044	0.0500
P1505308-008	-3.62	5.42	0.043	0.0500
P1505308-009	-2.68	5.35	0.048	0.0550
P1505308-010	-3.00	5.47	0.043	0.0500
P1505308-011	-7.11	5.45	0.069	0.0850

Validation Date: 10/13/09
Template Name: MFC_GCF_backfill.xls
Printed: 12/22/15

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

2655 Park Center Drive, Suite A
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Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No: D150 5308

ALS Contact:

Company Name & Address (Reporting Information): AECOM, 207 N. Broadway, Ste. 315, Billings, MT 59101

Project Name: BNSF - Mission Wye

Project Number:

Project Manager: Shelly Young

P.O. # / Billing Information:

Phone: 406-896-4582

Fax:

Email Address for Result Reporting: shelly.young@aecom.com

Sampler (Print & Sign): Cole R. Grover

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method: TO-15 (Short List - 4 COCs only)	Analysis Method: D-1946 (Fixed Gas)	Comments e.g. Actual Preservative or specific instructions
SVE-1/12022015	1	12/2/2015	1033	4873	0341	-28.5	-1.5	6L	X	X	Please
SVE-2/12022015	2		1038	01839	04183	-28.0	-1.0		X	X	provide
SVE-3/12022015	3		1042	4528	04223	-26.5	-0.5		X	X	detection and
SVE-4/12022015	4		1045	002425	04145	-29.0	-2.5		X	X	reporting limits
SVE-5/12022015	5		1048	14042	03060	-28.5	-1.0		X	X	on reports.
SVE-6/12022015	6		1052	02243	04205	-26.5	-1.0		X	X	
SVE-7/12022015	7		1055	N0031	04444	-26.5	-0.5		X	X	
SVE-8/12022015	8		1057	02023	04464	-27.5	-1.5		X	X	
SVE-CEV/12022015	9		1103	002934	04293	-27.0	-1.0		X	X	
SVE-EV/12022015	10		1112	01270	03462	-26.5	-2.0		X	—	
SVE-DUP/12022015	11		1015	16966	03615	-26.5	-1.0		X	X	
—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	—	—	—	
—	—	—	—	—	—	—	—	—	—	—	

Report Tier Levels - please select

Tier I - Results (Default in not specified) ____
Tier II (Results + QC Summaries ____
Tier III (Results + QC & Calibration Summaries) X
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required YES / No
Type: AECOM Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Cole R. Grover	12-3-2015	1035	[signature]	12/3/15	1015
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____°C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1505308
Project: BNSF Mission Wye
Sample(s) received on: 12/8/15 Date opened: 12/8/15 by: KKELPE

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1505308-001.01	6.0 L Silonite Can					
P1505308-002.01	6.0 L Source Can					
P1505308-003.01	6.0 L Silonite Can					
P1505308-004.01	6.0 L Source Can					
P1505308-005.01	6.0 L Silonite Can					
P1505308-006.01	6.0 L Source Can					
P1505308-007.01	6.0 L Ambient Can					
P1505308-008.01	6.0 L Source Can					
P1505308-009.01	6.0 L Source Can					
P1505308-010.01	6.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-1/12022015**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1505308
ALS Sample ID: P1505308-001

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00088

Date Collected: 12/2/15
Date Received: 12/8/15
Date Analyzed: 12/15/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.81 Final Pressure (psig): 4.11

Canister Dilution Factor: 1.73

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**222,000**	1,700	
7727-37-9	**Nitrogen**	**777,000**	1,700	
74-82-8	Methane	ND	1,700	
124-38-9	Carbon Dioxide	ND	1,700	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-2/12022015**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1505308
ALS Sample ID: P1505308-002

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC02090

Date Collected: 12/2/15
Date Received: 12/8/15
Date Analyzed: 12/15/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -5.55 Final Pressure (psig): 3.64

Canister Dilution Factor: 2.00

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	2,000	
7727-37-9	**Nitrogen**	**778,000**	2,000	
74-82-8	Methane	ND	2,000	
124-38-9	**Carbon Dioxide**	**2,280**	2,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-3/12022015**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1505308
ALS Sample ID: P1505308-003

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS00030

Date Collected: 12/2/15
Date Received: 12/8/15
Date Analyzed: 12/15/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -9.18 Final Pressure (psig): 5.39

Canister Dilution Factor: 3.64

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**218,000**	3,600	
7727-37-9	**Nitrogen**	**778,000**	3,600	
74-82-8	Methane	ND	3,600	
124-38-9	**Carbon Dioxide**	**4,060**	3,600	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-4/12022015**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1505308
ALS Sample ID: P1505308-004

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01561

Date Collected: 12/2/15
Date Received: 12/8/15
Date Analyzed: 12/15/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.90 Final Pressure (psig): 5.33

Canister Dilution Factor: 1.70

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,700	
7727-37-9	**Nitrogen**	**777,000**	1,700	
74-82-8	Methane	ND	1,700	
124-38-9	**Carbon Dioxide**	**1,910**	1,700	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-5/12022015**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1505308
ALS Sample ID: P1505308-005

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00125

Date Collected: 12/2/15
Date Received: 12/8/15
Date Analyzed: 12/15/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -7.01 Final Pressure (psig): 5.34

Canister Dilution Factor: 2.61

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	2,600	
7727-37-9	**Nitrogen**	**777,000**	2,600	
74-82-8	Methane	ND	2,600	
124-38-9	Carbon Dioxide	ND	2,600	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-6/12022015**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1505308
ALS Sample ID: P1505308-006

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01484

Date Collected: 12/2/15
Date Received: 12/8/15
Date Analyzed: 12/15/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.61 Final Pressure (psig): 5.23

Canister Dilution Factor: 1.52

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,500	
7727-37-9	**Nitrogen**	**777,000**	1,500	
74-82-8	Methane	ND	1,500	
124-38-9	**Carbon Dioxide**	**2,000**	1,500	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-7/12022015**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1505308
ALS Sample ID: P1505308-007

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC02060

Date Collected: 12/2/15
Date Received: 12/8/15
Date Analyzed: 12/15/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.76 Final Pressure (psig): 5.15

Canister Dilution Factor: 1.53

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,500	
7727-37-9	**Nitrogen**	**778,000**	1,500	
74-82-8	Methane	ND	1,500	
124-38-9	**Carbon Dioxide**	**1,750**	1,500	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-8/12022015**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1505308
ALS Sample ID: P1505308-008

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01480

Date Collected: 12/2/15
Date Received: 12/8/15
Date Analyzed: 12/15/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.62 Final Pressure (psig): 5.42

Canister Dilution Factor: 1.82

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,800	
7727-37-9	**Nitrogen**	**777,000**	1,800	
74-82-8	Methane	ND	1,800	
124-38-9	**Carbon Dioxide**	**2,620**	1,800	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/12022015**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1505308
ALS Sample ID: P1505308-009

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01850

Date Collected: 12/2/15
Date Received: 12/8/15
Date Analyzed: 12/15/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.68 Final Pressure (psig): 5.35

Canister Dilution Factor: 1.67

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,700	
7727-37-9	**Nitrogen**	**778,000**	1,700	
74-82-8	Methane	ND	1,700	
124-38-9	**Carbon Dioxide**	**1,940**	1,700	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/12022015**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1505308
ALS Sample ID: P1505308-011

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00301

Date Collected: 12/2/15
Date Received: 12/8/15
Date Analyzed: 12/15/15
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -7.11 Final Pressure (psig): 5.45

Canister Dilution Factor: 2.65

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	2,700	
7727-37-9	**Nitrogen**	**777,000**	2,700	
74-82-8	Methane	ND	2,700	
124-38-9	Carbon Dioxide	ND	2,700	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P151215-MB

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 12/15/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P151215-LCS

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 12/15/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen*	2,000	**1,870**	**94**	84-121	
7727-37-9	Nitrogen	2,000	**2,110**	**106**	88-122	
74-82-8	Methane	1,600	**1,590**	**99**	85-116	
124-38-9	Carbon Dioxide	2,000	**1,930**	**97**	84-117	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-1/12022015** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1505308-001

Test Code: EPA TO-15 Modified Date Collected: 12/2/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/8/15
Analyst: Wida Ang Date Analyzed: 12/19/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.15 Liter(s)
Test Notes:
Container ID: SSC00088

Initial Pressure (psig): -3.81 Final Pressure (psig): 4.11

Canister Dilution Factor: 1.73

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	5.8	2.2	ND	1.5	0.55	
79-01-6	Trichloroethene	**64**	5.8	1.6	**12**	1.1	0.30	
127-18-4	Tetrachloroethene	**970**	5.8	1.6	**140**	0.85	0.24	
95-63-6	1,2,4-Trimethylbenzene	ND	5.8	1.7	ND	1.2	0.35	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-2/12022015** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1505308-002

Test Code: EPA TO-15 Modified Date Collected: 12/2/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/8/15
Analyst: Wida Ang Date Analyzed: 12/19/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.010 Liter(s)
Test Notes:
Container ID: SC02090

Initial Pressure (psig): -5.55 Final Pressure (psig): 3.64

Canister Dilution Factor: 2.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	100	38	ND	25	9.6	
79-01-6	Trichloroethene	**2,300**	100	28	**430**	19	5.2	
127-18-4	Tetrachloroethene	**14,000**	100	28	**2,100**	15	4.1	
95-63-6	1,2,4-Trimethylbenzene	ND	100	30	ND	20	6.1	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-3/12022015** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1505308-003

Test Code: EPA TO-15 Modified Date Collected: 12/2/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/8/15
Analyst: Wida Ang Date Analyzed: 12/19/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.0206 Liter(s)
Test Notes:
Container ID: AS00030

Initial Pressure (psig): -9.18 Final Pressure (psig): 5.39

Canister Dilution Factor: 3.64

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**36**	88	34	**9.2**	22	8.5	**J**
79-01-6	Trichloroethene	**2,100**	88	25	**390**	16	4.6	
127-18-4	Tetrachloroethene	**10,000**	88	25	**1,500**	13	3.6	
95-63-6	1,2,4-Trimethylbenzene	ND	88	27	ND	18	5.4	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-4/12022015** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1505308-004

Test Code: EPA TO-15 Modified Date Collected: 12/2/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/8/15
Analyst: Wida Ang Date Analyzed: 12/19/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes:
Container ID: SC01561

Initial Pressure (psig): -2.90 Final Pressure (psig): 5.33

Canister Dilution Factor: 1.70

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**2.4**	2.1	0.81	**0.61**	0.54	0.20	
79-01-6	Trichloroethene	**84**	2.1	0.60	**16**	0.40	0.11	
127-18-4	Tetrachloroethene	**270**	2.1	0.60	**40**	0.31	0.088	
95-63-6	1,2,4-Trimethylbenzene	ND	2.1	0.64	ND	0.43	0.13	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-5/12022015** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1505308-005

Test Code: EPA TO-15 Modified Date Collected: 12/2/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/8/15
Analyst: Evelyn Alvarez Date Analyzed: 12/20/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.50 Liter(s)
Test Notes:
Container ID: SSC00125

Initial Pressure (psig): -7.01 Final Pressure (psig): 5.34

Canister Dilution Factor: 2.61

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**3.3**	2.6	0.99	**0.84**	0.66	0.25	
79-01-6	Trichloroethene	**85**	2.6	0.73	**16**	0.49	0.14	
127-18-4	Tetrachloroethene	**430**	2.6	0.73	**64**	0.39	0.11	
95-63-6	1,2,4-Trimethylbenzene	ND	2.6	0.78	ND	0.53	0.16	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-6/12022015** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1505308-006

Test Code: EPA TO-15 Modified Date Collected: 12/2/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/8/15
Analyst: Wida Ang Date Analyzed: 12/19/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC01484

Initial Pressure (psig): -1.61 Final Pressure (psig): 5.23

Canister Dilution Factor: 1.52

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.76	0.29	ND	0.19	0.073	
79-01-6	Trichloroethene	**7.9**	0.76	0.21	**1.5**	0.14	0.040	
127-18-4	Tetrachloroethene	**34**	0.76	0.21	**5.0**	0.11	0.031	
95-63-6	1,2,4-Trimethylbenzene	ND	0.76	0.23	ND	0.15	0.046	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-7/12022015** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1505308-007

Test Code: EPA TO-15 Modified Date Collected: 12/2/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/8/15
Analyst: Wida Ang Date Analyzed: 12/19/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.050 Liter(s)
Test Notes:
Container ID: AC02060

Initial Pressure (psig): -1.76 Final Pressure (psig): 5.15

Canister Dilution Factor: 1.53

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**7.3**	15	5.8	**1.8**	3.9	1.5	**J**
79-01-6	Trichloroethene	**480**	15	4.3	**90**	2.8	0.80	
127-18-4	Tetrachloroethene	**2,500**	15	4.3	**370**	2.3	0.63	
95-63-6	1,2,4-Trimethylbenzene	ND	15	4.6	ND	3.1	0.93	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-8/12022015** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1505308-008

Test Code: EPA TO-15 Modified Date Collected: 12/2/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/8/15
Analyst: Wida Ang Date Analyzed: 12/19/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.050 Liter(s)
Test Notes:
Container ID: SC01480

Initial Pressure (psig): -3.62 Final Pressure (psig): 5.42

Canister Dilution Factor: 1.82

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	18	6.9	ND	4.6	1.7	
79-01-6	Trichloroethene	**170**	18	5.1	**32**	3.4	0.95	
127-18-4	Tetrachloroethene	**3,000**	18	5.1	**440**	2.7	0.75	
95-63-6	1,2,4-Trimethylbenzene	ND	18	5.5	ND	3.7	1.1	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/12022015** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1505308-009

Test Code: EPA TO-15 Modified Date Collected: 12/2/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/8/15
Analyst: Wida Ang Date Analyzed: 12/19/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.055 Liter(s)
Test Notes:
Container ID: SC01850

Initial Pressure (psig): -2.68 Final Pressure (psig): 5.35

Canister Dilution Factor: 1.67

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	15	5.8	ND	3.8	1.5	
79-01-6	Trichloroethene	**410**	15	4.3	**76**	2.8	0.79	
127-18-4	Tetrachloroethene	**2,600**	15	4.3	**390**	2.2	0.63	
95-63-6	1,2,4-Trimethylbenzene	ND	15	4.6	ND	3.1	0.93	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/12022015** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1505308-010

Test Code: EPA TO-15 Modified Date Collected: 12/2/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/8/15
Analyst: Wida Ang Date Analyzed: 12/19/15
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.050 Liter(s)
Test Notes:
Container ID: SC01477

Initial Pressure (psig): -3.00 Final Pressure (psig): 5.47

Canister Dilution Factor: 1.72

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	17	6.5	ND	4.3	1.6	
79-01-6	Trichloroethene	**270**	17	4.8	**51**	3.2	0.90	
127-18-4	Tetrachloroethene	**3,100**	17	4.8	**460**	2.5	0.71	
95-63-6	1,2,4-Trimethylbenzene	ND	17	5.2	ND	3.5	1.1	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/12022015** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1505308-011

Test Code: EPA TO-15 Modified Date Collected: 12/2/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/8/15
Analyst: Wida Ang Date Analyzed: 12/19/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.085 Liter(s)
Test Notes:
Container ID: SSC00301

Initial Pressure (psig): -7.11 Final Pressure (psig): 5.45

Canister Dilution Factor: 2.65

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	16	5.9	ND	3.9	1.5	
79-01-6	Trichloroethene	**160**	16	4.4	**30**	2.9	0.81	
127-18-4	Tetrachloroethene	**2,700**	16	4.4	**400**	2.3	0.64	
95-63-6	1,2,4-Trimethylbenzene	ND	16	4.7	ND	3.2	0.95	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P151219-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Wida Ang Date Analyzed: 12/19/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P151220-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Wida Ang Date Analyzed: 12/20/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **BNSF Mission Wye** ALS Project ID: P1505308

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date(s) Collected: 12/2/15
Analyst: Wida Ang Date(s) Received: 12/8/15
Sample Type: 6.0 L Silonite Canister(s) Date(s) Analyzed: 12/19 - 12/20/15
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P151219-MB	**103**	**100**	**93**	70-130	
Method Blank	P151220-MB	**106**	**99**	**91**	70-130	
Lab Control Sample	P151219-LCS	**102**	**99**	**95**	70-130	
Lab Control Sample	P151220-LCS	**104**	**99**	**94**	70-130	
SVE-1/12022015	P1505308-001	**104**	**98**	**93**	70-130	
SVE-2/12022015	P1505308-002	**103**	**99**	**93**	70-130	
SVE-3/12022015	P1505308-003	**104**	**97**	**94**	70-130	
SVE-3/12022015	P1505308-003DUP	**103**	**97**	**95**	70-130	
SVE-4/12022015	P1505308-004	**105**	**96**	**97**	70-130	
SVE-5/12022015	P1505308-005	**101**	**98**	**94**	70-130	
SVE-6/12022015	P1505308-006	**105**	**97**	**95**	70-130	
SVE-7/12022015	P1505308-007	**104**	**96**	**96**	70-130	
SVE-8/12022015	P1505308-008	**105**	**96**	**95**	70-130	
SVE-CEV/12022015	P1505308-009	**104**	**97**	**96**	70-130	
SVE-EV/12022015	P1505308-010	**105**	**97**	**94**	70-130	
SVE-DUP/12022015	P1505308-011	**105**	**97**	**96**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P151219-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Wida Ang Date Analyzed: 12/19/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**210**	**100**	69-129	
79-01-6	Trichloroethene	216	**184**	**85**	71-121	
127-18-4	Tetrachloroethene	202	**173**	**86**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**173**	**79**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P151220-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Wida Ang Date Analyzed: 12/20/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**209**	**100**	69-129	
79-01-6	Trichloroethene	216	**178**	**82**	71-121	
127-18-4	Tetrachloroethene	202	**165**	**82**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**170**	**78**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **AECOM Environment**
Client Sample ID: **SVE-3/12022015** ALS Project ID: P1505308
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1505308-003DUP

Test Code: EPA TO-15 Modified Date Collected: 12/2/15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 12/8/15
Analyst: Wida Ang Date Analyzed: 12/19/15
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.0206 Liter(s)
Test Notes:
Container ID: AS00030

Initial Pressure (psig): -9.18 Final Pressure (psig): 5.39

Canister Dilution Factor: 3.64

Compound	Sample Result µg/m³	Sample Result ppbV	**Duplicate Sample Result µg/m³**	**Duplicate Sample Result** ppbV	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
trans-1,2-Dichloroethene	36.4	9.18	34.8	8.78	35.6	**4**	25	**J**
Trichloroethene	2,110	393	2,090	389	2100	**1**	25	
Tetrachloroethene	10,400	1,530	10,300	1,520	10350	**1**	25	
1,2,4-Trimethylbenzene	ND	ND	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

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LABORATORY REPORT

January 27, 2016

Cole Grover
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: Mission Wye BNSF Liv. Mt

Dear Cole:

Enclosed are the results of the samples submitted to our laboratory on January 15, 2016. For your reference, these analyses have been assigned our service request number P1600207.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera

By Kate Aguilera at 2:50 pm, Jan 27, 2016

Kate Aguilera
Project Manager

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Client: AECOM Environment
Project: Mission Wye BNSF Liv. Mt

Service Request No: P1600207

CASE NARRATIVE

The samples were received intact under chain of custody on January 15, 2016 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen, nitrogen, methane and carbon dioxide) according to ASTM D1946 (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP or AIHA-LAP accreditation.

ALS Simi Valley standard operating procedure states an initial calibration curve shall be performed annually. Calibration standards ordered two months ago have not been received from the manufacturer. The calibration curve was generated on November 29, 2014 and will be update as soon as possible upon receipt of the new standard materials. The EPA 3C method does not provide criteria for how often a calibration curve should be performed. Additionally, the instrument daily quality control parameters are within criteria, documenting the stability and performance of the instrument are acceptable, therefore data has not been affected.

Volatile Organic Compound Analysis

The samples were also analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

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Client: AECOM Environment
Project: Mission Wye BNSF Liv. Mt

Service Request No: P1600207

CASE NARRATIVE

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L15-398
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	977273
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-001
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-15-6
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272015-5
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1600207

Project ID: Mission Wye BNSF Liv. Mt

Date Received: 1/15/2016

Time Received: 09:15

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-15 Modified - VOC Cans	ASTM D1946-90(2006) - Fxd Gases Can
SVE-CEV/1112016	P1600207-001	Air	1/11/2016	15:55	SC01719	-2.29	5.01	X	X
SVE-DUP/1112016	P1600207-002	Air	1/11/2016	16:00	SC00929	-3.82	5.00	X	X

Air - Chain of Custody Record & Analytical Service Request

ALS
2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No: P1600207

Company Name & Address (Reporting Information): BNSF Mission wye JOB

Project Name: Mission wye BNSF Liv. Mt

Project Number:

Project Manager: Cole Grover AECOM

Phone: 406-896-4588

Fax: Cell 406-670-8571

P.O. # / Billing Information:

Email Address for Result Reporting: Cole.grover@aecom.com

Sampler (Print & Sign): W Chambers W Chambers (OTS)

ALS Contact:

Analysis Method

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method		Comments e.g. Actual Preservative or specific instructions
SVE-CEV/0112016	1	1-11-16	15:55	SC01719	AVG02521	-27.5	-4.5	~~220~~ WC	6L		
SVE-DUP/0112016	2	1-11-16	16:00	SC00929	AVG04543	-27.0	-5.1	~~219~~ WC	6L		

Report Tier Levels - please select
Tier I - Results (Default in not specified) _____
Tier II (Results + QC Summaries _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Date Validation Package) 10% Surcharge _____

EDD required YES / No
Type: _____ Units: _____

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
W Chambers (OTS)	1-12-16	11:08	[signature]	1/15/16	09:15
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature _____°C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1600207
Project: Mission Wye BNSF Liv. Mt
Sample(s) received on: 1/15/16 Date opened: 1/15/16 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☐	☒
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1600207-001.01	6.0 L Source Can					
P1600207-002.01	6.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/1112016**
Client Project ID: **Mission Wye BNSF Liv. Mt**

ALS Project ID: P1600207
ALS Sample ID: P1600207-001

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: 1/11/16
Date Received: 1/15/16
Date Analyzed: 1/19/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.29 Final Pressure (psig): 5.01

Canister Dilution Factor: 1.59

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,600	
7727-37-9	**Nitrogen**	**777,000**	1,600	
74-82-8	Methane	ND	1,600	
124-38-9	**Carbon Dioxide**	**1,810**	1,600	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/1112016**
Client Project ID: **Mission Wye BNSF Liv. Mt**

ALS Project ID: P1600207
ALS Sample ID: P1600207-002

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: 1/11/16
Date Received: 1/15/16
Date Analyzed: 1/19/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.82 Final Pressure (psig): 5.00

Canister Dilution Factor: 1.81

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,800	
7727-37-9	**Nitrogen**	**777,000**	1,800	
74-82-8	Methane	ND	1,800	
124-38-9	Carbon Dioxide	ND	1,800	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye BNSF Liv. Mt**

ALS Project ID: P1600207
ALS Sample ID: P160119-MB

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 1/19/16
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1600207
Client Project ID: **Mission Wye BNSF Liv. Mt** ALS Sample ID: P160119-LCS

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 1/19/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen*	25,000	**24,800**	**99**	84-121	
7727-37-9	Nitrogen	50,000	**48,600**	**97**	88-122	
74-82-8	Methane	40,000	**39,600**	**99**	85-116	
124-38-9	Carbon Dioxide	50,000	**48,800**	**98**	84-117	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/1112016** ALS Project ID: P1600207
Client Project ID: **Mission Wye BNSF Liv. Mt** ALS Sample ID: P1600207-001

Test Code: EPA TO-15 Modified Date Collected: 1/11/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 1/15/16
Analyst: Simon Cao Date Analyzed: 1/21/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.057 Liter(s)
Test Notes: 0.0285 Liter(s)
Container ID: SC01719

Initial Pressure (psig): -2.29 Final Pressure (psig): 5.01

Canister Dilution Factor: 1.59

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	14	5.3	ND	3.5	1.3	
79-01-6	Trichloroethene	**490**	14	3.9	**92**	2.6	0.73	
127-18-4	Tetrachloroethene	**4,200**	28	7.8	**620**	4.1	1.2	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	14	4.2	ND	2.8	0.85	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/1112016** ALS Project ID: P1600207
Client Project ID: **Mission Wye BNSF Liv. Mt** ALS Sample ID: P1600207-002

Test Code: EPA TO-15 Modified Date Collected: 1/11/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 1/15/16
Analyst: Simon Cao Date Analyzed: 1/21/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.0583 Liter(s)
Test Notes: 0.0292 Liter(s)
Container ID: SC00929

Initial Pressure (psig): -3.82 Final Pressure (psig): 5.00

Canister Dilution Factor: 1.81

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	16	5.9	ND	3.9	1.5	
79-01-6	Trichloroethene	**500**	16	4.3	**93**	2.9	0.81	
127-18-4	Tetrachloroethene	**4,300**	31	8.7	**640**	4.6	1.3	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	16	4.7	ND	3.2	0.95	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye BNSF Liv. Mt**

ALS Project ID: P1600207
ALS Sample ID: P160121-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Simon Cao
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 1/21/16
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **Mission Wye BNSF Liv. Mt** ALS Project ID: P1600207

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date(s) Collected: 1/11/16
Analyst: Simon Cao Date(s) Received: 1/15/16
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 1/21/16
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P160121-MB	**92**	**103**	**106**	70-130	
Lab Control Sample	P160121-LCS	**87**	**101**	**109**	70-130	
SVE-CEV/1112016	P1600207-001	**90**	**100**	**107**	70-130	
SVE-DUP/1112016	P1600207-002	**86**	**100**	**106**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1600207
Client Project ID: **Mission Wye BNSF Liv. Mt** ALS Sample ID: P160121-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 1/21/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**170**	**81**	69-129	
79-01-6	Trichloroethene	216	**192**	**89**	71-121	
127-18-4	Tetrachloroethene	202	**200**	**99**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**201**	**92**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

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LABORATORY REPORT

March 5, 2016

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: Mission Wye

Dear Shelly:

Your report number P1600816 has been amended for the samples submitted to our laboratory on February 17, 2016. The EPA TO-15 report list has been reduced to report the compounds of concern. The entire report has been revised and indicated by the "Revised Page" footer located at the bottom right of each page.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera

By Kate Aguilera at 11:43 am, Mar 05, 2016

Kate Aguilera
Project Manager

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www.alsglobal.com

Client: AECOM Environment
Project: Mission Wye

Service Request No: P1600816

CASE NARRATIVE

The samples were received intact under chain of custody on February 17, 2016 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen, nitrogen, methane and carbon dioxide) according to ASTM D1946 (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP or AIHA-LAP accreditation.

Volatile Organic Compound Analysis

The samples were also analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L15-398
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	977273
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-001
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-15-6
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272015-5
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1600816

Project ID: Mission Wye

Date Received: 2/17/2016

Time Received: 09:10

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	ASTM D1946-90(2006) - Fxd Gases Can	TO-15 Modified - VOC Cans
SVE-CEV/02122016	P1600816-001	Air	2/12/2016	12:50	SC00872	-1.96	3.40	X	X
SVE-DUP/02122016	P1600816-002	Air	2/12/2016	13:10	SC01565	-2.03	3.09	X	X
SVE-PHX/02122016	P1600816-003	Air	2/12/2016	13:30	SC01792	-1.64	3.22	X	X

Revised Page

ALS ENVIRONMENTAL
Sample Volume Correction for Helium Pressurization for SCAN Analysis

Sample ID	Pi	Pf	Sample Volume (L)	Adjusted Volume (L)
P1600816-001	-1.96	3.40	0.250	0.279
P1600816-001DIL	-1.96	3.40	0.050	0.0558
P1600816-002	-2.03	3.09	0.500	0.557
P1600816-002DIL	-2.03	3.09	0.100	0.111
P1600816-003	-1.64	3.22	0.250	0.277
P1600816-003DIL	-1.64	3.22	0.050	0.0554

Air - Chain of Custody Record & Analytical Service Request

ALS
2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No: P1600816

Company Name & Address (Reporting Information): BNSF MISSION WYE SITE

Project Name: MISSION WYE.

Project Number:

Project Manager: COLE GROVER AECOM

P.O. # / Billing Information:

Phone: 406 896-4588 Fax CELL 406 670-8571

Email Address for Result Reporting: COLE.GROVER@AECOM.COM

Sampler (Print & Sign): NEIL KUNE OTS

ALS Contact:

Analysis Method

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume			Comments e.g. Actual Preservative or specific instructions
SVE-CEV02122016	1	2-12-16	1250	SC00872	AV603927	-24	0	6L	TO-15	D-1946	
SVE-DUP02121620 16	2	2-12-16	1310	SC01565	AV604632	-24	0	6L	TO-15	D-1946	
SVE-PHX02121620 16	3	2-12-16	1330	SC01792	AV601893	-24	-3.5	6L	TO-15	D-1946	

Report Tier Levels - please select
Tier I - Results (Default in not specified) _____
Tier II (Results + QC Summaries _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Date Validation Package) 10% Surcharge _____

EDD required YES / No
Type: _____ Units: _____

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date: 2-12-16	Time: 1400	Received by: (Signature)	Date: 2/13/16	Time: 0910
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature _____°C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1600816
Project: Mission Wye
Sample(s) received on: 2/17/16 Date opened: 2/17/16 by: KKELPE

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1600816-001.01	6.0 L Source Can					
P1600816-002.01	6.0 L Source Can					
P1600816-003.01	6.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

Revised Page

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/02122016**
Client Project ID: **Mission Wye**

ALS Project ID: P1600816
ALS Sample ID: P1600816-001

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo/Wade Henton
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00872

Date Collected: 2/12/16
Date Received: 2/17/16
Date Analyzed: 2/22/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.96 Final Pressure (psig): 3.40

Canister Dilution Factor: 1.42

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,400	
7727-37-9	**Nitrogen**	**778,000**	1,400	
74-82-8	Methane	ND	1,400	
124-38-9	Carbon Dioxide	ND	1,400	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

Revised Page

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/02122016**
Client Project ID: **Mission Wye**

ALS Project ID: P1600816
ALS Sample ID: P1600816-002

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo/Wade Henton
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01565

Date Collected: 2/12/16
Date Received: 2/17/16
Date Analyzed: 2/22/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.03 Final Pressure (psig): 3.09

Canister Dilution Factor: 1.40

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,400	
7727-37-9	**Nitrogen**	**778,000**	1,400	
74-82-8	Methane	ND	1,400	
124-38-9	Carbon Dioxide	ND	1,400	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-PHX/02122016**
Client Project ID: **Mission Wye**

ALS Project ID: P1600816
ALS Sample ID: P1600816-003

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo/Wade Henton
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01792

Date Collected: 2/12/16
Date Received: 2/17/16
Date Analyzed: 2/22/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.64 Final Pressure (psig): 3.22

Canister Dilution Factor: 1.37

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,400	
7727-37-9	**Nitrogen**	**778,000**	1,400	
74-82-8	Methane	ND	1,400	
124-38-9	**Carbon Dioxide**	**1,680**	1,400	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

Revised Page

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1600816
Client Project ID: **Mission Wye** ALS Sample ID: P160222-MB

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo/Wade Henton Date Analyzed: 2/22/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

Revised Page

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1600816
Client Project ID: **Mission Wye** ALS Sample ID: P160222-LCS

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo/Wade Henton Date Analyzed: 2/22/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	**Compound**	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen*	40,000	**41,800**	**105**	84-121	
7727-37-9	Nitrogen	40,000	**40,400**	**101**	88-122	
74-82-8	Methane	40,000	**41,100**	**103**	85-116	
124-38-9	Carbon Dioxide	40,000	**40,500**	**101**	84-117	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/02122016** ALS Project ID: P1600816
Client Project ID: **Mission Wye** ALS Sample ID: P1600816-001

Test Code: EPA TO-15 Modified Date Collected: 2/12/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 2/17/16
Analyst: Wida Ang Date Analyzed: 2/26/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.279 Liter(s)
Test Notes: 0.0558 Liter(s)
Container ID: SC00872

Initial Pressure (psig): -1.96 Final Pressure (psig): 3.40

Canister Dilution Factor: 1.42

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**2.7**	2.5	0.97	**0.68**	0.64	0.24	
79-01-6	Trichloroethene	**160**	2.5	0.71	**30**	0.47	0.13	
127-18-4	Tetrachloroethene	**710**	13	3.6	**100**	1.9	0.53	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	2.5	0.76	ND	0.52	0.16	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/02122016** ALS Project ID: P1600816
Client Project ID: **Mission Wye** ALS Sample ID: P1600816-002

Test Code: EPA TO-15 Modified Date Collected: 2/12/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 2/17/16
Analyst: Wida Ang Date Analyzed: 2/27/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.557 Liter(s)
Test Notes: 0.111 Liter(s)
Container ID: SC01565

Initial Pressure (psig): -2.03 Final Pressure (psig): 3.09

Canister Dilution Factor: 1.40

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**2.7**	1.3	0.48	**0.69**	0.32	0.12	
79-01-6	Trichloroethene	**180**	1.3	0.35	**33**	0.23	0.066	
127-18-4	Tetrachloroethene	**760**	6.3	1.8	**110**	0.93	0.26	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	1.3	0.38	ND	0.26	0.077	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-PHX/02122016** ALS Project ID: P1600816
Client Project ID: **Mission Wye** ALS Sample ID: P1600816-003

Test Code: EPA TO-15 Modified Date Collected: 2/12/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: 2/17/16
Analyst: Wida Ang Date Analyzed: 2/27/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.277 Liter(s)
Test Notes: 0.0554 Liter(s)
Container ID: SC01792

Initial Pressure (psig): -1.64 Final Pressure (psig): 3.22

Canister Dilution Factor: 1.37

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**3.6**	2.5	0.94	**0.91**	0.62	0.24	
79-01-6	Trichloroethene	**240**	2.5	0.69	**44**	0.46	0.13	
127-18-4	Tetrachloroethene	**1,200**	12	3.5	**180**	1.8	0.51	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	2.5	0.74	ND	0.50	0.15	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye**

ALS Project ID: P1600816
ALS Sample ID: P160226-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 2/26/16
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1600816
Client Project ID: **Mission Wye** ALS Sample ID: P160226-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date Received: NA
Analyst: Wida Ang Date Analyzed: 2/26/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**208**	**99**	69-129	
79-01-6	Trichloroethene	216	**174**	**81**	71-121	
127-18-4	Tetrachloroethene	202	**151**	**75**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**189**	**87**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **Mission Wye** ALS Project ID: P1600816

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS8 Date(s) Collected: 2/12/16
Analyst: Wida Ang Date(s) Received: 2/17/16
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 2/26 - 2/27/16
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P160226-MB	**114**	**95**	**92**	70-130	
Lab Control Sample	P160226-LCS	**112**	**93**	**92**	70-130	
SVE-CEV/02122016	P1600816-001	**113**	**95**	**90**	70-130	
SVE-DUP/02122016	P1600816-002	**115**	**95**	**88**	70-130	
SVE-PHX/02122016	P1600816-003	**117**	**94**	**86**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

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LABORATORY REPORT

April 8, 2016

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: BNSF-Mission Wye

Dear Shelly:

Enclosed are the results of the samples submitted to our laboratory on March 22, 2016. For your reference, these analyses have been assigned our service request number P1601476.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Aguilera

By Kate Aguilera at 1:11 pm, Apr 08, 2016

Kate Aguilera
Project Manager

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www.alsglobal.com

Client: AECOM Environment
Project: BNSF-Mission Wye

Service Request No: P1601476

CASE NARRATIVE

The samples were received intact under chain of custody on March 22, 2016 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Methane, Carbon Dioxide, Oxygen and Nitrogen Analysis

The samples were analyzed for methane, carbon dioxide, oxygen and nitrogen per ASTM D 1946-90 using a gas chromatograph equipped with a thermal conductivity detector (TCD). This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP or AIHA-LAP accreditation.

Volatile Organic Compound Analysis

The samples were analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L15-398
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	977273
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-003
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-15-6
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272015-5
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1601476

Project ID: BNSF-Mission Wye

Date Received: 3/21/2016

Time Received: 09:00

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	ASTM D1946-90(2006) - Fxd Gases Can	TO-15 Modified - VOC Cans
SVE-1/03152016	P1601476-001	Air	3/15/2016	12:48	SC01547	-4.38	4.96	X	X
SVE-2/03152016	P1601476-002	Air	3/15/2016	12:55	SSC00055	-3.86	4.93	X	X
SVE-3/03152016	P1601476-003	Air	3/15/2016	13:00	SC01086	-3.67	5.06	X	X
SVE-4/03152016	P1601476-004	Air	3/15/2016	13:08	SSC00236	-4.10	5.23	X	X
SVE-5/03152016	P1601476-005	Air	3/15/2016	13:15	SC01652	-3.88	5.52	X	X
SVE-6/03152016	P1601476-006	Air	3/15/2016	13:20	SC01069	-4.72	5.62	X	X
SVE-7/03152016	P1601476-007	Air	3/15/2016	13:25	SC01065	-3.93	5.48	X	X
SVE-8/03152016	P1601476-008	Air	3/15/2016	13:30	SC00825	-4.12	5.22	X	X
SVE-CEV/03152016	P1601476-009	Air	3/15/2016	12:35	SC01525	-4.27	5.67	X	X
SVE-EV/03152016	P1601476-010	Air	3/15/2016	12:15	SC01756	-1.79	5.08	X	X
SVE-DUP/03152016	P1601476-011	Air	3/15/2016	12:00	SC00869	-3.84	5.42	X	X

Air - Chain of Custody Record & Analytical Service Request

ALS
2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No: P1601476

Company Name & Address (Reporting Information): AECOM, 207 N. Broadway, Ste. 315, Billings, MT 59101

Project Name: BNSF - Mission Wye

Project Number:

P.O. # / Billing Information:

ALS Contact: Kate A.

Project Manager: Shelly Young

Phone: 406-896-4582

Fax:

Email Address for Result Reporting: shelly.young@aecom.com / Cole.grover@aecom.com

Samples (Print & Sign): Cole R. Grover / Colin Grover

Analysis Method

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	TO-15 (Site COCs only)	D-1946 (Atmospheric Gas)	Comments e.g. Actual Preservative or specific instructions
SVE-1/03152016	1	3-15-2016	1248	A6470	None	-24.5	-4.0	6l	X	X	
SVE-2/03152016	2		1255	004618		-25.0	-4.0	6l	X	X	
SVE-3/03152016	3		1300	002888		-25.0	-3.0	6l	X	X	
SVE-4/03152016	4		1308	005190		-25.0	-4.0	6l	X	X	
SVE-5/03152016	5		1315	004368		-25.0	-3.5	6l	X	X	
SVE-6/03152016	6		1320	003408		-24.0	-3.5	6l	X	X	
SVE-7/03152016	7		1325	003684		-24.0	-4.0	6l	X	X	
SVE-8/03152016	8		1330	02229		-24.5	-4.0	6l	X	X	
SVE-CEV/03152016	9		1235	02318		-24.0	-4.0	6l	X	X	
SVE-EV/03152016	10		1215	002829		-28.0	-3.0	6l	X	—	
SVE-DUP/03152016	11		1200	01506		-24.0	-4.0	6l	X	X	

Report Tier Levels - please select
Tier I - Results (Default in not specified) ____
Tier II (Results + QC Summaries ____
Tier III (Results + QC & Calibration Summaries) X
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required YES / No
Type: AECOM Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Cole R. Grover	3-16-2016	1545	[signature]	3/21/16	8:00
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1601476
Project: BNSF-Mission Wye
Sample(s) received on: 3/22/16 Date opened: 3/22/16 by: KKELPE

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1601476-001.01	6.0 L Source Can					
P1601476-002.01	6.0 L Silonite Can					
P1601476-003.01	6.0 L Source Can					
P1601476-004.01	6.0 L Silonite Can					
P1601476-005.01	6.0 L Source Can					
P1601476-006.01	6.0 L Source Can					
P1601476-007.01	6.0 L Source Can					
P1601476-008.01	6.0 L Source Can					
P1601476-009.01	6.0 L Source Can					
P1601476-010.01	6.0 L Source Can					
P1601476-011.01	6.0 L Source Can					
P1601476-012.02	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-1/03152016**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P1601476-001

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01547

Date Collected: 3/15/16
Date Received: 3/21/16
Date Analyzed: 3/31/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.38 Final Pressure (psig): 4.96

Canister Dilution Factor: 1.91

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,900	
7727-37-9	**Nitrogen**	**778,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	Carbon Dioxide	ND	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-2/03152016**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P1601476-002

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00055

Date Collected: 3/15/16
Date Received: 3/21/16
Date Analyzed: 3/31/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.86 Final Pressure (psig): 4.93

Canister Dilution Factor: 1.81

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,800	
7727-37-9	**Nitrogen**	**778,000**	1,800	
74-82-8	Methane	ND	1,800	
124-38-9	Carbon Dioxide	ND	1,800	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-3/03152016**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P1601476-003

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01086

Date Collected: 3/15/16
Date Received: 3/21/16
Date Analyzed: 3/31/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.67 Final Pressure (psig): 5.06

Canister Dilution Factor: 1.79

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,800	
7727-37-9	**Nitrogen**	**778,000**	1,800	
74-82-8	Methane	ND	1,800	
124-38-9	**Carbon Dioxide**	**2,180**	1,800	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-4/03152016**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P1601476-004

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00236

Date Collected: 3/15/16
Date Received: 3/21/16
Date Analyzed: 3/31/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.10 Final Pressure (psig): 5.23

Canister Dilution Factor: 1.88

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,900	
7727-37-9	**Nitrogen**	**778,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	Carbon Dioxide	ND	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-5/03152016**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P1601476-005

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01652

Date Collected: 3/15/16
Date Received: 3/21/16
Date Analyzed: 3/31/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.88 Final Pressure (psig): 5.52

Canister Dilution Factor: 1.87

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,900	
7727-37-9	**Nitrogen**	**777,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	Carbon Dioxide	ND	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-6/03152016**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P1601476-006

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01069

Date Collected: 3/15/16
Date Received: 3/21/16
Date Analyzed: 3/31/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.72 Final Pressure (psig): 5.62

Canister Dilution Factor: 2.04

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	2,000	
7727-37-9	**Nitrogen**	**777,000**	2,000	
74-82-8	Methane	ND	2,000	
124-38-9	Carbon Dioxide	ND	2,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-7/03152016**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P1601476-007

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01065

Date Collected: 3/15/16
Date Received: 3/21/16
Date Analyzed: 3/31/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.93 Final Pressure (psig): 5.48

Canister Dilution Factor: 1.87

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,900	
7727-37-9	**Nitrogen**	**778,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	Carbon Dioxide	ND	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-8/03152016**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P1601476-008

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00825

Date Collected: 3/15/16
Date Received: 3/21/16
Date Analyzed: 3/31/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.12 Final Pressure (psig): 5.22

Canister Dilution Factor: 1.88

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,900	
7727-37-9	**Nitrogen**	**778,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	**Carbon Dioxide**	**2,280**	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/03152016**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P1601476-009

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01525

Date Collected: 3/15/16
Date Received: 3/21/16
Date Analyzed: 3/31/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.27 Final Pressure (psig): 5.67

Canister Dilution Factor: 1.95

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	2,000	
7727-37-9	**Nitrogen**	**778,000**	2,000	
74-82-8	Methane	ND	2,000	
124-38-9	Carbon Dioxide	ND	2,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/03152016**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P1601476-010

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01756

Date Collected: 3/15/16
Date Received: 3/21/16
Date Analyzed: 3/31/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.79 Final Pressure (psig): 5.08

Canister Dilution Factor: 1.53

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,500	
7727-37-9	**Nitrogen**	**778,000**	1,500	
74-82-8	Methane	ND	1,500	
124-38-9	**Carbon Dioxide**	**1,630**	1,500	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/03152016**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P1601476-011

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00869

Date Collected: 3/15/16
Date Received: 3/21/16
Date Analyzed: 3/31/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.84 Final Pressure (psig): 5.42

Canister Dilution Factor: 1.85

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,900	
7727-37-9	**Nitrogen**	**778,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	Carbon Dioxide	ND	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P160331-MB

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 3/31/16
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P160331-MB

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 3/31/16
Volume(s) Analyzed: 0.10 ml(s)

CAS #	**Compound**	**Result ppmV**	MRL ppmV	Data Qualifier
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P160331-LCS

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 3/31/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	**Compound**	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen*	25,000	**25,800**	**103**	84-121	
7727-37-9	Nitrogen	50,000	**50,700**	**101**	88-122	
74-82-8	Methane	40,000	**42,100**	**105**	85-116	
124-38-9	Carbon Dioxide	50,000	**50,300**	**101**	84-117	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P160331-LCS

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 3/31/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	**Compound**	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen*	25,000	**26,200**	**105**	84-121	
7727-37-9	Nitrogen	50,000	**51,100**	**102**	88-122	
74-82-8	Methane	40,000	**42,600**	**107**	85-116	
124-38-9	Carbon Dioxide	50,000	**50,700**	**101**	84-117	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-1/03152016** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P1601476-001

Test Code: EPA TO-15 Modified Date Collected: 3/15/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/21/16
Analyst: Simon Cao/Evelyn Alvarez Date Analyzed: 4/2/16 & 4/4/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.22 Liter(s)
Test Notes: 0.11 Liter(s)
Container ID: SC01547

Initial Pressure (psig): -4.38 Final Pressure (psig): 4.96

Canister Dilution Factor: 1.91

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	4.3	1.6	ND	1.1	0.42	
79-01-6	Trichloroethene	**42**	4.3	1.2	**7.8**	0.81	0.23	
127-18-4	Tetrachloroethene	**890**	8.7	2.4	**130**	1.3	0.36	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	4.3	1.3	ND	0.88	0.27	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-2/03152016** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P1601476-002

Test Code: EPA TO-15 Modified Date Collected: 3/15/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/21/16
Analyst: Evelyn Alvarez Date Analyzed: 4/4/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.010 Liter(s)
Test Notes:
Container ID: SSC00055

Initial Pressure (psig): -3.86 Final Pressure (psig): 4.93

Canister Dilution Factor: 1.81

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	91	34	ND	23	8.7	
79-01-6	Trichloroethene	**1,500**	91	25	**290**	17	4.7	
127-18-4	Tetrachloroethene	**16,000**	91	25	**2,400**	13	3.7	
95-63-6	1,2,4-Trimethylbenzene	ND	91	27	ND	18	5.5	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-3/03152016** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P1601476-003

Test Code: EPA TO-15 Modified Date Collected: 3/15/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/21/16
Analyst: Simon Cao Date Analyzed: 4/2/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.035 Liter(s)
Test Notes:
Container ID: SC01086

Initial Pressure (psig): -3.67 Final Pressure (psig): 5.06

Canister Dilution Factor: 1.79

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**11**	26	9.7	**2.7**	6.5	2.5	**J**
79-01-6	Trichloroethene	**770**	26	7.2	**140**	4.8	1.3	
127-18-4	Tetrachloroethene	**4,800**	26	7.2	**700**	3.8	1.1	
95-63-6	1,2,4-Trimethylbenzene	ND	26	7.7	ND	5.2	1.6	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-4/03152016** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P1601476-004

Test Code: EPA TO-15 Modified Date Collected: 3/15/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/21/16
Analyst: Simon Cao Date Analyzed: 4/2/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SSC00236

Initial Pressure (psig): -4.10 Final Pressure (psig): 5.23

Canister Dilution Factor: 1.88

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.94	0.36	ND	0.24	0.090	
79-01-6	Trichloroethene	**24**	0.94	0.26	**4.4**	0.17	0.049	
127-18-4	Tetrachloroethene	**180**	0.94	0.26	**27**	0.14	0.039	
95-63-6	1,2,4-Trimethylbenzene	ND	0.94	0.28	ND	0.19	0.057	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-5/03152016** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P1601476-005

Test Code: EPA TO-15 Modified Date Collected: 3/15/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/21/16
Analyst: Simon Cao Date Analyzed: 4/2/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC01652

Initial Pressure (psig): -3.88 Final Pressure (psig): 5.52

Canister Dilution Factor: 1.87

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.94	0.36	ND	0.24	0.090	
79-01-6	Trichloroethene	**15**	0.94	0.26	**2.9**	0.17	0.049	
127-18-4	Tetrachloroethene	**160**	0.94	0.26	**24**	0.14	0.039	
95-63-6	1,2,4-Trimethylbenzene	ND	0.94	0.28	ND	0.19	0.057	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-6/03152016** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P1601476-006

Test Code: EPA TO-15 Modified Date Collected: 3/15/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/21/16
Analyst: Simon Cao Date Analyzed: 4/2/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC01069

Initial Pressure (psig): -4.72 Final Pressure (psig): 5.62

Canister Dilution Factor: 2.04

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	1.0	0.39	ND	0.26	0.098	
79-01-6	Trichloroethene	**6.5**	1.0	0.29	**1.2**	0.19	0.053	
127-18-4	Tetrachloroethene	**59**	1.0	0.29	**8.8**	0.15	0.042	
95-63-6	1,2,4-Trimethylbenzene	ND	1.0	0.31	ND	0.21	0.062	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-7/03152016** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P1601476-007

Test Code: EPA TO-15 Modified Date Collected: 3/15/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/21/16
Analyst: Simon Cao Date Analyzed: 4/3/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SC01065

Initial Pressure (psig): -3.93 Final Pressure (psig): 5.48

Canister Dilution Factor: 1.87

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.94	0.36	ND	0.24	0.090	
79-01-6	Trichloroethene	**6.3**	0.94	0.26	**1.2**	0.17	0.049	
127-18-4	Tetrachloroethene	**39**	0.94	0.26	**5.8**	0.14	0.039	
95-63-6	1,2,4-Trimethylbenzene	ND	0.94	0.28	ND	0.19	0.057	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-8/03152016** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P1601476-008

Test Code: EPA TO-15 Modified Date Collected: 3/15/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/21/16
Analyst: Simon Cao/Evelyn Alvarez Date Analyzed: 4/3 - 4/4/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.090 Liter(s)
Test Notes: 0.045 Liter(s)
Container ID: SC00825

Initial Pressure (psig): -4.12 Final Pressure (psig): 5.22

Canister Dilution Factor: 1.88

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	10	4.0	ND	2.6	1.0	
79-01-6	Trichloroethene	**88**	10	2.9	**16**	1.9	0.54	
127-18-4	Tetrachloroethene	**2,300**	21	5.8	**340**	3.1	0.86	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	10	3.1	ND	2.1	0.64	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/03152016** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P1601476-009

Test Code: EPA TO-15 Modified Date Collected: 3/15/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/21/16
Analyst: Simon Cao Date Analyzed: 4/4/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.055 Liter(s)
Test Notes:
Container ID: SC01525

Initial Pressure (psig): -4.27 Final Pressure (psig): 5.67

Canister Dilution Factor: 1.95

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	18	6.7	ND	4.5	1.7	
79-01-6	Trichloroethene	**290**	18	5.0	**55**	3.3	0.92	
127-18-4	Tetrachloroethene	**2,900**	18	5.0	**430**	2.6	0.73	
95-63-6	1,2,4-Trimethylbenzene	ND	18	5.3	ND	3.6	1.1	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/03152016** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P1601476-010

Test Code: EPA TO-15 Modified Date Collected: 3/15/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/21/16
Analyst: Simon Cao Date Analyzed: 4/4/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.10 Liter(s)
Test Notes:
Container ID: SC01756

Initial Pressure (psig): -1.79 Final Pressure (psig): 5.08

Canister Dilution Factor: 1.53

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	7.7	2.9	ND	1.9	0.73	
79-01-6	Trichloroethene	**16**	7.7	2.1	**3.1**	1.4	0.40	
127-18-4	Tetrachloroethene	**1,300**	7.7	2.1	**200**	1.1	0.32	
95-63-6	1,2,4-Trimethylbenzene	ND	7.7	2.3	ND	1.6	0.47	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/03152016**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P1601476-011

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Simon Cao
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00869

Date Collected: 3/15/16
Date Received: 3/21/16
Date Analyzed: 4/4/16
Volume(s) Analyzed: 0.055 Liter(s)
0.0055 Liter(s)

Initial Pressure (psig): -3.84 Final Pressure (psig): 5.42

Canister Dilution Factor: 1.85

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	17	6.4	ND	4.2	1.6	
79-01-6	Trichloroethene	**390**	17	4.7	**72**	3.1	0.88	
127-18-4	Tetrachloroethene	**3,100**	170	47	**460**	25	6.9	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	17	5.0	ND	3.4	1.0	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P160402-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Simon Cao
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 4/2/16
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF-Mission Wye**

ALS Project ID: P1601476
ALS Sample ID: P160404-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Evelyn Alvarez
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 4/4/16
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **BNSF-Mission Wye** ALS Project ID: P1601476

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date(s) Collected: 3/15/16
Analyst: Simon Cao Date(s) Received: 3/21/16
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 4/2 - 4/4/16
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P160402-MB	**88**	**100**	**104**	70-130	
Method Blank	P160404-MB	**88**	**104**	**100**	70-130	
Lab Control Sample	P160402-LCS	**86**	**100**	**107**	70-130	
Lab Control Sample	P160404-LCS	**86**	**103**	**103**	70-130	
SVE-1/03152016	P1601476-001	**87**	**100**	**103**	70-130	
SVE-2/03152016	P1601476-002	**87**	**103**	**100**	70-130	
SVE-3/03152016	P1601476-003	**86**	**100**	**102**	70-130	
SVE-3/03152016	P1601476-003DUP	**86**	**100**	**102**	70-130	
SVE-4/03152016	P1601476-004	**87**	**99**	**103**	70-130	
SVE-5/03152016	P1601476-005	**87**	**100**	**104**	70-130	
SVE-6/03152016	P1601476-006	**88**	**101**	**102**	70-130	
SVE-7/03152016	P1601476-007	**87**	**101**	**102**	70-130	
SVE-8/03152016	P1601476-008	**87**	**101**	**100**	70-130	
SVE-CEV/03152016	P1601476-009	**85**	**102**	**101**	70-130	
SVE-EV/03152016	P1601476-010	**86**	**101**	**101**	70-130	
SVE-EV/03152016	P1601476-010DUP	**87**	**100**	**102**	70-130	
SVE-DUP/03152016	P1601476-011	**86**	**100**	**101**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P160402-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 4/2/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**235**	**112**	69-129	
79-01-6	Trichloroethene	216	**207**	**96**	71-121	
127-18-4	Tetrachloroethene	202	**217**	**107**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**228**	**105**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P160404-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Evelyn Alvarez Date Analyzed: 4/4/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**237**	**113**	69-129	
79-01-6	Trichloroethene	216	**206**	**95**	71-121	
127-18-4	Tetrachloroethene	202	**229**	**113**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**241**	**111**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **AECOM Environment**
Client Sample ID: **SVE-3/03152016** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P1601476-003DUP

Test Code: EPA TO-15 Modified Date Collected: 3/15/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/21/16
Analyst: Simon Cao Date Analyzed: 4/2/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.035 Liter(s)
Test Notes:
Container ID: SC01086

Initial Pressure (psig): -3.67 Final Pressure (psig): 5.06

Canister Dilution Factor: 1.79

Compound	Sample Result µg/m³	Sample Result ppbV	**Duplicate Sample Result µg/m³**	**Duplicate Sample Result** ppbV	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
trans-1,2-Dichloroethene	10.7	2.71	10.9	2.76	10.8	**2**	25	**J**
Trichloroethene	771	144	776	145	773.5	**0.6**	25	
Tetrachloroethene	4,780	705	4,810	710	4795	**0.6**	25	
1,2,4-Trimethylbenzene	ND	ND	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/03152016** ALS Project ID: P1601476
Client Project ID: **BNSF-Mission Wye** ALS Sample ID: P1601476-010DUP

Test Code: EPA TO-15 Modified Date Collected: 3/15/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/21/16
Analyst: Simon Cao Date Analyzed: 4/4/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.10 Liter(s)
Test Notes:
Container ID: SC01756

Initial Pressure (psig): -1.79 Final Pressure (psig): 5.08

Canister Dilution Factor: 1.53

Compound	Sample Result µg/m³	Sample Result ppbV	**Duplicate Sample Result µg/m³**	**Duplicate Sample Result** ppbV	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
trans-1,2-Dichloroethene	ND	ND	ND	ND	-	-	25	
Trichloroethene	16.4	3.06	16.4	3.05	16.4	**0**	25	
Tetrachloroethene	1,340	198	1,320	195	1330	**2**	25	
1,2,4-Trimethylbenzene	ND	ND	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

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LABORATORY REPORT

May 13, 2016

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: BNSF Mission Wye

Dear Shelly:

Enclosed are the results of the samples submitted to our laboratory on April 29, 2016. For your reference, these analyses have been assigned our service request number P1602261.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

By Kate Aguilera at 3:35 pm, May 13, 2016

Kate Aguilera
Project Manager

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Client: AECOM Environment
Project: BNSF Mission Wye

Service Request No: P1602261

CASE NARRATIVE

The samples were received intact under chain of custody on April 29, 2016 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen, nitrogen, methane and carbon dioxide) according to ASTM D 1946 (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP or AIHA-LAP accreditation.

Volatile Organic Compound Analysis

The samples were also analyzed for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L15-398
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	977273
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-003
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-15-6
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272015-5
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1602261

Project ID: BNSF Mission Wye

Date Received: 4/29/2016

Time Received: 09:25

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	ASTM D1946-90(2006) - Fxd Gases Can	TO-15 Modified - VOC Cans
SVE-DUP/04262016	P1602261-001	Air	4/26/2016	11:00	SC00270	-1.84	3.72	X	X
SVE-CEV/04262016	P1602261-002	Air	4/26/2016	11:17	SSC00354	-3.51	3.65	X	X
SVE-PHX/04262016	P1602261-003	Air	4/26/2016	11:29	SC02104	-1.98	3.75	X	X

ALS ENVIRONMENTAL

Sample Volume Correction for Helium Pressurization for SCAN Analysis

Sample ID	Pi	Pf	Sample Volume (L)	Adjusted Volume (L)
P1602261-001	-1.84	3.72	0.152	0.17
P1602261-002	-3.51	3.65	0.122	0.14
P1602261-003	-1.98	3.75	0.089	0.10
P1602261-001DIL	-1.84	3.72	0.050	0.056
P1602261-002DIL	-3.51	3.65	0.070	0.080
P1602261-003DIL	-1.98	3.75	0.022	0.025

Validation Date: 10/13/09

Template Name: MFC_GCF_backfill.xls

Printed: 5/13/16

I:\A-GCMS\Helium pressurization\P1602261_HE Pressurization_SCAN_1605111517_LHakobyan.xls

1 of 1

Air - Chain of Custody Record & Analytical Service Request

ALS
2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No: P1602261

Company Name & Address (Reporting Information): AECOM, 207 N. Broadway, ste. 315, Billings, MT 59101

Project Name: BNSF-Mission Wye

Project Number:

ALS Contact:

Project Manager: Shelly Young

P.O. # / Billing Information: SAA

Phone: 406-896-4588

Fax: NA

Email Address for Result Reporting: shelly.young@aecom.com / cole.grover@aecom.com

Sampler (Print & Sign): Cole R Grover / Cole R. Grover

Analysis Method

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	TO-15 (Project COC)	D-1946	Comments e.g. Actual Preservative or specific instructions
SVE-DUP/04262016	1	4-26-2016	1100	00161	NA	-27.5	-2.0	6l	X	X	
SVE-CEV/04262016	2		1117	14163	NA.	-25.0	-3.0	6l	X	X	
SVE-PHX/04262016	3		1129	02038	NA	-29.0	-3.0	6l	X	X	

Report Tier Levels - please select

Tier I - Results (Default in not specified) ____
Tier II (Results + QC Summaries ____
Tier III (Results + QC & Calibration Summaries) X
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required (YES) / No
Type: AECOM Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Cole R Grover	4-26-2016	1600	[signature]	4/29/16	0925
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____°C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1602261
Project: BNSF Mission Wye
Sample(s) received on: 4/29/16 Date opened: 4/29/16 by: KKELPE

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1602261-001.01	6.0 L Source Can					
P1602261-002.01	6.0 L Silonite Can					
P1602261-003.01	6.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/04262016**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1602261
ALS Sample ID: P1602261-001

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: 4/26/16
Date Received: 4/29/16
Date Analyzed: 5/5/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.84 Final Pressure (psig): 3.72

Canister Dilution Factor: 1.43

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,400	
7727-37-9	**Nitrogen**	**778,000**	1,400	
74-82-8	Methane	ND	1,400	
124-38-9	**Carbon Dioxide**	**1,710**	1,400	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/04262016**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1602261
ALS Sample ID: P1602261-002

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:

Date Collected: 4/26/16
Date Received: 4/29/16
Date Analyzed: 5/5/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.51 Final Pressure (psig): 3.65

Canister Dilution Factor: 1.64

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,600	
7727-37-9	**Nitrogen**	**778,000**	1,600	
74-82-8	Methane	ND	1,600	
124-38-9	Carbon Dioxide	ND	1,600	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-PHX/04262016**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1602261
ALS Sample ID: P1602261-003

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: 4/26/16
Date Received: 4/29/16
Date Analyzed: 5/5/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -1.98 Final Pressure (psig): 3.75

Canister Dilution Factor: 1.45

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**219,000**	1,500	
7727-37-9	**Nitrogen**	**778,000**	1,500	
74-82-8	Methane	ND	1,500	
124-38-9	**Carbon Dioxide**	**2,390**	1,500	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1602261
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P160505-MB

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 5/05/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1602261
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P160505-LCS

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 5/05/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	**Compound**	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen*	25,000	**25,400**	**102**	84-121	
7727-37-9	Nitrogen	50,000	**50,100**	**100**	88-122	
74-82-8	Methane	40,000	**41,600**	**104**	85-116	
124-38-9	Carbon Dioxide	50,000	**49,600**	**99**	84-117	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/04262016**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1602261
ALS Sample ID: P1602261-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
Analyst: Lusine Hakobyan
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00270

Date Collected: 4/26/16
Date Received: 4/29/16
Date Analyzed: 5/12/16
Volume(s) Analyzed: 0.17 Liter(s)
0.056 Liter(s)

Initial Pressure (psig): -1.84 Final Pressure (psig): 3.72

Canister Dilution Factor: 1.43

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	4.2	1.6	ND	1.1	0.40	
79-01-6	Trichloroethene	**220**	4.2	1.2	**41**	0.78	0.22	
127-18-4	Tetrachloroethene	**2,100**	13	3.6	**310**	1.9	0.53	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	4.2	1.3	ND	0.86	0.26	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/04262016** ALS Project ID: P1602261
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1602261-002

Test Code: EPA TO-15 Modified Date Collected: 4/26/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 4/29/16
Analyst: Lusine Hakobyan Date Analyzed: 5/12/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.14 Liter(s)
Test Notes: 0.080 Liter(s)
Container ID: SSC00354

Initial Pressure (psig): -3.51 Final Pressure (psig): 3.65

Canister Dilution Factor: 1.64

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	5.9	2.2	ND	1.5	0.56	
79-01-6	Trichloroethene	**210**	5.9	1.6	**39**	1.1	0.31	
127-18-4	Tetrachloroethene	**1,900**	10	2.9	**280**	1.5	0.42	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	5.9	1.8	ND	1.2	0.36	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-PHX/04262016** ALS Project ID: P1602261
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1602261-003

Test Code: EPA TO-15 Modified Date Collected: 4/26/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 4/29/16
Analyst: Lusine Hakobyan Date Analyzed: 5/12/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.10 Liter(s)
Test Notes: 0.025 Liter(s)
Container ID: SC02104

Initial Pressure (psig): -1.98 Final Pressure (psig): 3.75

Canister Dilution Factor: 1.45

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	7.3	2.8	ND	1.8	0.70	
79-01-6	Trichloroethene	**280**	7.3	2.0	**53**	1.3	0.38	
127-18-4	Tetrachloroethene	**2,700**	29	8.1	**410**	4.3	1.2	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	7.3	2.2	ND	1.5	0.44	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1602261
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P160511-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 5/11/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **BNSF Mission Wye** ALS Project ID: P1602261

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date(s) Collected: 4/26/16
Analyst: Lusine Hakobyan Date(s) Received: 4/29/16
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 5/11 - 5/12/16
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P160511-MB	**95**	**102**	**101**	70-130	
Lab Control Sample	P160511-LCS	**93**	**102**	**101**	70-130	
SVE-DUP/04262016	P1602261-001	**95**	**103**	**102**	70-130	
SVE-CEV/04262016	P1602261-002	**95**	**104**	**101**	70-130	
SVE-PHX/04262016	P1602261-003	**94**	**102**	**100**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1602261
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P160511-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 5/12/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**216**	**103**	69-129	
79-01-6	Trichloroethene	216	**205**	**95**	71-121	
127-18-4	Tetrachloroethene	202	**209**	**103**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**215**	**99**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

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LABORATORY REPORT

June 16, 2016

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: Mission Wye

Dear Shelly:

Enclosed are the results of the samples submitted to our laboratory on June 2, 2016. For your reference, these analyses have been assigned our service request number P1602804.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Samantha Henningsen

By Samantha Henningsen at 9:54 am, Jun 16, 2016

For Kate Aguilera
Project Manager

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www.alsglobal.com

Client: AECOM Environment
Project: Mission Wye

Service Request No: P1602804

CASE NARRATIVE

The samples were received intact under chain of custody on June 2, 2016 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen, nitrogen, methane and carbon dioxide) according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP or AIHA-LAP accreditation.

Volatile Organic Compound Analysis

The samples were also analyzed for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
DoD ELAP	http://www.pjlabs.com/search-accredited-labs	L15-398
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	977273
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-003
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-15-6
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272015-5
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1602804

Project ID: Mission Wye

Date Received: 6/2/2016

Time Received: 09:30

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	ASTM D1946-90(2006) - Fxd Gases Bag	TO-15 Modified - VOC Cans
SVE-CEV05262016	P1602804-001	Air	5/26/2016	16:04	SC01793	-3.70	3.65	X	X
SVE-DUP05262016	P1602804-002	Air	5/26/2016	16:12	SC00133	-3.34	3.52	X	X

Air - Chain of Custody Record & Analytical Service Request

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No: P1602864

Company Name & Address (Reporting Information): BNSF MISSION WYE SITE

Project Name: MISSION WYE

Project Number:

Project Manager: Cole Grover AECOM

P.O. # / Billing Information:

Phone: 406-896-4588 Fax: 406-670-8571

Email Address for Result Reporting: cole.grover@AECOM.com

Sampler (Print & Sign): W Chambers W. Chambers OTS

ALS Contact:

Analysis Method

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume			Comments e.g. Actual Preservative or specific instructions
SVE-CEV05262016	1	5-26-16	16:09	SC01793	AVG04243 ~~SC00133~~ WB	-25.5	-4.0	6L	TO-15	D-1946	
SVE-DUP05262016	2	5-26-16	16:12	~~AVG04243~~ SC00133 WB	AVG04472	-27.0	-4.0	6L	TO-15	D1946	

5 of 17

Report Tier Levels - please select
Tier I - Results (Default in not specified) _____
Tier II (Results + QC Summaries _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Date Validation Package) 10% Surcharge _____

EDD required YES / No
Type: _____ Units: _____

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
W. Chambers	5-26-16	16:45			
Relinquished by: (Signature) FEDEX	Date:	Time:	Received by: (Signature)	6/2/16	Time: 0930

Cooler / Blank Temperature _____°C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1602804
Project: Mission Wye
Sample(s) received on: 6/2/16 Date opened: 6/2/16 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1602804-001.01	6.0 L Source Can					
P1602804-002.01	6.0 L Source Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV05262016**
Client Project ID: **Mission Wye**

ALS Project ID: P1602804
ALS Sample ID: P1602804-001

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Wade Henton
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01793

Date Collected: 5/26/16
Date Received: 6/2/16
Date Analyzed: 6/8/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.70 Final Pressure (psig): 3.65

Canister Dilution Factor: 1.67

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**219,000**	1,700	
7727-37-9	**Nitrogen**	**778,000**	1,700	
74-82-8	Methane	ND	1,700	
124-38-9	**Carbon Dioxide**	**2,460**	1,700	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP05262016**
Client Project ID: **Mission Wye**

ALS Project ID: P1602804
ALS Sample ID: P1602804-002

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Wade Henton
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC00133

Date Collected: 5/26/16
Date Received: 6/2/16
Date Analyzed: 6/8/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.34 Final Pressure (psig): 3.52

Canister Dilution Factor: 1.60

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**219,000**	1,600	
7727-37-9	**Nitrogen**	**779,000**	1,600	
74-82-8	Methane	ND	1,600	
124-38-9	**Carbon Dioxide**	**2,360**	1,600	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye**

ALS Project ID: P1602804
ALS Sample ID: P160608-MB

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Wade Henton
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 6/08/16
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1602804
Client Project ID: **Mission Wye** ALS Sample ID: P160608-LCS

Test Code: ASTM D1946 Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Wade Henton Date Analyzed: 6/08/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: NA ml(s)
Test Notes:

CAS #	**Compound**	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen*	25,000	**25,600**	**102**	84-121	
7727-37-9	Nitrogen	50,000	**50,500**	**101**	88-122	
74-82-8	Methane	40,000	**41,700**	**104**	85-116	
124-38-9	Carbon Dioxide	50,000	**49,900**	**100**	84-117	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV05262016**
Client Project ID: **Mission Wye**

ALS Project ID: P1602804
ALS Sample ID: P1602804-001

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Simon Cao
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01793

Date Collected: 5/26/16
Date Received: 6/2/16
Date Analyzed: 6/3/16 & 6/8/16
Volume(s) Analyzed: 0.0575 Liter(s)
0.0287 Liter(s)

Initial Pressure (psig): -3.70 Final Pressure (psig): 3.65

Canister Dilution Factor: 1.67

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	15	5.5	ND	3.7	1.4	
79-01-6	Trichloroethene	**320**	15	4.1	**59**	2.7	0.76	
127-18-4	Tetrachloroethene	**2,800**	29	8.1	**420**	4.3	1.2	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	15	4.4	ND	3.0	0.89	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP05262016** ALS Project ID: P1602804
Client Project ID: **Mission Wye** ALS Sample ID: P1602804-002

Test Code: EPA TO-15 Modified Date Collected: 5/26/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/2/16
Analyst: Simon Cao Date Analyzed: 6/3/16 & 6/8/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.0571 Liter(s)
Test Notes: 0.0285 Liter(s)
Container ID: SC00133

Initial Pressure (psig): -3.34 Final Pressure (psig): 3.52

Canister Dilution Factor: 1.60

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	14	5.3	ND	3.5	1.3	
79-01-6	Trichloroethene	**310**	14	3.9	**58**	2.6	0.73	
127-18-4	Tetrachloroethene	**2,800**	28	7.9	**420**	4.1	1.2	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	14	4.2	ND	2.9	0.86	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye**

ALS Project ID: P1602804
ALS Sample ID: P160603-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Simon Cao
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 6/3/16
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank** ALS Project ID: P1602804
Client Project ID: **Mission Wye** ALS Sample ID: P160607-MB

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 6/7/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **Mission Wye** ALS Project ID: P1602804

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date(s) Collected: 5/26/16
Analyst: Simon Cao Date(s) Received: 6/2/16
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 6/3 - 6/7/16
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P160603-MB	**95**	**105**	**111**	70-130	
Method Blank	P160607-MB	**91**	**96**	**130**	70-130	
Lab Control Sample	P160603-LCS	**95**	**100**	**117**	70-130	
Lab Control Sample	P160607-LCS	**90**	**103**	**116**	70-130	
SVE-CEV05262016	P1602804-001	**95**	**99**	**115**	70-130	
SVE-DUP05262016	P1602804-002	**97**	**99**	**114**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1602804
Client Project ID: **Mission Wye** ALS Sample ID: P160603-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 6/3/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**214**	**102**	69-129	
79-01-6	Trichloroethene	216	**231**	**107**	71-121	
127-18-4	Tetrachloroethene	202	**240**	**119**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**256**	**117**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1602804
Client Project ID: **Mission Wye** ALS Sample ID: P160607-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 6/7/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**202**	**96**	69-129	
79-01-6	Trichloroethene	216	**223**	**103**	71-121	
127-18-4	Tetrachloroethene	202	**236**	**117**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**245**	**112**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
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F: +1 805 526 7270
www.alsglobal.com

LABORATORY REPORT

July 21, 2016

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: Mission Wye / 60436173

Dear Shelly:

Enclosed are the results of the samples submitted to our laboratory on July 7, 2016. For your reference, these analyses have been assigned our service request number P1603415.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

By Sue Anderson at 5:28 pm, Jul 21, 2016

For Kate Aguilera
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

Client: AECOM Environment
Project: Mission Wye / 60436173

Service Request No: P1603415

CASE NARRATIVE

The samples were received intact under chain of custody on July 7, 2016 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen, nitrogen, methane and carbon dioxide) according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP or AIHA-LAP, LLC accreditation.

Volatile Organic Compound Analysis

The samples were also analyzed for volatile organic in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP, LLC accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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www.alsglobal.com

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA-LAP, LLC	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	977273
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-003
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-16-7
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272016-6
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1603415

Project ID: Mission Wye / 60436173

Date Received: 7/7/2016

Time Received: 09:25

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	ASTM D1946-90(2006) - Fxd Gases Bag	TO-15 Modified - VOC Cans
SVE-1/06302016	P1603415-001	Air	6/30/2016	11:42	AC02156	-4.90	3.72	X	X
SVE-2/06302016	P1603415-002	Air	6/30/2016	11:49	AS00663	-4.46	4.38	X	X
SVE-3/06302016	P1603415-003	Air	6/30/2016	13:34	AS01129	-3.93	3.75	X	X
SVE-4/06302016	P1603415-004	Air	6/30/2016	13:39	AS00802	-3.53	3.68	X	X
SVE-5/06302016	P1603415-005	Air	6/30/2016	13:46	AC01837	-4.80	4.16	X	X
SVE-6/06302016	P1603415-006	Air	6/30/2016	14:12	AS00750	-5.42	3.73	X	X
SVE-7/06302016	P1603415-007	Air	6/30/2016	14:26	SSC00085	-4.80	3.53	X	X
SVE-8/06302016	P1603415-008	Air	6/30/2016	14:31	AS00424	-4.11	3.57	X	X
SVE-EV/06302016	P1603415-009	Air	6/30/2016	15:05	AC01122	-3.08	3.75	X	X
SVE-CEV/06302016	P1603415-010	Air	6/30/2016	14:44	AS00803	-2.67	3.87	X	X
SVE-DUP/06302016	P1603415-011	Air	6/30/2016	14:46	AC02055	-2.34	3.98	X	X

ALS ENVIRONMENTAL

Sample Volume Correction for Helium Pressurization for SCAN Analysis

Sample ID	Pi	Pf	Sample Volume (L)	Adjusted Volume (L)
P1603415-001	-4.90	3.72	0.298	0.350
P1603415-001DIL	-4.90	3.72	0.043	0.0500
P1603415-003	-3.93	3.75	0.035	0.0400
P1603415-004	-3.53	3.68	0.872	1.00
P1603415-005	-4.80	4.16	0.851	1.00
P1603415-006	-5.42	3.73	0.845	1.00
P1603415-007	-4.80	3.53	0.855	1.00
P1603415-008	-4.11	3.57	0.242	0.280
P1603415-009	-3.08	3.75	0.026	0.0300
P1603415-010	-2.67	3.87	0.088	0.100
P1603415-011	-2.34	3.98	0.089	0.100

Validation Date: 10/13/09

Template Name: MFC_GCF_backfill.xls

Printed: 7/21/16

Air - Chain of Custody Record & Analytical Service Request

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No. F605415

ALS Contact:

Company Name & Address (Reporting Information): AECOM

Project Name: MISSION WYE

Project Number: 60436173

Project Manager: Cole Grover

P.O. # / Billing Information: AECOM

Phone:

Fax:

Email Address for Result Reporting: cole.grover@aecom.com

Sampler (Print & Sign): W Chambers W Chambers

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method		Comments e.g. Actual Preservative or specific instructions
SVE-1/06302016	1	6-30-16	11:42	SC02114	AC02156	-26.0	-5.0	6L	TO15	D1946	
SVE-2/06302016	2		11:49	5035	005868	-25.0	-3.0		TO15	D1946	
SVE3/06302016	3		12:34	21235	AVG04617	-27.0	-5.0		TO15	D1946	
SVE4/06302016	4		13:39	17274	AVG04656	-29.0	-5.0		TO15	D1946	
SVE5/06302016	5		13:45	11944	AVG04110	-27.0	-5.0		TO15	D1946	
SVE6/06302016	6		14:12	AS00750	AVG04053	-26.0	-6.0		TO15	D1946	
SVE7/06302016	7		14:26	SSC00085	004193	-25.0	-5.0		TO15	D1946	
SVE8/06302016	8		14:31	14197	AS00624	-26.0	-5.0		TO15	D1946	
SVE-EV/06302016	9		15:05	AC00122	AVG02391	-30.0	-6.0		TO15	—	
SVE-CEV/06302016	10		14:44	17289	AVG03348	-27.0	-2.0		TO15	D1946	
SVE-DUP/06302016	11		14:46	11927	AVG04385	-27.5	-5.0		TO15	D1946	

Report Tier Levels - please select

Tier I - Results (Default in not specified) ____
Tier II (Results + QC Summaries ____
Tier III (Results + QC & Calibration Summaries) X
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required YES No
Type: AECOM Units: ____

Chain of Custody Seal (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Cole Grover FEDEX	7-1-2016	1625			
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
				7/1/16	0925

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1603415
Project: Mission Wye / 60436173
Sample(s) received on: 7/7/16 Date opened: 7/7/16 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1603415-001.01	6.0 L Ambient Can					
P1603415-002.01	6.0 L Silonite Can					
P1603415-003.01	6.0 L Silonite Can					
P1603415-004.01	6.0 L Silonite Can					
P1603415-005.01	6.0 L Ambient Can					
P1603415-006.01	6.0 L Silonite Can					
P1603415-007.01	6.0 L Silonite Can					
P1603415-008.01	6.0 L Silonite Can					
P1603415-009.01	6.0 L Ambient Can					
P1603415-010.01	6.0 L Silonite Can					
P1603415-011.01	6.0 L Ambient Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-1/06302016**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603415
ALS Sample ID: P1603415-001

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC02156

Date Collected: 6/30/16
Date Received: 7/7/16
Date Analyzed: 7/11/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.90 Final Pressure (psig): 3.72

Canister Dilution Factor: 1.88

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,900	
7727-37-9	**Nitrogen**	**778,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	Carbon Dioxide	ND	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-2/06302016**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603415
ALS Sample ID: P1603415-002

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS00663

Date Collected: 6/30/16
Date Received: 7/7/16
Date Analyzed: 7/11/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.46 Final Pressure (psig): 4.38

Canister Dilution Factor: 1.86

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,900	
7727-37-9	**Nitrogen**	**778,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	Carbon Dioxide	ND	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-3/06302016**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603415
ALS Sample ID: P1603415-003

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS01129

Date Collected: 6/30/16
Date Received: 7/7/16
Date Analyzed: 7/11/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.93 Final Pressure (psig): 3.75

Canister Dilution Factor: 1.71

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,700	
7727-37-9	**Nitrogen**	**778,000**	1,700	
74-82-8	Methane	ND	1,700	
124-38-9	Carbon Dioxide	ND	1,700	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-4/06302016**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603415
ALS Sample ID: P1603415-004

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS00802

Date Collected: 6/30/16
Date Received: 7/7/16
Date Analyzed: 7/11/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.53 Final Pressure (psig): 3.68

Canister Dilution Factor: 1.65

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**218,000**	1,700	
7727-37-9	**Nitrogen**	**778,000**	1,700	
74-82-8	Methane	ND	1,700	
124-38-9	**Carbon Dioxide**	**3,660**	1,700	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-5/06302016**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603415
ALS Sample ID: P1603415-005

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01837

Date Collected: 6/30/16
Date Received: 7/7/16
Date Analyzed: 7/11/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.80 Final Pressure (psig): 4.16

Canister Dilution Factor: 1.91

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**217,000**	1,900	
7727-37-9	**Nitrogen**	**778,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	**Carbon Dioxide**	**4,970**	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-6/06302016**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603415
ALS Sample ID: P1603415-006

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS00750

Date Collected: 6/30/16
Date Received: 7/7/16
Date Analyzed: 7/11/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -5.42 Final Pressure (psig): 3.73

Canister Dilution Factor: 1.99

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**214,000**	2,000	
7727-37-9	**Nitrogen**	**779,000**	2,000	
74-82-8	Methane	ND	2,000	
124-38-9	**Carbon Dioxide**	**6,620**	2,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-7/06302016**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603415
ALS Sample ID: P1603415-007

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: SSC00085

Date Collected: 6/30/16
Date Received: 7/7/16
Date Analyzed: 7/11/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.80 Final Pressure (psig): 3.53

Canister Dilution Factor: 1.84

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**218,000**	1,800	
7727-37-9	**Nitrogen**	**778,000**	1,800	
74-82-8	Methane	ND	1,800	
124-38-9	**Carbon Dioxide**	**3,810**	1,800	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-8/06302016**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603415
ALS Sample ID: P1603415-008

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS00424

Date Collected: 6/30/16
Date Received: 7/7/16
Date Analyzed: 7/11/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.11 Final Pressure (psig): 3.57

Canister Dilution Factor: 1.73

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,700	
7727-37-9	**Nitrogen**	**778,000**	1,700	
74-82-8	Methane	ND	1,700	
124-38-9	**Carbon Dioxide**	**2,060**	1,700	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/06302016**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603415
ALS Sample ID: P1603415-009

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC01122

Date Collected: 6/30/16
Date Received: 7/7/16
Date Analyzed: 7/11/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.08 Final Pressure (psig): 3.75

Canister Dilution Factor: 1.59

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,600	
7727-37-9	**Nitrogen**	**778,000**	1,600	
74-82-8	Methane	ND	1,600	
124-38-9	Carbon Dioxide	ND	1,600	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/06302016**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603415
ALS Sample ID: P1603415-010

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS00803

Date Collected: 6/30/16
Date Received: 7/7/16
Date Analyzed: 7/11/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.67 Final Pressure (psig): 3.87

Canister Dilution Factor: 1.54

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,500	
7727-37-9	**Nitrogen**	**778,000**	1,500	
74-82-8	Methane	ND	1,500	
124-38-9	Carbon Dioxide	ND	1,500	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/06302016**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603415
ALS Sample ID: P1603415-011

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC02055

Date Collected: 6/30/16
Date Received: 7/7/16
Date Analyzed: 7/11/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.34 Final Pressure (psig): 3.98

Canister Dilution Factor: 1.51

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,500	
7727-37-9	**Nitrogen**	**778,000**	1,500	
74-82-8	Methane	ND	1,500	
124-38-9	Carbon Dioxide	ND	1,500	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603415
ALS Sample ID: P160711-MB

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 7/11/16
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603415
ALS Sample ID: P160711-LCS

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 7/11/16
Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen*	25,000	**25,700**	**103**	84-121	
7727-37-9	Nitrogen	50,000	**50,700**	**101**	88-122	
74-82-8	Methane	40,000	**42,600**	**107**	85-116	
124-38-9	Carbon Dioxide	50,000	**50,600**	**101**	84-117	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-1/06302016** ALS Project ID: P1603415
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1603415-001

Test Code: EPA TO-15 Modified Date Collected: 6/30/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 7/7/16
Analyst: Lusine Hakobyan Date Analyzed: 7/14/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.35 Liter(s)
Test Notes: 0.050 Liter(s)
Container ID: AC02156

Initial Pressure (psig): -4.90 Final Pressure (psig): 3.72

Canister Dilution Factor: 1.88

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	2.7	1.0	ND	0.68	0.26	
79-01-6	Trichloroethene	**67**	2.7	0.75	**12**	0.50	0.14	
127-18-4	Tetrachloroethene	**570**	19	5.3	**84**	2.8	0.78	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	2.7	0.81	ND	0.55	0.16	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-2/06302016** ALS Project ID: P1603415
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1603415-002

Test Code: EPA TO-15 Modified Date Collected: 6/30/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 7/7/16
Analyst: Lusine Hakobyan Date Analyzed: 7/14/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.013 Liter(s)
Test Notes:
Container ID: AS00663

Initial Pressure (psig): -4.46 Final Pressure (psig): 4.38

Canister Dilution Factor: 1.86

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	72	27	ND	18	6.9	
79-01-6	Trichloroethene	**970**	72	20	**180**	13	3.7	
127-18-4	Tetrachloroethene	**9,700**	72	20	**1,400**	11	3.0	
95-63-6	1,2,4-Trimethylbenzene	ND	72	21	ND	15	4.4	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-3/06302016** ALS Project ID: P1603415
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1603415-003

Test Code: EPA TO-15 Modified Date Collected: 6/30/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 7/7/16
Analyst: Lusine Hakobyan Date Analyzed: 7/14/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.040 Liter(s)
Test Notes:
Container ID: AS01129

Initial Pressure (psig): -3.93 Final Pressure (psig): 3.75

Canister Dilution Factor: 1.71

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	21	8.1	ND	5.4	2.0	
79-01-6	Trichloroethene	**970**	21	6.0	**180**	4.0	1.1	
127-18-4	Tetrachloroethene	**4,000**	21	6.0	**590**	3.2	0.88	
95-63-6	1,2,4-Trimethylbenzene	ND	21	6.4	ND	4.3	1.3	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-4/06302016** ALS Project ID: P1603415
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1603415-004

Test Code: EPA TO-15 Modified Date Collected: 6/30/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 7/7/16
Analyst: Lusine Hakobyan Date Analyzed: 7/14/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00802

Initial Pressure (psig): -3.53 Final Pressure (psig): 3.68

Canister Dilution Factor: 1.65

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.83	0.31	ND	0.21	0.079	
79-01-6	Trichloroethene	**30**	0.83	0.23	**5.6**	0.15	0.043	
127-18-4	Tetrachloroethene	**51**	0.83	0.23	**7.5**	0.12	0.034	
95-63-6	1,2,4-Trimethylbenzene	ND	0.83	0.25	ND	0.17	0.050	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-5/06302016** ALS Project ID: P1603415
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1603415-005

Test Code: EPA TO-15 Modified Date Collected: 6/30/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 7/7/16
Analyst: Lusine Hakobyan Date Analyzed: 7/14/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01837

Initial Pressure (psig): -4.80 Final Pressure (psig): 4.16

Canister Dilution Factor: 1.91

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.96	0.36	ND	0.24	0.092	
79-01-6	Trichloroethene	**13**	0.96	0.27	**2.4**	0.18	0.050	
127-18-4	Tetrachloroethene	**88**	0.96	0.27	**13**	0.14	0.039	
95-63-6	1,2,4-Trimethylbenzene	ND	0.96	0.29	ND	0.19	0.058	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-6/06302016** ALS Project ID: P1603415
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1603415-006

Test Code: EPA TO-15 Modified Date Collected: 6/30/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 7/7/16
Analyst: Lusine Hakobyan Date Analyzed: 7/14/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00750

Initial Pressure (psig): -5.42 Final Pressure (psig): 3.73

Canister Dilution Factor: 1.99

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	1.0	0.38	ND	0.25	0.095	
79-01-6	Trichloroethene	**9.0**	1.0	0.28	**1.7**	0.19	0.052	
127-18-4	Tetrachloroethene	**81**	1.0	0.28	**12**	0.15	0.041	
95-63-6	1,2,4-Trimethylbenzene	ND	1.0	0.30	ND	0.20	0.061	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-7/06302016** ALS Project ID: P1603415
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1603415-007

Test Code: EPA TO-15 Modified Date Collected: 6/30/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 7/7/16
Analyst: Lusine Hakobyan Date Analyzed: 7/14/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: SSC00085

Initial Pressure (psig): -4.80 Final Pressure (psig): 3.53

Canister Dilution Factor: 1.84

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.92	0.35	ND	0.23	0.088	
79-01-6	Trichloroethene	**31**	0.92	0.26	**5.8**	0.17	0.048	
127-18-4	Tetrachloroethene	**140**	0.92	0.26	**20**	0.14	0.038	
95-63-6	1,2,4-Trimethylbenzene	ND	0.92	0.28	ND	0.19	0.056	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-8/06302016** ALS Project ID: P1603415
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1603415-008

Test Code: EPA TO-15 Modified Date Collected: 6/30/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 7/7/16
Analyst: Lusine Hakobyan Date Analyzed: 7/14/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.28 Liter(s)
Test Notes:
Container ID: AS00424

Initial Pressure (psig): -4.11 Final Pressure (psig): 3.57

Canister Dilution Factor: 1.73

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	3.1	1.2	ND	0.78	0.30	
79-01-6	Trichloroethene	**57**	3.1	0.87	**11**	0.58	0.16	
127-18-4	Tetrachloroethene	**580**	3.1	0.87	**86**	0.46	0.13	
95-63-6	1,2,4-Trimethylbenzene	ND	3.1	0.93	ND	0.63	0.19	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/06302016** ALS Project ID: P1603415
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1603415-009

Test Code: EPA TO-15 Modified Date Collected: 6/30/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 7/7/16
Analyst: Lusine Hakobyan Date Analyzed: 7/14/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.030 Liter(s)
Test Notes:
Container ID: AC01122

Initial Pressure (psig): -3.08 Final Pressure (psig): 3.75

Canister Dilution Factor: 1.59

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	27	10	ND	6.7	2.5	
79-01-6	Trichloroethene	**340**	27	7.4	**63**	4.9	1.4	
127-18-4	Tetrachloroethene	**4,100**	27	7.4	**610**	3.9	1.1	
95-63-6	1,2,4-Trimethylbenzene	ND	27	8.0	ND	5.4	1.6	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/06302016** ALS Project ID: P1603415
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1603415-010

Test Code: EPA TO-15 Modified Date Collected: 6/30/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 7/7/16
Analyst: Lusine Hakobyan Date Analyzed: 7/14/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.10 Liter(s)
Test Notes:
Container ID: AS00803

Initial Pressure (psig): -2.67 Final Pressure (psig): 3.87

Canister Dilution Factor: 1.54

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	7.7	2.9	ND	1.9	0.74	
79-01-6	Trichloroethene	**160**	7.7	2.2	**29**	1.4	0.40	
127-18-4	Tetrachloroethene	**1,100**	7.7	2.2	**170**	1.1	0.32	
95-63-6	1,2,4-Trimethylbenzene	ND	7.7	2.3	ND	1.6	0.47	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/06302016** ALS Project ID: P1603415
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1603415-011

Test Code: EPA TO-15 Modified Date Collected: 6/30/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 7/7/16
Analyst: Lusine Hakobyan Date Analyzed: 7/14/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.10 Liter(s)
Test Notes:
Container ID: AC02055

Initial Pressure (psig): -2.34 Final Pressure (psig): 3.98

Canister Dilution Factor: 1.51

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	7.6	2.9	ND	1.9	0.72	
79-01-6	Trichloroethene	**160**	7.6	2.1	**29**	1.4	0.39	
127-18-4	Tetrachloroethene	**1,100**	7.6	2.1	**170**	1.1	0.31	
95-63-6	1,2,4-Trimethylbenzene	ND	7.6	2.3	ND	1.5	0.46	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603415
ALS Sample ID: P160714-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16
Analyst: Lusine Hakobyan
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 7/14/16
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **Mission Wye / 60436173** ALS Project ID: P1603415

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date(s) Collected: 6/30/16
Analyst: Lusine Hakobyan Date(s) Received: 7/7/16
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 7/14/16
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P160714-MB	**99**	**102**	**105**	70-130	
Lab Control Sample	P160714-LCS	**95**	**101**	**105**	70-130	
SVE-1/06302016	P1603415-001	**99**	**102**	**105**	70-130	
SVE-2/06302016	P1603415-002	**98**	**102**	**103**	70-130	
SVE-3/06302016	P1603415-003	**98**	**102**	**103**	70-130	
SVE-4/06302016	P1603415-004	**99**	**101**	**104**	70-130	
SVE-5/06302016	P1603415-005	**99**	**102**	**105**	70-130	
SVE-5/06302016	P1603415-005DUP	**99**	**101**	**104**	70-130	
SVE-6/06302016	P1603415-006	**98**	**102**	**103**	70-130	
SVE-7/06302016	P1603415-007	**99**	**102**	**104**	70-130	
SVE-8/06302016	P1603415-008	**98**	**103**	**105**	70-130	
SVE-EV/06302016	P1603415-009	**97**	**102**	**104**	70-130	
SVE-CEV/06302016	P1603415-010	**97**	**101**	**104**	70-130	
SVE-DUP/06302016	P1603415-011	**98**	**100**	**106**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1603415
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P160714-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 7/14/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**210**	**100**	69-129	
79-01-6	Trichloroethene	216	**208**	**96**	71-121	
127-18-4	Tetrachloroethene	202	**200**	**99**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**208**	**95**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **AECOM Environment**
Client Sample ID: **SVE-5/06302016** ALS Project ID: P1603415
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1603415-005DUP

Test Code: EPA TO-15 Modified Date Collected: 6/30/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Cinert/6890N/MS16 Date Received: 7/7/16
Analyst: Lusine Hakobyan Date Analyzed: 7/14/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01837

Initial Pressure (psig): -4.80 Final Pressure (psig): 4.16

Canister Dilution Factor: 1.91

Compound	Sample Result µg/m³	Sample Result ppbV	**Duplicate Sample Result µg/m³**	**Duplicate Sample Result** ppbV	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
trans-1,2-Dichloroethene	ND	ND	ND	ND	-	-	25	
Trichloroethene	12.7	2.37	12.6	2.35	12.65	**0.8**	25	
Tetrachloroethene	87.9	13.0	87.7	12.9	87.8	**0.2**	25	
1,2,4-Trimethylbenzene	ND	ND	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.

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LABORATORY REPORT

August 12, 2016

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: Mission Wye / 60436173

Dear Shelly:

Enclosed are the results of the samples submitted to our laboratory on August 1, 2016. For your reference, these analyses have been assigned our service request number P1603773.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Kaneko

By Kate Kaneko at 3:40 pm, 08/12/16

Kate Kaneko
Project Manager

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Client: AECOM Environment
Project: Mission Wye / 60436173

Service Request No: P1603773

CASE NARRATIVE

The samples were received intact under chain of custody on August 1, 2016 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample(s) at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen, nitrogen, methane and carbon dioxide) according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP or AIHA-LAP, LLC accreditation.

Volatile Organic Compound Analysis

The samples were also analyzed for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation, however it is not part of the AIHA-LAP, LLC accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The dilution for tetrachloroethene in sample SVE-DUP/07272016 (P1603773-002) was analyzed on August 5, 2016. This analytical batch did not have a sample duplicate.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
AIHA-LAP, LLC	http://www.aihaaccreditedlabs.org	101661
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2014025
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	977273
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-003
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-16-7
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272016-6
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1603773

Project ID: Mission Wye / 60436173

Date Received: 8/1/2016

Time Received: 09:40

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	ASTM D1946-90(2006) - Fxd Gases Bag	TO-15 Modified - VOC Cans
SVE-CEV/07272016	P1603773-001	Air	7/27/2016	12:05	SC01653	-4.86	3.92	X	X
SVE-DUP/07272016	P1603773-002	Air	7/27/2016	12:06	AS00712	-2.54	3.79	X	X

ALS ENVIRONMENTAL

Sample Volume Correction for Helium Pressurization for SCAN Analysis

Sample ID	Pi	Pf	Sample Volume (L)	Adjusted Volume (L)
P1603773-001	-4.86	3.92	0.300	0.352
P1603773-002	-2.54	3.79	0.177	0.200
P1603773-001DIL	-4.86	3.92	0.050	0.0587
P1603773-002DIL	-2.54	3.79	0.088	0.100

Validation Date: 10/13/09

Template Name: MFC_GCF_backfill.xls

Printed: 8/12/16

I:\A-GCMS\Helium pressurization\P1603773_HE Pressurization_SCAN_1608040657_WAng.xls

1 of 1

Air - Chain of Custody Record & Analytical Service Request

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No: F603773

Company Name & Address (Reporting Information): AECOM

Project Name: MISSION WYE

Project Number: 60436173

Project Manager: Cole Grover

P.O. # / Billing Information: AECOM

Phone: 406-670-8571

Fax:

Email Address for Result Reporting: Cole.Grover@AECOM.com

Sampler (Print & Sign): W Chambers W Chambers

ALS Contact:

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method		Comments e.g. Actual Preservative or specific instructions
SVE-CEV/07272016	1	7-27-16	12:05	SC01653	AVG0442	25.8	5.0	6L	TO15	D1946	
SVE-DUP/07272016	2	7-27-16	12:06	AS00712	AVG04518	25.5	-0-	6L	TO15	D1946	

Report Tier Levels - please select

Tier I - Results (Default in not specified) _____
Tier II (Results + QC Summaries _____
Tier III (Results + QC & Calibration Summaries) _____
Tier IV (Date Validation Package) 10% Surcharge _____

EDD required YES / No
Type: _____ Units: _____

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature) FEDEX	Date:	Time:	Received by: (Signature)	Date: 8/1/16	Time: 0940

Cooler / Blank Temperature _____ °C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1603773
Project: Mission Wye / 60436173
Sample(s) received on: 8/1/16 Date opened: 8/1/16 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? _____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1603773-001.01	6.0 L Source Can					
P1603773-002.01	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers): _____

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/07272016**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603773
ALS Sample ID: P1603773-001

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Adam McAfee
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01653

Date Collected: 7/27/16
Date Received: 8/1/16
Date Analyzed: 8/4/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -4.86 Final Pressure (psig): 3.92

Canister Dilution Factor: 1.89

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,900	
7727-37-9	**Nitrogen**	**778,000**	1,900	
74-82-8	Methane	ND	1,900	
124-38-9	Carbon Dioxide	ND	1,900	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/07272016**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603773
ALS Sample ID: P1603773-002

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Adam McAfee
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS00712

Date Collected: 7/27/16
Date Received: 8/1/16
Date Analyzed: 8/4/16
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.54 Final Pressure (psig): 3.79

Canister Dilution Factor: 1.52

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,500	
7727-37-9	**Nitrogen**	**778,000**	1,500	
74-82-8	Methane	ND	1,500	
124-38-9	Carbon Dioxide	ND	1,500	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603773
ALS Sample ID: P160804-MB

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Adam McAfee
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 8/04/16
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603773
ALS Sample ID: P160804-LCS

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Adam McAfee
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 8/04/16
Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen*	50,000	**52,500**	**105**	84-121	
7727-37-9	Nitrogen	50,000	**52,900**	**106**	88-122	
74-82-8	Methane	50,000	**49,900**	**100**	85-116	
124-38-9	Carbon Dioxide	50,000	**49,900**	**100**	84-117	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/07272016** ALS Project ID: P1603773
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1603773-001

Test Code: EPA TO-15 Modified Date Collected: 7/27/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/1/16
Analyst: Wida Ang Date Analyzed: 8/4/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.352 Liter(s)
Test Notes: 0.0587 Liter(s)
Container ID: SC01653

Initial Pressure (psig): -4.86 Final Pressure (psig): 3.92

Canister Dilution Factor: 1.89

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**1.1**	2.7	1.0	**0.28**	0.68	0.26	**J**
79-01-6	Trichloroethene	**290**	2.7	0.75	**54**	0.50	0.14	
127-18-4	Tetrachloroethene	**1,800**	16	4.5	**270**	2.4	0.67	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	2.7	0.81	ND	0.55	0.16	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/07272016** ALS Project ID: P1603773
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1603773-002

Test Code: EPA TO-15 Modified Date Collected: 7/27/16
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 8/1/16
Analyst: Cory Lewis/Wida Ang Date Analyzed: 8/4 - 8/5/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.20 Liter(s)
Test Notes: 0.10 Liter(s)
Container ID: AS00712

Initial Pressure (psig): -2.54 Final Pressure (psig): 3.79

Canister Dilution Factor: 1.52

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	3.8	1.4	ND	0.96	0.36	
79-01-6	Trichloroethene	**190**	3.8	1.1	**35**	0.71	0.20	
127-18-4	Tetrachloroethene	**1,000**	7.6	2.1	**150**	1.1	0.31	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	3.8	1.1	ND	0.77	0.23	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603773
ALS Sample ID: P160803-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 8/3/16
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1603773
ALS Sample ID: P160805-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Cory Lewis
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 8/5/16
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **Mission Wye / 60436173** ALS Project ID: P1603773

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date(s) Collected: 7/27/16
Analyst: Wida Ang Date(s) Received: 8/1/16
Sample Type: 6.0 L Summa Canister(s) Date(s) Analyzed: 8/3 - 8/5/16
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P160803-MB	**91**	**106**	**110**	70-130	
Method Blank	P160805-MB	**94**	**102**	**107**	70-130	
Lab Control Sample	P160803-LCS	**91**	**104**	**114**	70-130	
Lab Control Sample	P160805-LCS	**93**	**100**	**111**	70-130	
SVE-CEV/07272016	P1603773-001	**89**	**103**	**112**	70-130	
SVE-DUP/07272016	P1603773-002	**90**	**107**	**110**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1603773
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P160803-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 8/3/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**217**	**103**	69-129	
79-01-6	Trichloroethene	216	**208**	**96**	71-121	
127-18-4	Tetrachloroethene	202	**228**	**113**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**239**	**110**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1603773
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P160805-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 8/5/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	210	**224**	**107**	69-129	
79-01-6	Trichloroethene	216	**211**	**98**	71-121	
127-18-4	Tetrachloroethene	202	**219**	**108**	65-126	
95-63-6	1,2,4-Trimethylbenzene	218	**235**	**108**	62-134	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

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Simi Valley, CA 93065
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www.alsglobal.com

LABORATORY REPORT

November 30, 2016

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: BNSF Mission Wye / 60508912.200

Dear Shelly:

Enclosed are the results of the samples submitted to our laboratory on November 15, 2016. For your reference, these analyses have been assigned our service request number P1605348.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Kaneko
By Kate Kaneko at 4:53 pm, 11/30/16

Kate Kaneko
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

Client: AECOM Environment
Project: BNSF Mission Wye / 60508912.200

Service Request No: P1605348

CASE NARRATIVE

The samples were received intact under chain of custody on November 15, 2016 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Volatile Organic Compound Analysis

The samples were analyzed for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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www.alsglobal.com

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0694
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2016036
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	977273
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-003
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-16-7
Utah DOH (NELAP)	http://www.health.utah.gov/lab/labimp/certification/index.html	CA016272016-6
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1605348

Project ID: BNSF Mission Wye / 60508912.200

Date Received: 11/15/2016

Time Received: 09:15

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-15 Modified - VOC Cans
SVE-CEV/11102016	P1605348-001	Air	11/10/2016	11:57	AS01081	-3.11	3.74	X
SVE-Dup/11102016	P1605348-002	Air	11/10/2016	12:00	AS00920	-2.82	3.74	X
SVE-Mid-T/11102016	P1605348-003	Air	11/10/2016	12:04	AC02172	-3.61	3.66	X
SVE-EV/11102016	P1605348-004	Air	11/10/2016	12:10	AS00949	-2.90	3.84	X

Air - Chain of Custody Record & Analytical Service Request

ALS
2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No. 1605348

ALS Contact:

Company Name & Address (Reporting Information): AECOM, 207 N. Broadway, Ste. 315, Billings, MT 59101

Project Name: BNSF Mission Wye

Project Number: 60508912.200

Project Manager: Margaret Zebley / Shelly Young

P.O. # / Billing Information

Phone: 406-670-8571 Fax:

Email Address for Result Reporting: Cole.grover@aecom.com, shelly.young@aecom.com, margaret.zebley@aecom.com

Sampler (Print & Sign): Cole R. Grover / Cole R. Grover

Analysis Method: TO-15

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	TO-15		Comments e.g. Actual Preservative or specific instructions
SVE-CEV/11102016	1	11/10/2016	1157	19031	—	-25.0	-3.0	6l	X		
SVE-DUP/11102016	2		1200	20419	—	-27.0	-3.0	6l	X		
SVE-Mid-T/11102016	3		1204	10621	—	-25.0	-3.0	6l	X		
SVE-EV/11102016	4		1210	20477	—	-25.0	-3.0	6l	X		

Report Tier Levels - please select
Tier I - Results (Default in not specified) ____
Tier II (Results + QC Summaries ____
Tier III (Results + QC & Calibration Summaries) X
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required YES / No
Type: AECOM Units: ppb/mg/m³

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Cole R. Grover	11-11-2016	1337			
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
				11/15/16	0915

Cooler / Blank Temperature ____°C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1605348
Project: BNSF Mission Wye / 60508912.200
Sample(s) received on: 11/15/16 Date opened: 11/15/16 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☒	☐	☐
	Location of seal(s)? Top and bottom box sealing. Sealing Lid?	☒	☐	☐
	Were signature and date included?	☒	☐	☐
	Were seals intact?	☒	☐	☐
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1605348-001.01	6.0 L Silonite Can					
P1605348-002.01	6.0 L Silonite Can					
P1605348-003.01	6.0 L Ambient Can					
P1605348-004.01	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/11102016** ALS Project ID: P1605348
Client Project ID: **BNSF Mission Wye / 60508912.200** ALS Sample ID: P1605348-001

Test Code: EPA TO-15 Date Collected: 11/10/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 11/15/16
Analyst: Cory Lewis Date Analyzed: 11/21 - 11/22/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.40 Liter(s)
Test Notes: 0.040 Liter(s)
Container ID: AS01081

Initial Pressure (psig): -3.11 Final Pressure (psig): 3.74

Canister Dilution Factor: 1.59

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	2.0	0.76	ND	0.50	0.19	
79-01-6	Trichloroethene	**60**	2.0	0.56	**11**	0.37	0.10	
127-18-4	Tetrachloroethene	**520**	20	5.6	**77**	2.9	0.82	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	0.60	ND	0.40	0.12	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-Dup/11102016** ALS Project ID: P1605348
Client Project ID: **BNSF Mission Wye / 60508912.200** ALS Sample ID: P1605348-002

Test Code: EPA TO-15 Date Collected: 11/10/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 11/15/16
Analyst: Cory Lewis Date Analyzed: 11/21 - 11/22/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.35 Liter(s)
Test Notes: 0.035 Liter(s)
Container ID: AS00920

Initial Pressure (psig): -2.82 Final Pressure (psig): 3.74

Canister Dilution Factor: 1.55

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	2.2	0.84	ND	0.56	0.21	
79-01-6	Trichloroethene	**67**	2.2	0.62	**13**	0.41	0.12	
127-18-4	Tetrachloroethene	**580**	22	6.2	**86**	3.3	0.91	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	2.2	0.66	ND	0.45	0.14	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-Mid-T/11102016** ALS Project ID: P1605348
Client Project ID: **BNSF Mission Wye / 60508912.200** ALS Sample ID: P1605348-003

Test Code: EPA TO-15 Date Collected: 11/10/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 11/15/16
Analyst: Cory Lewis Date Analyzed: 11/21 - 11/22/16
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.10 Liter(s)
Test Notes: 0.050 Liter(s)
Container ID: AC02172

Initial Pressure (psig): -3.61 Final Pressure (psig): 3.66

Canister Dilution Factor: 1.66

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	8.3	3.2	ND	2.1	0.80	
79-01-6	Trichloroethene	**220**	8.3	2.3	**41**	1.5	0.43	
127-18-4	Tetrachloroethene	**1,900**	17	4.6	**280**	2.4	0.69	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	8.3	2.5	ND	1.7	0.51	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/11102016** ALS Project ID: P1605348
Client Project ID: **BNSF Mission Wye / 60508912.200** ALS Sample ID: P1605348-004

Test Code: EPA TO-15 Date Collected: 11/10/16
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 11/15/16
Analyst: Cory Lewis Date Analyzed: 11/21/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00949

Initial Pressure (psig): -2.90 Final Pressure (psig): 3.84

Canister Dilution Factor: 1.57

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.79	0.30	ND	0.20	0.075	
79-01-6	Trichloroethene	ND	0.79	0.22	ND	0.15	0.041	
127-18-4	Tetrachloroethene	**0.86**	0.79	0.22	**0.13**	0.12	0.032	
95-63-6	1,2,4-Trimethylbenzene	ND	0.79	0.24	ND	0.16	0.048	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF Mission Wye / 60508912.200**

ALS Project ID: P1605348
ALS Sample ID: P161121-MB

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13
Analyst: Cory Lewis
Sample Type: 6.0 L Silonite Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 11/21/16
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF Mission Wye / 60508912.200**

ALS Project ID: P1605348
ALS Sample ID: P161122-MB

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13
Analyst: Cory Lewis
Sample Type: 6.0 L Silonite Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 11/22/16
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **BNSF Mission Wye / 60508912.200** ALS Project ID: P1605348

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date(s) Collected: 11/10/16
Analyst: Cory Lewis Date(s) Received: 11/15/16
Sample Type: 6.0 L Silonite Canister(s) / 6.0 L Summa Canister(s) Date(s) Analyzed: 11/21 - 11/22/16
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P161121-MB	**98**	**101**	**112**	70-130	
Method Blank	P161122-MB	**98**	**100**	**113**	70-130	
Lab Control Sample	P161121-LCS	**97**	**101**	**113**	70-130	
Lab Control Sample	P161122-LCS	**97**	**100**	**114**	70-130	
SVE-CEV/11102016	P1605348-001	**101**	**99**	**110**	70-130	
SVE-Dup/11102016	P1605348-002	**104**	**99**	**112**	70-130	
SVE-Mid-T/11102016	P1605348-003	**105**	**99**	**113**	70-130	
SVE-EV/11102016	P1605348-004	**103**	**99**	**111**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1605348
Client Project ID: **BNSF Mission Wye / 60508912.200** ALS Sample ID: P161121-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 11/21/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	213	**191**	**90**	74-123	
79-01-6	Trichloroethene	212	**197**	**93**	68-114	
127-18-4	Tetrachloroethene	213	**203**	**95**	65-130	
95-63-6	1,2,4-Trimethylbenzene	212	**200**	**94**	67-129	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1605348
Client Project ID: **BNSF Mission Wye / 60508912.200** ALS Sample ID: P161122-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Cory Lewis Date Analyzed: 11/22/16
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	213	**230**	**108**	74-123	
79-01-6	Trichloroethene	212	**233**	**110**	68-114	
127-18-4	Tetrachloroethene	213	**237**	**111**	65-130	
95-63-6	1,2,4-Trimethylbenzene	212	**233**	**110**	67-129	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

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LABORATORY REPORT

January 20, 2017

Shelly Young
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: Mission Wye / 60436173

Dear Shelly:

Enclosed are the results of the samples submitted to our laboratory on January 6, 2017. For your reference, these analyses have been assigned our service request number P1700066.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Kaneko

By Kate Kaneko at 11:00 am, 01/20/17

Kate Kaneko
Project Manager

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Simi Valley, CA 93065
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www.alsglobal.com

Client: AECOM Environment
Project: Mission Wye / 60436173

Service Request No: P1700066

CASE NARRATIVE

The samples were received intact under chain of custody on January 6, 2017 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Fixed Gases Analysis

The samples were analyzed for fixed gases (oxygen, nitrogen, methane and carbon dioxide) according to ASTM D1946 (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP accreditation.

Volatile Organic Compound Analysis

The samples were also analyzed for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. The method was modified to include the use of helium as a diluent gas in place of zero-grade air for container pressurization. When necessary, analytical sample volumes were adjusted by a correction factor for containers pressurized with helium. A summary sheet has been included listing the affected samples. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2016036
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1177034
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-003
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-16-7
Utah DOH (NELAP)	http://health.utah.gov/lab/environmental-lab-certification/	CA016272016-6
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment

Service Request: P1700066

Project ID: Mission Wye / 60436173

Date Received: 1/6/2017

Time Received: 10:00

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	ASTM D1946-90(2006) - Fxd Gases Can	TO-15 Modified - VOC Cans
SVE-CEV 01032017	P1700066-001	Air	1/3/2017	13:57	AS01094	-3.34	3.57	X	X
SVE-DUP/01032017	P1700066-002	Air	1/3/2017	13:15	AC02226	-2.96	4.50	X	X
SVE-MID-T/01032017	P1700066-003	Air	1/3/2017	14:17	SC01867	-2.99	4.17	X	X
SVE-EV/01032017	P1700066-004	Air	1/3/2017	14:24	AS00931	-2.74	3.61	X	X

ALS ENVIRONMENTAL

Sample Volume Correction for Helium Pressurization for SCAN Analysis

Sample ID	Pi	Pf	Sample Volume (L)	Adjusted Volume (L)
P1700066-001	-3.34	3.57	1.000	1.14
P1700066-002	-2.96	4.50	1.000	1.15
P1700066-003	-2.99	4.17	1.000	1.14
P1700066-004	-2.74	3.61	1.000	1.13
P1700066-001DIL	-3.34	3.57	0.025	0.0286
P1700066-002DIL	-2.96	4.50	0.100	0.115

Validation Date: 10/13/09

Template Name: MFC_GCF_backfill.xls

Printed: 1/20/17

Air - Chain of Custody Record & Analytical Service Request

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No: P17 00066

Company Name & Address (Reporting Information): AECOM

Project Name: MISSION WYE

Project Number: 60436173

Project Manager: Cole Grover

P.O. # / Billing Information: AECOM

Phone: 406-670-8571

Fax:

Email Address for Result Reporting: Cole.Grover@AECOM.com

Sampler (Print & Sign): Cole Grover W. Chambers

ALS Contact:

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method		Comments e.g. Actual Preservative or specific instructions
SVE-CEV/01032017	1	01-03-17	13:57	20372	AVG04685	-25.5	-2.5	6L	TO15	D1946	
SVE-DUP/01032017	2	01-03-17	13:15	AC02226	AVG04684	-26.0	-2.5	6L	TO15	D1946	
—	—	—	—	—	—	~~-25~~ WC	—	—	—	—	
SVE-MID-T/01032017	3	01-03-17	14:17	002725	AVG04686	-23.0	-2.0	6L	TO15	D1946	
SVE-EV/01032017	4	01-03-17	14:24	20400	AVG-03290	-23.0	-3.0	6L	TO15	D1946	

Report Tier Levels - please select

Tier I - Results (Default in not specified) ____
Tier II (Results + QC Summaries ____
Tier III (Results + QC & Calibration Summaries) X
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required YES / No
Type: AECOM Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	1-3-2017	1440			
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
FEDEX			[signature]	1/6/17	1000

Cooler / Blank Temperature ____°C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1700066
Project: Mission Wye / 60436173
Sample(s) received on: 1/6/17 Date opened: 1/6/17 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☒	☐	☐
	Location of seal(s)? Top and bottom box sealing and top sealing of 2 can box. Sealing Lid?	☒	☐	☐
	Were signature and date included?	☒	☐	☐
	Were seals intact?	☒	☐	☐
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☐
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☐
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☐
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☐
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☐
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☐
	Are dual bed badges separated and individually capped and intact?	☐	☐	☐

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1700066-001.01	6.0 L Silonite Can					
P1700066-002.01	6.0 L Ambient Can					
P1700066-003.01	6.0 L Source Can					
P1700066-004.01	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV 01032017**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1700066
ALS Sample ID: P1700066-001

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS01094

Date Collected: 1/3/17
Date Received: 1/6/17
Date Analyzed: 1/9/17
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -3.34 Final Pressure (psig): 3.57

Canister Dilution Factor: 1.61

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,600	
7727-37-9	**Nitrogen**	**778,000**	1,600	
74-82-8	Methane	ND	1,600	
124-38-9	Carbon Dioxide	ND	1,600	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/01032017**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1700066
ALS Sample ID: P1700066-002

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: AC02226

Date Collected: 1/3/17
Date Received: 1/6/17
Date Analyzed: 1/9/17
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.96 Final Pressure (psig): 4.50

Canister Dilution Factor: 1.64

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**221,000**	1,600	
7727-37-9	**Nitrogen**	**778,000**	1,600	
74-82-8	Methane	ND	1,600	
124-38-9	Carbon Dioxide	ND	1,600	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-MID-T/01032017**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1700066
ALS Sample ID: P1700066-003

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Summa Canister
Test Notes:
Container ID: SC01867

Date Collected: 1/3/17
Date Received: 1/6/17
Date Analyzed: 1/9/17
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.99 Final Pressure (psig): 4.17

Canister Dilution Factor: 1.61

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,600	
7727-37-9	**Nitrogen**	**778,000**	1,600	
74-82-8	Methane	ND	1,600	
124-38-9	**Carbon Dioxide**	**2,050**	1,600	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/01032017**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1700066
ALS Sample ID: P1700066-004

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS00931

Date Collected: 1/3/17
Date Received: 1/6/17
Date Analyzed: 1/9/17
Volume(s) Analyzed: 0.10 ml(s)

Initial Pressure (psig): -2.74 Final Pressure (psig): 3.61

Canister Dilution Factor: 1.53

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	**Oxygen***	**220,000**	1,500	
7727-37-9	**Nitrogen**	**778,000**	1,500	
74-82-8	Methane	ND	1,500	
124-38-9	**Carbon Dioxide**	**1,910**	1,500	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1700066
ALS Sample ID: P170109-MB

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 1/09/17
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result ppmV	MRL ppmV	Data Qualifier
7782-44-7	Oxygen*	ND	1,000	
7727-37-9	Nitrogen	ND	1,000	
74-82-8	Methane	ND	1,000	
124-38-9	Carbon Dioxide	ND	1,000	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1700066
ALS Sample ID: P170109-LCS

Test Code: ASTM D1946
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 6.0 L Silonite Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 1/09/17
Volume(s) Analyzed: NA ml(s)

CAS #	Compound	Spike Amount ppmV	Result ppmV	% Recovery	ALS Acceptance Limits	Data Qualifier
7782-44-7	Oxygen*	50,000	**52,600**	**105**	97-108	
7727-37-9	Nitrogen	50,000	**54,600**	**109**	89-113	
74-82-8	Methane	50,000	**49,300**	**99**	94-111	
124-38-9	Carbon Dioxide	50,000	**49,100**	**98**	94-104	

* = The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.

Response Factor Report GC01_FXG

Method Path : I:\GC01\METHODS\
Method File : 3C012416.M
Title : EPA 3C, ASTM D 1946-90, VOA-EPA3C
Last Update : Sun Jan 24 22:12:55 2016
Response Via : Initial Calibration

Calibration Files
0.1 =01241627.D 0.5 =01241628.D 1 =01241629.D
4 =01241631.D 16 =01241632.D CO2 =01241633.D

	Compound	0.1	0.5	1	4	16	CO2	Avg	%RSD
1)	Hydrogen	1.295	1.311	1.271	1.247	1.260		1.317 E1	7.72
2)	Oxygen	1.471	1.599	1.556	1.522	1.454		1.513 E1	3.72
3)	Nitrogen	1.968	1.935	1.742	1.703	1.632		1.753 E1	9.60
4)	Carbon Monoxide	1.656	1.801	1.725	1.689	1.616		1.697 E1	4.15
5)	Methane	1.200	1.368	1.293	1.263	1.198		1.259 E1	5.14
6)	Carbon Dioxide	2.060	2.178	2.092	2.038	1.929	1.879	2.029 E1	5.38

(#) = Out of Range ### Number of calibration levels exceeded format ###

Modified EPA Method 3C Daily QC Summary

Client : AECOM Environment
Analyst : MC
Method Name : EPA 3C, ASTM D 1946-90, VOA-EPA3C

Instrument : GC 1
Date Analyzed : 1/9/17

RT Summaries and QC Check (minutes)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ICAL Mean RT	**0.708**	**2.188**	**2.368**	**3.076**	**5.045**	**6.707**		
RT Windows (+/- min)	**0.072**	**0.133**	**0.146**	**0.034**	**0.130**	**0.145**		
std s30-12091603	0.704	2.207	2.382	3.068	5.059	6.720	01091701.D	08:05
+/- 0.33min of ICAL Mean RT	Pass	Pass	Pass	Pass	Pass	Pass		
mb							01091702.D	08:25
lab air		2.161 Pass	2.300 Pass			6.732 Pass	01091703.D	08:42
lcs s30-12201601	0.704 Pass	2.209 Pass	2.385 Pass	3.072 Pass	5.061 Pass	6.722 Pass	01091704.D	09:00
lcsd s30-12201601	0.703 Pass	2.206 Pass	2.382 Pass	3.068 Pass	5.058 Pass	6.719 Pass	01091705.D	09:17
0066-001		2.169 Pass	2.316 Pass			6.717 Pass	01091710.D	10:47
0066-002		2.179 Pass	2.326 Pass			6.730 Pass	01091711.D	11:06
0066-003		2.172 Pass	2.319 Pass			6.720 Pass	01091712.D	11:23
0066-004		2.181 Pass	2.328 Pass			6.725 Pass	01091713.D	11:43
std s30-12091603	0.703 Pass	2.205 Pass	2.380 Pass	3.066 Pass	5.058 Pass	6.719 Pass	01091714.D	12:00

Continuing Calibration Standards Summary (ppm)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
ACTUAL	40000.0	40000.0	50000.0	50000.0	40000.0	50000.0		
CCV Criteria (+/- %D)	**15.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**	**10.0%**		
std s30-12091603	42290.3 5.7%	42760.5 6.9%	52472.2 4.9%	53559.9 7.1%	43258.1 8.1%	51524.4 3.0%	01091701.D	08:05
std s30-12091603	42408.9 6.0%	42759.2 6.9%	52373.0 4.7%	53583.6 7.2%	43301.4 8.3%	51675.2 3.4%	01091714.D	12:00
	####	####	####	####	####	#####		
	####	####	####	####	####	#####		

Lab Dup Summary (ppm, without DF correction and nomalization)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time

LCS / LCS Dup Summary (ppm, without DF correction)

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxide	Methane	Carbon Dioxide	File ID	Time
LCS Actual Conc. (ppm)	50000.0	50000.0	50000.0	50000.0	50000.0	50000.0		
LCS Criteria (% Range)	**94%-105%**	**97%-108%**	**89%-113%**	**98%-108%**	**94%-111%**	**94%-104%**		
lcs s30-12201601	50474.6	52550.6	54596.0	51225.9	49321.8	49054.9	01091704.D	09:00
LCS % Recovery	101% Pass	105% Pass	109% Pass	102% Pass	99% Pass	98% Pass		
lcsd s30-12201601	51023.8	52215.2	51204.9	51905.9	50107.3	49906.2	01091705.D	09:17
LCS % Recovery	102% Pass	104% Pass	102% Pass	104% Pass	100% Pass	100% Pass		
Duplicate % RPD	1.1%	0.6%	6.4%	1.3%	1.6%	1.7%		
Duplicate Criteria % RPD	**3%** Pass	**3%** Pass	**7%** Pass	**3%** Pass	**3%** Pass	**3%** Pass		

Lab Air QC Summary

Sample ID	Hydrogen	Oxygen	Nitrogen	Carbon Monoxid	Methane	Carbon Dioxide	Lab Air Criteria Total (90%-110%)
lab air		204925.5	727480.8			408.5	93.3% Pass
Lab Air Normalized (%)		21.97%	77.98%			0.04%	100.0%

KAH 1/9/17

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV 01032017** ALS Project ID: P1700066
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1700066-001

Test Code: EPA TO-15 Modified Date Collected: 1/3/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 1/6/17
Analyst: Lusine Hakobyan Date Analyzed: 1/9/17 & 1/11/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.14 Liter(s)
Test Notes: 0.029 Liter(s)
Container ID: AS01094

Initial Pressure (psig): -3.34 Final Pressure (psig): 3.57

Canister Dilution Factor: 1.61

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**0.29**	0.71	0.27	**0.073**	0.18	0.068	**J**
79-01-6	Trichloroethene	**49**	0.71	0.20	**9.2**	0.13	0.037	
127-18-4	Tetrachloroethene	**330**	28	7.8	**49**	4.1	1.1	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	0.71	0.21	ND	0.14	0.043	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/01032017** ALS Project ID: P1700066
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1700066-002

Test Code: EPA TO-15 Modified Date Collected: 1/3/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 1/6/17
Analyst: Lusine Hakobyan Date Analyzed: 1/9/17 & 1/11/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.15 Liter(s)
Test Notes: 0.115 Liter(s)
Container ID: AC02226

Initial Pressure (psig): -2.96 Final Pressure (psig): 4.50

Canister Dilution Factor: 1.64

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**0.30**	0.71	0.27	**0.076**	0.18	0.068	**J**
79-01-6	Trichloroethene	**52**	0.71	0.20	**9.8**	0.13	0.037	
127-18-4	Tetrachloroethene	**400**	7.1	2.0	**60**	1.1	0.29	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	0.71	0.21	ND	0.15	0.044	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-MID-T/01032017** ALS Project ID: P1700066
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1700066-003

Test Code: EPA TO-15 Modified Date Collected: 1/3/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 1/6/17
Analyst: Lusine Hakobyan Date Analyzed: 1/9/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.14 Liter(s)
Test Notes:
Container ID: SC01867

Initial Pressure (psig): -2.99 Final Pressure (psig): 4.17

Canister Dilution Factor: 1.61

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.71	0.27	ND	0.18	0.068	
79-01-6	Trichloroethene	ND	0.71	0.20	ND	0.13	0.037	
127-18-4	Tetrachloroethene	**0.26**	0.71	0.20	**0.038**	0.10	0.029	**J**
95-63-6	1,2,4-Trimethylbenzene	ND	0.71	0.21	ND	0.14	0.043	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/01032017** ALS Project ID: P1700066
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P1700066-004

Test Code: EPA TO-15 Modified Date Collected: 1/3/17
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: 1/6/17
Analyst: Lusine Hakobyan Date Analyzed: 1/9/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.13 Liter(s)
Test Notes:
Container ID: AS00931

Initial Pressure (psig): -2.74 Final Pressure (psig): 3.61

Canister Dilution Factor: 1.53

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.68	0.26	ND	0.17	0.065	
79-01-6	Trichloroethene	ND	0.68	0.19	ND	0.13	0.035	
127-18-4	Tetrachloroethene	ND	0.68	0.19	ND	0.10	0.028	
95-63-6	1,2,4-Trimethylbenzene	ND	0.68	0.20	ND	0.14	0.041	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1700066
ALS Sample ID: P170109-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13
Analyst: Lusine Hakobyan
Sample Type: 6.0 L Silonite Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 1/9/17
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye / 60436173**

ALS Project ID: P1700066
ALS Sample ID: P170111-MB

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13
Analyst: Lusine Hakobyan
Sample Type: 6.0 L Silonite Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 1/11/17
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **Mission Wye / 60436173** ALS Project ID: P1700066

Test Code: EPA TO-15 Modified
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date(s) Collected: 1/3/17
Analyst: Lusine Hakobyan Date(s) Received: 1/6/17
Sample Type: 6.0 L Silonite Canister(s) / 6.0 L Summa Canister(s) Date(s) Analyzed: 1/9 - 1/11/17
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P170109-MB	**100**	**100**	**99**	70-130	
Method Blank	P170111-MB	**96**	**100**	**99**	70-130	
Lab Control Sample	P170109-LCS	**99**	**99**	**100**	70-130	
Lab Control Sample	P170111-LCS	**96**	**99**	**100**	70-130	
SVE-CEV 01032017	P1700066-001	**97**	**98**	**98**	70-130	
SVE-DUP/01032017	P1700066-002	**98**	**97**	**97**	70-130	
SVE-MID-T/01032017	P1700066-003	**97**	**100**	**98**	70-130	
SVE-EV/01032017	P1700066-004	**100**	**99**	**98**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700066
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P170109-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 1/9/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	213	**218**	**102**	74-123	
79-01-6	Trichloroethene	212	**195**	**92**	68-114	
127-18-4	Tetrachloroethene	213	**191**	**90**	65-130	
95-63-6	1,2,4-Trimethylbenzene	212	**193**	**91**	67-129	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1700066
Client Project ID: **Mission Wye / 60436173** ALS Sample ID: P170111-LCS

Test Code: EPA TO-15 Modified Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5975Binert/6890N/MS13 Date Received: NA
Analyst: Lusine Hakobyan Date Analyzed: 1/11/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	213	**212**	**100**	74-123	
79-01-6	Trichloroethene	212	**195**	**92**	68-114	
127-18-4	Tetrachloroethene	213	**189**	**89**	65-130	
95-63-6	1,2,4-Trimethylbenzene	212	**189**	**89**	67-129	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

Response Factor Report MS13

Method Path : I:\MS13\METHODS\
Method File : R13120516.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Tue Dec 06 07:29:38 2016
Response Via : Initial Calibration

Calibration Files
0.08=12051612.D 0.10=12051613.D 0.20=12051614.D 0.40=12051615.D 1.0 =12051616.D 5.0 =12051617.D 25 =12051618.D
50 =12051619.D 100 =12051620.D

CL 12/6/16

		Compound	0.08	0.10	0.20	0.40	1.0	5.0	25	50	100	Avg	%RSD
1)	IR	Bromochloromethane...	----------ISTD----------										
2)	T	Propene	1.067	0.963	0.837	0.885	0.814	0.821	0.870	0.796	0.735	0.865	11.41
3)	T	Dichlorodifluo...	2.418	2.178	2.178	2.302	2.135	2.095	2.206	2.051	1.930	2.166	6.50
4)	T	Chloromethane			0.858	0.951	1.031	0.824	1.182	0.883	0.638	0.910	18.78
5)	T	1,2-Dichloro-1...	1.292	1.331	1.333	1.410	1.290	1.293	1.371	1.180	1.138	1.293	6.68
6)	T	Vinyl Chloride	1.013	1.198	1.213	1.319	1.322	1.381	1.475	1.253	1.178	1.261	10.58
7)	T	1,3-Butadiene			0.563	0.675	0.745	0.790	0.928	0.807	0.789	0.757	15.12
8)	T	Bromomethane	0.740	0.535	0.573	0.709	0.674	0.694	0.844	0.802	0.747	0.702	14.17
9)	T	Chloroethane	0.626	0.514	0.527	0.600	0.630	0.631	0.667	0.635	0.607	0.604	8.45
10)	T	Ethanol	0.604	0.544	0.503	0.574	0.571	0.552	0.573	0.535	0.495	0.550	6.44
11)	T	Acetonitrile			1.168	1.350	1.364	1.410	1.509	1.460	1.410	1.381	7.88
12)	T	Acrolein				0.403	0.497	0.530	0.574	0.549	0.531	0.514	11.69
13)	T	Acetone				0.673	0.642	0.628	0.610	0.553	0.491	0.599	11.06
14)	T	Trichlorofluor...	2.005	2.042	1.915	2.014	1.882	1.859	1.958	1.865	1.793	1.926	4.37
15)	T	2-Propanol (Is...	1.569	1.695	1.834	2.032	2.036	2.063	2.173	2.041	1.892	1.926	10.16
16)	T	Acrylonitrile				0.707	0.876	1.050	1.155	1.126	1.087	1.000	17.37
17)	T	1,1-Dichloroet...	0.884	0.865	0.901	0.978	0.906	0.937	0.991	0.965	0.941	0.930	4.69
18)	T	2-Methyl-2-Pro...	1.905	2.010	1.966	2.228	2.135	1.966	2.196	1.861	1.469	1.971	11.55
19)	T	Methylene Chlo...	1.140	1.114	1.050	1.031	0.954	0.919	0.980	0.941	0.877	1.001	8.92
20)	T	3-Chloro-1-pro...	0.998	0.741	0.913	1.080	1.066	1.077	1.240	1.195	1.141	1.050	14.46
21)	T	Trichlorotrifl...	1.110	1.073	1.093	1.164	1.078	1.053	1.127	1.086	1.053	1.093	3.31
22)	T	Carbon Disulfide				4.022	3.348	3.277	3.497	3.377	3.215	3.456	8.49
23)	T	trans-1,2-Dich...	0.997	1.064	1.117	1.228	1.245	1.250	1.368	1.318	1.266	1.206	10.07
24)	T	1,1-Dichloroet...	1.567	1.715	1.598	1.648	1.628	1.579	1.684	1.618	1.547	1.620	3.40
25)	T	Methyl tert-Bu...	2.860	2.793	2.783	2.846	2.653	2.395	2.623	2.267	1.878	2.567	12.82
26)	T	Vinyl Acetate				0.199	0.203	0.225	0.232	0.217	0.198	0.212	6.71
27)	T	2-Butanone (MEK)					0.508	0.612	0.655	0.629	0.596	0.600	9.27
28)	T	cis-1,2-Dichlo...	1.249	1.080	1.137	1.292	1.174	1.197	1.295	1.252	1.194	1.208	5.93
29)	T	Diisopropyl Ether	0.954	0.829	0.900	1.007	0.966	0.945	0.973	0.908	0.843	0.925	6.50
30)	T	Ethyl Acetate				0.272	0.286	0.305	0.307	0.278	0.244	0.282	8.29
31)	T	n-Hexane	1.531	1.702	1.464	1.512	1.408	1.380	1.366	1.254	1.140	1.417	11.50
32)	T	Chloroform	1.753	1.720	1.720	1.800	1.665	1.678	1.778	1.699	1.623	1.715	3.28
33)	S	1,2-Dichloroet...	1.369	1.382	1.383	1.422	1.385	1.396	1.394	1.389	1.370	1.388	1.15
34)	T	Tetrahydrofura...	0.767	0.683	0.565	0.664	0.590	0.598	0.634	0.613	0.584	0.633	9.96
35)	T	Ethyl tert-But...	1.072	0.944	1.038	1.100	1.064	1.061	1.164	1.088	1.061	1.066	5.45
36)	T	1,2-Dichloroet...	1.411	1.209	1.232	1.335	1.298	1.296	1.398	1.337	1.281	1.311	5.16
37)	IR	1,4-Difluorobenzen...	----------ISTD----------										
38)	T	1,1,1-Trichlor...	0.361	0.333	0.352	0.351	0.359	0.346	0.380	0.360	0.340	0.354	3.85
39)	T	Isopropyl Acetate	0.105	0.091	0.107	0.120	0.117	0.116	0.118	0.109	0.098	0.109	9.11
40)	T	1-Butanol					0.147	0.179	0.180	0.166	0.152	0.165	9.21
41)	T	Benzene		0.946	0.882	0.876	0.814	0.776	0.795	0.730	0.646	0.808	11.71
42)	T	Carbon Tetrach...	0.328	0.332	0.314	0.327	0.326	0.328	0.362	0.347	0.330	0.333	4.17

Method Path : I:\MS13\METHODS\
Method File : R13120516.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

43)	T	Cyclohexane	0.363	0.335	0.315	0.331	0.311	0.307	0.320	0.294	0.267	0.316	8.54
44)	T	tert-Amyl Meth...	0.536	0.555	0.516	0.532	0.514	0.529	0.577	0.539	0.517	0.535	3.80
45)	T	1,2-Dichloropr...	0.172	0.205	0.185	0.184	0.180	0.180	0.192	0.182	0.172	0.184	5.59
46)	T	Bromodichlorom...	0.268	0.265	0.263	0.276	0.271	0.284	0.310	0.297	0.284	0.280	5.65
47)	T	Trichloroethene	0.259	0.257	0.265	0.261	0.255	0.252	0.272	0.260	0.247	0.259	2.86
48)	T	1,4-Dioxane	0.153	0.139	0.140	0.152	0.169	0.173	0.186	0.175	0.165	0.161	9.94
49)	T	2,2,4-Trimethy...	0.848	0.839	0.772	0.813	0.764	0.746	0.783	0.731	0.665	0.773	7.36
50)	T	Methyl Methacr...				0.074	0.084	0.088	0.095	0.090	0.084	0.086	8.28
51)	T	n-Heptane	0.195	0.186	0.189	0.193	0.201	0.193	0.200	0.189	0.176	0.191	3.95
52)	T	cis-1,3-Dichlo...	0.296	0.278	0.292	0.307	0.307	0.328	0.359	0.343	0.323	0.315	8.16
53)	T	4-Methyl-2-pen...				0.150	0.154	0.170	0.180	0.169	0.158	0.164	6.80
54)	T	trans-1,3-Dich...				0.269	0.274	0.308	0.342	0.328	0.313	0.306	9.45
55)	T	1,1,2-Trichlor...	0.217	0.193	0.202	0.212	0.204	0.204	0.218	0.209	0.199	0.206	4.02
56)	IR	Chlorobenzene-d5 (...	----------ISTD----------										
57)	S	Toluene-d8 (SS2)	2.544	2.549	2.563	2.556	2.549	2.529	2.540	2.544	2.540	2.546	0.39
58)	T	Toluene	2.640	2.473	2.281	2.375	2.224	2.188	2.291	2.183	2.016	2.297	7.91
59)	T	2-Hexanone				0.823	0.875	1.014	1.044	0.996	0.915	0.945	9.22
60)	T	Dibromochlorom...	0.660	0.596	0.612	0.676	0.670	0.700	0.782	0.760	0.728	0.687	9.08
61)	T	1,2-Dibromoethane	0.571	0.525	0.540	0.617	0.603	0.618	0.670	0.650	0.620	0.601	8.01
62)	T	n-Butyl Acetate				0.812	0.982	1.083	1.138	1.085	0.994	1.016	11.45
63)	T	n-Octane	0.429	0.406	0.393	0.435	0.410	0.393	0.415	0.393	0.357	0.403	5.74
64)	T	Tetrachloroethene	0.742	0.799	0.762	0.801	0.760	0.755	0.806	0.781	0.751	0.773	3.11
65)	T	Chlorobenzene	1.791	1.746	1.649	1.671	1.589	1.561	1.646	1.566	1.462	1.631	6.14
66)	T	Ethylbenzene	2.793	2.579	2.515	2.627	2.530	2.516	2.668	2.516	2.297	2.560	5.29
67)	T	m- & p-Xylenes	2.224	2.055	2.054	2.068	2.017	2.008	2.115	1.989	1.808	2.038	5.44
68)	T	Bromoform		0.530	0.502	0.594	0.575	0.651	0.735	0.718	0.692	0.625	14.02
69)	T	Styrene	1.443	1.220	1.350	1.414	1.467	1.561	1.708	1.633	1.515	1.479	9.97
70)	T	o-Xylene	2.283	2.072	2.003	2.083	2.015	1.998	2.111	2.003	1.836	2.045	5.83
71)	T	n-Nonane	0.931	0.866	0.891	0.911	0.899	0.885	0.895	0.821	0.726	0.869	7.11
72)	T	1,1,2,2-Tetrac...	0.820	0.846	0.825	0.893	0.872	0.884	0.936	0.882	0.801	0.862	4.93
73)	S	Bromofluoroben...	1.047	1.048	1.068	1.064	1.061	1.060	1.048	1.045	1.040	1.054	0.94
74)	T	Cumene	3.121	2.751	2.646	2.763	2.715	2.650	2.811	2.632	2.364	2.717	7.32
75)	T	alpha-Pinene	1.271	1.262	1.292	1.312	1.259	1.303	1.405	1.326	1.210	1.293	4.19
76)	T	n-Propylbenzene	3.241	2.891	3.019	3.112	3.049	3.052	3.162	2.930	2.604	3.007	6.17
77)	T	3-Ethyltoluene	2.606	2.514	2.527	2.762	2.562	2.647	2.740	2.693	2.474	2.614	3.94
78)	T	4-Ethyltoluene	2.663	2.506	2.538	2.556	2.593	2.502	2.703	2.406	2.113	2.509	6.89
79)	T	1,3,5-Trimethy...	2.986	2.276	2.420	2.376	2.246	2.197	2.350	2.221	2.030	2.345	11.38
80)	T	alpha-Methylst...	0.956	0.931	1.063	1.020	1.068	1.131	1.325	1.261	1.152	1.101	11.93
81)	T	2-Ethyltoluene	2.928	2.638	2.585	2.739	2.609	2.574	2.699	2.536	2.276	2.620	6.67
82)	T	1,2,4-Trimethy...	2.307	2.290	2.214	2.277	2.252	2.241	2.332	2.172	1.935	2.225	5.34
83)	T	n-Decane	0.960	0.927	0.934	1.000	0.991	0.978	0.987	0.895	0.782	0.939	7.27
84)	T	Benzyl Chloride				1.343	1.512	1.790	1.995	1.909	1.727	1.713	14.34
85)	T	1,3-Dichlorobe...	1.415	1.387	1.341	1.403	1.383	1.393	1.477	1.410	1.307	1.391	3.43
86)	T	1,4-Dichlorobe...	1.712	1.503	1.378	1.484	1.437	1.408	1.498	1.430	1.325	1.464	7.49
87)	T	sec-Butylbenzene	3.106	3.000	2.902	3.048	2.970	2.946	3.064	2.851	2.520	2.934	5.96
88)	T	4-Isopropyltol...	2.927	2.718	2.833	3.011	2.896	2.897	3.006	2.743	2.367	2.822	7.04
89)	T	1,2,3-Trimethy...	2.364	2.225	2.153	2.352	2.285	2.227	2.365	2.205	1.966	2.238	5.70
90)	T	1,2-Dichlorobe...	1.452	1.328	1.318	1.384	1.360	1.369	1.437	1.356	1.233	1.360	4.79
91)	T	d-Limonene	0.644	0.625	0.620	0.687	0.710	0.743	0.823	0.752	0.652	0.695	9.81
92)	T	1,2-Dibromo-3-...				0.388	0.456	0.523	0.569	0.547	0.517	0.500	13.38
93)	T	n-Undecane				0.968	1.003	1.019	1.035	0.942	0.818	0.964	8.23
94)	T	1,2,4-Trichlor...	0.957	0.763	0.847	0.988	1.042	1.092	1.165	1.115	1.045	1.001	12.94

Method Path : I:\MS13\METHODS\
Method File : R13120516.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)

95)	T	Naphthalene			1.987	2.313	2.533	2.820	2.938	2.731	2.397	2.531	13.01
96)	T	n-Dodecane				0.840	0.900	0.984	0.888	0.806	0.694	0.852	11.54
97)	T	Hexachlorobuta...	0.859	0.789	0.728	0.801	0.764	0.778	0.847	0.824	0.792	0.798	5.12
98)	T	Cyclohexanone				0.589	0.635	0.677	0.694	0.664	0.613	0.645	6.17
99)	T	tert-Butylbenzene	2.402	2.321	2.174	2.374	2.240	2.241	2.329	2.143	1.898	2.236	6.87
100)	T	n-Butylbenzene	1.901	1.846	1.986	2.249	2.240	2.292	2.384	2.211	1.955	2.118	9.25

(#) = Out of Range

Evaluate Continuing Calibration Report

Data File : I:\MS13\DATA\2017 01\09\01091702.D Vial: 3
Acq On : 9 Jan 2017 9:19 am Operator: LH/AMF
Sample : CCV R13010917 25ng Inst : MS13
Misc : S29-12271601/S29-12301601 (1(28)

Quant Time: Jan 09 09:42:44 2017
Quant Method : I:\MS13\METHODS\R13120516.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 06 07:29:38 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

LH 1/9/17

1/9/17

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	85	-0.02
2	T	Propene	0.865	0.827	4.4	81	-0.02
3	T	Dichlorodifluoromethane (CF	2.166	1.913	11.7	74	-0.02
4	T	Chloromethane	0.910	1.166	-28.1	84	-0.02
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.293	1.162	10.1	72	-0.02
6	T	Vinyl Chloride	1.261	1.355	-7.5	78	-0.03
7	T	1,3-Butadiene	0.757	0.866	-14.4	80	-0.03
8	T	Bromomethane	0.702	0.858	-22.2	87	-0.02
9	T	Chloroethane	0.604	0.628	-4.0	80	-0.02
10	T	Ethanol	0.550	0.538	2.2	80	-0.09
11	T	Acetonitrile	1.381	1.438	-4.1	81	-0.06
12	T	Acrolein	0.514	0.517	-0.6	77	-0.03
13	T	Acetone	0.599	0.576	3.8	81	-0.05
14	T	Trichlorofluoromethane	1.926	1.715	11.0	75	-0.02
15	T	2-Propanol (Isopropanol)	1.926	2.063	-7.1	81	-0.07
16	T	Acrylonitrile	1.000	1.107	-10.7	82	-0.04
17	T	1,1-Dichloroethene	0.930	0.917	1.4	79	-0.02
18	T	2-Methyl-2-Propanol (tert-B	1.971	2.222	-12.7	86	-0.06
19	T	Methylene Chloride	1.001	0.899	10.2	78	-0.02
20	T	3-Chloro-1-propene (Allyl C	1.050	1.179	-12.3	81	-0.02
21	T	Trichlorotrifluoroethane	1.093	1.005	8.1	76	-0.02
22	T	Carbon Disulfide	3.456	3.288	4.9	80	-0.02
23	T	trans-1,2-Dichloroethene	1.206	1.256	-4.1	78	-0.02
24	T	1,1-Dichloroethane	1.620	1.558	3.8	79	-0.02
25	T	Methyl tert-Butyl Ether	2.567	2.822	-9.9	92	-0.02
26	T	Vinyl Acetate	0.212	0.214	-0.9	79	-0.03
27	T	2-Butanone (MEK)	0.600	0.609	-1.5	79	-0.03
28	T	cis-1,2-Dichloroethene	1.208	1.197	0.9	79	-0.02
29	T	Diisopropyl Ether	0.925	0.895	3.2	78	-0.01
30	T	Ethyl Acetate	0.282	0.294	-4.3	82	-0.02
31	T	n-Hexane	1.417	1.289	9.0	81	-0.01
32	T	Chloroform	1.715	1.623	5.4	78	-0.02
33	S	1,2-Dichloroethane-d4(SS1)	1.388	1.391	-0.2	85	-0.02
34	T	Tetrahydrofuran (THF)	0.633	0.595	6.0	80	-0.02
35	T	Ethyl tert-Butyl Ether	1.066	1.140	-6.9	84	-0.01
36	T	1,2-Dichloroethane	1.311	1.257	4.1	77	-0.02
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	87	-0.01
38	T	1,1,1-Trichloroethane	0.354	0.332	6.2	76	-0.01
39	T	Isopropyl Acetate	0.109	0.111	-1.8	82	-0.02
40	T	1-Butanol	0.165	0.168	-1.8	81	-0.04
41	T	Benzene	0.808	0.736	8.9	80	-0.01
42	T	Carbon Tetrachloride	0.333	0.313	6.0	75	-0.01
43	T	Cyclohexane	0.316	0.294	7.0	80	-0.01
44	T	tert-Amyl Methyl Ether	0.535	0.559	-4.5	84	-0.01
45	T	1,2-Dichloropropane	0.184	0.182	1.1	82	-0.01
46	T	Bromodichloromethane	0.280	0.281	-0.4	79	-0.01
47	T	Trichloroethene	0.259	0.246	5.0	78	-0.01
48	T	1,4-Dioxane	0.161	0.170	-5.6	79	-0.02
49	T	2,2,4-Trimethylpentane (Iso	0.773	0.736	4.8	82	-0.01
50	T	Methyl Methacrylate	0.086	0.087	-1.2	79	-0.01
51	T	n-Heptane	0.191	0.187	2.1	81	-0.01
52	T	cis-1,3-Dichloropropene	0.315	0.329	-4.4	80	-0.01
53	T	4-Methyl-2-pentanone	0.164	0.168	-2.4	81	-0.01
54	T	trans-1,3-Dichloropropene	0.306	0.312	-2.0	79	-0.01
55	T	1,1,2-Trichloroethane	0.206	0.200	2.9	79	-0.01

Evaluate Continuing Calibration Report

Data File : I:\MS13\DATA\2017 01\09\01091702.D Vial: 3
Acq On : 9 Jan 2017 9:19 am Operator: LH/AMF
Sample : CCV R13010917 25ng Inst : MS13
Misc : S29-12271601/S29-12301601 (1(28)

Quant Time: Jan 09 09:42:44 2017
Quant Method : I:\MS13\METHODS\R13120516.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 06 07:29:38 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	88	0.00
57	S	Toluene-d8 (SS2)	2.546	2.517	1.1	87	0.00
58	T	Toluene	2.297	2.073	9.8	80	-0.01
59	T	2-Hexanone	0.945	0.978	-3.5	83	-0.01
60	T	Dibromochloromethane	0.687	0.684	0.4	77	0.00
61	T	1,2-Dibromoethane	0.601	0.602	-0.2	79	0.00
62	T	n-Butyl Acetate	1.016	1.053	-3.6	82	-0.01
63	T	n-Octane	0.403	0.385	4.5	82	0.00
64	T	Tetrachloroethene	0.773	0.710	8.2	78	0.00
65	T	Chlorobenzene	1.631	1.473	9.7	79	0.00
66	T	Ethylbenzene	2.560	2.382	7.0	79	0.00
67	T	m- & p-Xylenes	2.038	1.877	7.9	78	-0.01
68	T	Bromoform	0.625	0.639	-2.2	77	0.00
69	T	Styrene	1.479	1.537	-3.9	79	-0.01
70	T	o-Xylene	2.045	1.884	7.9	79	-0.01
71	T	n-Nonane	0.869	0.838	3.6	82	0.00
72	T	1,1,2,2-Tetrachloroethane	0.862	0.855	0.8	80	0.00
73	S	Bromofluorobenzene (SS3)	1.054	1.049	0.5	88	0.00
74	T	Cumene	2.717	2.503	7.9	78	0.00
75	T	alpha-Pinene	1.293	1.259	2.6	79	0.00
76	T	n-Propylbenzene	3.007	2.841	5.5	79	0.00
77	T	3-Ethyltoluene	2.614	2.485	4.9	80	-0.01
78	T	4-Ethyltoluene	2.509	2.375	5.3	77	0.00
79	T	1,3,5-Trimethylbenzene	2.345	2.075	11.5	78	-0.01
80	T	alpha-Methylstyrene	1.101	1.169	-6.2	78	-0.01
81	T	2-Ethyltoluene	2.620	2.406	8.2	79	0.00
82	T	1,2,4-Trimethylbenzene	2.225	2.073	6.8	78	-0.01
83	T	n-Decane	0.939	0.924	1.6	82	-0.01
84	T	Benzyl Chloride	1.713	1.803	-5.3	80	-0.01
85	T	1,3-Dichlorobenzene	1.391	1.333	4.2	80	-0.01
86	T	1,4-Dichlorobenzene	1.464	1.357	7.3	80	0.00
87	T	sec-Butylbenzene	2.934	2.734	6.8	79	-0.01
88	T	4-Isopropyltoluene (p-Cymen	2.822	2.661	5.7	78	-0.01
89	T	1,2,3-Trimethylbenzene	2.238	2.108	5.8	79	0.00
90	T	1,2-Dichlorobenzene	1.360	1.281	5.8	79	-0.01
91	T	d-Limonene	0.695	0.752	-8.2	80	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.500	0.503	-0.6	78	0.00
93	T	n-Undecane	0.964	0.981	-1.8	84	0.00
94	T	1,2,4-Trichlorobenzene	1.001	1.086	-8.5	82	0.00
95	T	Naphthalene	2.531	2.906	-14.8	87	0.00
96	T	n-Dodecane	0.852	0.933	-9.5	93	0.00
97	T	Hexachlorobutadiene	0.798	0.727	8.9	76	0.00
98	T	Cyclohexanone	0.645	0.623	3.4	79	-0.01
99	T	tert-Butylbenzene	2.236	2.049	8.4	78	-0.01
100	T	n-Butylbenzene	2.118	2.153	-1.7	80	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

Evaluate Continuing Calibration Report

Data File : I:\MS13\DATA\2017 01\11\01111701.D Vial: 3
Acq On : 11 Jan 2017 5:06 am Operator: LH/AMF
Sample : CCV R13011117 25ng Inst : MS13
Misc : S29-12271601/S29-12301601 (1(28)

Quant Time: Jan 11 08:22:15 2017
Quant Method : I:\MS13\METHODS\R13120516.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS) LH 1/17/17
QLast Update : Tue Dec 06 07:29:38 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M AM 1/11/17

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	89	-0.02
2	T	Propene	0.865	0.794	8.2	82	0.00
3	T	Dichlorodifluoromethane (CF	2.166	1.803	16.8	73	-0.01
4	T	Chloromethane	0.910	1.141	-25.4	86	-0.02
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.293	1.145	11.4	75	-0.02
6	T	Vinyl Chloride	1.261	1.294	-2.6	78	-0.02
7	T	1,3-Butadiene	0.757	0.888	-17.3	86	-0.02
8	T	Bromomethane	0.702	0.836	-19.1	89	-0.02
9	T	Chloroethane	0.604	0.612	-1.3	82	-0.02
10	T	Ethanol	0.550	0.518	5.8	81	-0.08
11	T	Acetonitrile	1.381	1.385	-0.3	82	-0.05
12	T	Acrolein	0.514	0.511	0.6	80	-0.02
13	T	Acetone	0.599	0.557	7.0	82	-0.04
14	T	Trichlorofluoromethane	1.926	1.611	16.4	74	-0.02
15	T	2-Propanol (Isopropanol)	1.926	1.981	-2.9	82	-0.07
16	T	Acrylonitrile	1.000	1.078	-7.8	84	-0.03
17	T	1,1-Dichloroethene	0.930	0.885	4.8	80	-0.01
18	T	2-Methyl-2-Propanol (tert-B	1.971	2.116	-7.4	86	-0.05
19	T	Methylene Chloride	1.001	0.876	12.5	80	-0.02
20	T	3-Chloro-1-propene (Allyl C	1.050	1.128	-7.4	81	-0.02
21	T	Trichlorotrifluoroethane	1.093	0.971	11.2	77	-0.02
22	T	Carbon Disulfide	3.456	3.158	8.6	81	-0.01
23	T	trans-1,2-Dichloroethene	1.206	1.216	-0.8	80	-0.02
24	T	1,1-Dichloroethane	1.620	1.502	7.3	80	-0.02
25	T	Methyl tert-Butyl Ether	2.567	2.713	-5.7	93	-0.02
26	T	Vinyl Acetate	0.212	0.209	1.4	81	-0.03
27	T	2-Butanone (MEK)	0.600	0.591	1.5	81	-0.02
28	T	cis-1,2-Dichloroethene	1.208	1.151	4.7	79	-0.02
29	T	Diisopropyl Ether	0.925	0.871	5.8	80	-0.01
30	T	Ethyl Acetate	0.282	0.289	-2.5	84	-0.02
31	T	n-Hexane	1.417	1.260	11.1	83	-0.01
32	T	Chloroform	1.715	1.551	9.6	78	-0.02
33	S	1,2-Dichloroethane-d4(SS1)	1.388	1.320	4.9	85	-0.01
34	T	Tetrahydrofuran (THF)	0.633	0.587	7.3	83	-0.01
35	T	Ethyl tert-Butyl Ether	1.066	1.096	-2.8	84	-0.01
36	T	1,2-Dichloroethane	1.311	1.166	11.1	75	-0.01
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	90	-0.01
38	T	1,1,1-Trichloroethane	0.354	0.317	10.5	75	0.00
39	T	Isopropyl Acetate	0.109	0.109	0.0	83	-0.01
40	T	1-Butanol	0.165	0.164	0.6	82	-0.04
41	T	Benzene	0.808	0.725	10.3	82	-0.01
42	T	Carbon Tetrachloride	0.333	0.296	11.1	74	-0.01
43	T	Cyclohexane	0.316	0.289	8.5	82	-0.01
44	T	tert-Amyl Methyl Ether	0.535	0.543	-1.5	85	-0.01
45	T	1,2-Dichloropropane	0.184	0.179	2.7	84	-0.01
46	T	Bromodichloromethane	0.280	0.267	4.6	78	-0.01
47	T	Trichloroethene	0.259	0.241	6.9	80	-0.01
48	T	1,4-Dioxane	0.161	0.166	-3.1	81	-0.02
49	T	2,2,4-Trimethylpentane (Iso	0.773	0.724	6.3	83	0.00
50	T	Methyl Methacrylate	0.086	0.085	1.2	81	-0.01
51	T	n-Heptane	0.191	0.186	2.6	84	-0.01
52	T	cis-1,3-Dichloropropene	0.315	0.320	-1.6	80	0.00
53	T	4-Methyl-2-pentanone	0.164	0.165	-0.6	83	-0.01
54	T	trans-1,3-Dichloropropene	0.306	0.300	2.0	79	-0.01
55	T	1,1,2-Trichloroethane	0.206	0.196	4.9	81	-0.01

Evaluate Continuing Calibration Report

Data File : I:\MS13\DATA\2017 01\11\01111701.D Vial: 3
Acq On : 11 Jan 2017 5:06 am Operator: LH/AMF
Sample : CCV R13011117 25ng Inst : MS13
Misc : S29-12271601/S29-12301601 (1(28)

Quant Time: Jan 11 08:22:15 2017
Quant Method : I:\MS13\METHODS\R13120516.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Tue Dec 06 07:29:38 2016
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	91	0.00
57	S	Toluene-d8 (SS2)	2.546	2.518	1.1	90	0.00
58	T	Toluene	2.297	2.050	10.8	81	-0.01
59	T	2-Hexanone	0.945	0.944	0.1	82	-0.01
60	T	Dibromochloromethane	0.687	0.664	3.3	77	0.00
61	T	1,2-Dibromoethane	0.601	0.590	1.8	80	0.00
62	T	n-Butyl Acetate	1.016	1.026	-1.0	82	-0.01
63	T	n-Octane	0.403	0.382	5.2	84	0.00
64	T	Tetrachloroethene	0.773	0.699	9.6	79	0.00
65	T	Chlorobenzene	1.631	1.447	11.3	80	0.00
66	T	Ethylbenzene	2.560	2.337	8.7	80	0.00
67	T	m- & p-Xylenes	2.038	1.840	9.7	79	0.00
68	T	Bromoform	0.625	0.620	0.8	77	0.00
69	T	Styrene	1.479	1.517	-2.6	81	0.00
70	T	o-Xylene	2.045	1.842	9.9	79	-0.01
71	T	n-Nonane	0.869	0.816	6.1	83	0.00
72	T	1,1,2,2-Tetrachloroethane	0.862	0.840	2.6	82	0.00
73	S	Bromofluorobenzene (SS3)	1.054	1.053	0.1	91	0.00
74	T	Cumene	2.717	2.445	10.0	79	0.00
75	T	alpha-Pinene	1.293	1.230	4.9	80	0.00
76	T	n-Propylbenzene	3.007	2.777	7.6	80	0.00
77	T	3-Ethyltoluene	2.614	2.411	7.8	80	0.00
78	T	4-Ethyltoluene	2.509	2.332	7.1	79	0.00
79	T	1,3,5-Trimethylbenzene	2.345	2.020	13.9	78	-0.01
80	T	alpha-Methylstyrene	1.101	1.142	-3.7	78	-0.01
81	T	2-Ethyltoluene	2.620	2.347	10.4	79	0.00
82	T	1,2,4-Trimethylbenzene	2.225	2.014	9.5	79	0.00
83	T	n-Decane	0.939	0.899	4.3	83	-0.01
84	T	Benzyl Chloride	1.713	1.726	-0.8	79	-0.01
85	T	1,3-Dichlorobenzene	1.391	1.294	7.0	80	-0.01
86	T	1,4-Dichlorobenzene	1.464	1.317	10.0	80	0.00
87	T	sec-Butylbenzene	2.934	2.656	9.5	79	-0.01
88	T	4-Isopropyltoluene (p-Cymen	2.822	2.576	8.7	78	-0.01
89	T	1,2,3-Trimethylbenzene	2.238	2.023	9.6	78	0.00
90	T	1,2-Dichlorobenzene	1.360	1.241	8.8	79	0.00
91	T	d-Limonene	0.695	0.729	-4.9	81	0.00
92	T	1,2-Dibromo-3-Chloropropane	0.500	0.482	3.6	77	0.00
93	T	n-Undecane	0.964	0.944	2.1	83	0.00
94	T	1,2,4-Trichlorobenzene	1.001	1.036	-3.5	81	0.00
95	T	Naphthalene	2.531	2.732	-7.9	85	0.00
96	T	n-Dodecane	0.852	0.887	-4.1	91	0.00
97	T	Hexachlorobutadiene	0.798	0.689	13.7	74	0.00
98	T	Cyclohexanone	0.645	0.606	6.0	80	-0.01
99	T	tert-Butylbenzene	2.236	1.996	10.7	78	-0.01
100	T	n-Butylbenzene	2.118	2.067	2.4	79	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

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LABORATORY REPORT

April 7, 2017

Margaret Zebley
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: BNSF Mission Wye

Dear Margaret:

Enclosed are the results of the samples submitted to our laboratory on March 24, 2017. For your reference, these analyses have been assigned our service request number P1701429.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

By Sue Anderson at 3:28 pm, Apr 07, 2017
For Kate Kaneko
Project Manager

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Client: AECOM Environment
Project: BNSF Mission Wye

Service Request No: P1701429

CASE NARRATIVE

The samples were received intact under chain of custody on March 24, 2017 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Volatile Organic Compound Analysis

The samples were analyzed for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2016036
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1177034
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-004
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-16-7
Utah DOH (NELAP)	http://health.utah.gov/lab/environmental-lab-certification/	CA016272016-6
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment
Project ID: BNSF Mission Wye

Service Request: P1701429

Date Received: 3/24/2017
Time Received: 09:30

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-15 - VOC Cans
SVE-CEV/03212017	P1701429-001	Air	3/21/2017	10:28	AC00897	-2.34	3.53	X
SVE-DUP/03212017	P1701429-002	Air	3/21/2017	10:30	AS00930	-3.09	3.58	X
SVE-Mid-T/03212017	P1701429-003	Air	3/21/2017	10:38	AC02158	-4.03	3.58	X
SVE-EV/03212017	P1701429-004	Air	3/21/2017	10:45	AS00132	-2.77	3.56	X

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

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Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No: 1701429

Company Name & Address (Reporting Information): AECOM, 207 N. Broadway, Ste. 315, Billings, MT 59101

Project Name: BNSF - Mission Wye

Project Number:

ALS Contact:

Project Manager: Margaret Zelley (Cole Grover)

P.O. # / Billing Information:

Phone: 406-670-8571

Fax:

Email Address for Result Reporting: margaret.zelley@aecom.com; cole.grover@aecom.com

Sampler (Print & Sign): Cole R. Grover / Cole R. Grover

Analysis Method: TO-15

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	TO-15		Comments e.g. Actual Preservative or specific instructions
SVE-CEV/03212017	1	3-21-2017	1028	AC00897	Not Marked	-28.0	-3.5	6l	X		
SVE-DUP/03212017	2		1030	20425	AVG02393	-27.0	-3.5	6l	X		
SVE-Mid-T/03212017	3		1038	N0683	Not Marked	-23.5	-3.0	6l	X		
SVE-EV/03212017	4		1045	5036	AVG04689	-25.0	-3.0	6l	X		

Report Tier Levels - please select

Tier I - Results (Default in not specified) ____
Tier II (Results + QC Summaries ____
Tier III (Results + QC & Calibration Summaries) X
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required (YES) / No
Type: AECOM
Units: ug/m3 ; ppb

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
Cole R. Grover	3-21-2017	1415	[illegible]	3/24/17	1332
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1701429
Project: BNSF Mission Wye
Sample(s) received on: 3/24/17 Date opened: 3/24/17 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☒	☐	☐
	Location of seal(s)? Box sealing. Sealing Lid?	☒	☐	☐
	Were signature and date included?	☒	☐	☐
	Were seals intact?	☒	☐	☐
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1701429-001.01	6.0 L Ambient Can					
P1701429-002.01	6.0 L Silonite Can					
P1701429-003.01	6.0 L Ambient Can					
P1701429-004.01	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/03212017** ALS Project ID: P1701429
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1701429-001

Test Code: EPA TO-15 Date Collected: 3/21/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/24/17
Analyst: Simon Cao Date Analyzed: 4/3/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes: 0.10 Liter(s)
Container ID: AC00897

Initial Pressure (psig): -2.34 Final Pressure (psig): 3.53

Canister Dilution Factor: 1.47

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**0.45**	0.74	0.28	**0.11**	0.19	0.070	**J**
79-01-6	Trichloroethene	**97**	0.74	0.21	**18**	0.14	0.038	
127-18-4	Tetrachloroethene	**960**	7.4	2.1	**140**	1.1	0.30	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	0.74	0.22	ND	0.15	0.045	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/03212017**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1701429
ALS Sample ID: P1701429-002

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Simon Cao
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS00930

Date Collected: 3/21/17
Date Received: 3/24/17
Date Analyzed: 4/3/17
Volume(s) Analyzed: 1.00 Liter(s)
0.10 Liter(s)

Initial Pressure (psig): -3.09 Final Pressure (psig): 3.58

Canister Dilution Factor: 1.57

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**0.46**	0.79	0.30	**0.12**	0.20	0.075	**J**
79-01-6	Trichloroethene	**97**	0.79	0.22	**18**	0.15	0.041	
127-18-4	Tetrachloroethene	**960**	7.9	2.2	**140**	1.2	0.32	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	0.79	0.24	ND	0.16	0.048	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-Mid-T/03212017** ALS Project ID: P1701429
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1701429-003

Test Code: EPA TO-15 Date Collected: 3/21/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/24/17
Analyst: Simon Cao Date Analyzed: 4/3/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes: 0.10 Liter(s)
Container ID: AC02158

Initial Pressure (psig): -4.03 Final Pressure (psig): 3.58

Canister Dilution Factor: 1.71

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	**0.64**	0.86	0.32	**0.16**	0.22	0.082	**J**
79-01-6	Trichloroethene	**140**	0.86	0.24	**27**	0.16	0.045	
127-18-4	Tetrachloroethene	**1,300**	8.6	2.4	**190**	1.3	0.35	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	0.86	0.26	ND	0.17	0.052	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/03212017**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1701429
ALS Sample ID: P1701429-004

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Simon Cao
Sample Type: 6.0 L Silonite Canister
Test Notes:
Container ID: AS00132

Date Collected: 3/21/17
Date Received: 3/24/17
Date Analyzed: 4/3/17
Volume(s) Analyzed: 1.00 Liter(s)

Initial Pressure (psig): -2.77 Final Pressure (psig): 3.56

Canister Dilution Factor: 1.53

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.77	0.29	ND	0.19	0.073	
79-01-6	Trichloroethene	ND	0.77	0.21	ND	0.14	0.040	
127-18-4	Tetrachloroethene	**0.39**	0.77	0.21	**0.058**	0.11	0.032	**J**
95-63-6	1,2,4-Trimethylbenzene	ND	0.77	0.23	ND	0.16	0.047	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **BNSF Mission Wye**

ALS Project ID: P1701429
ALS Sample ID: P170403-MB

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Simon Cao
Sample Type: 6.0 L Summa Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 4/3/17
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **BNSF Mission Wye** ALS Project ID: P1701429

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date(s) Collected: 3/21/17
Analyst: Simon Cao Date(s) Received: 3/24/17
Sample Type: 6.0 L Summa Canister(s) / 6.0 L Silonite Canister(s) Date(s) Analyzed: 4/3/17
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P170403-MB	**98**	**105**	**102**	70-130	
Lab Control Sample	P170403-LCS	**96**	**103**	**105**	70-130	
SVE-CEV/03212017	P1701429-001	**97**	**103**	**102**	70-130	
SVE-DUP/03212017	P1701429-002	**98**	**103**	**101**	70-130	
SVE-Mid-T/03212017	P1701429-003	**98**	**103**	**103**	70-130	
SVE-EV/03212017	P1701429-004	**97**	**104**	**104**	70-130	
SVE-EV/03212017	P1701429-004DUP	**97**	**103**	**103**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1701429
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P170403-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Simon Cao Date Analyzed: 4/3/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	213	**211**	**99**	74-123	
79-01-6	Trichloroethene	212	**195**	**92**	68-114	
127-18-4	Tetrachloroethene	213	**222**	**104**	65-130	
95-63-6	1,2,4-Trimethylbenzene	212	**233**	**110**	67-129	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY DUPLICATE SUMMARY RESULTS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/03212017** ALS Project ID: P1701429
Client Project ID: **BNSF Mission Wye** ALS Sample ID: P1701429-004DUP

Test Code: EPA TO-15 Date Collected: 3/21/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 3/24/17
Analyst: Simon Cao Date Analyzed: 4/3/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00132

Initial Pressure (psig): -2.77 Final Pressure (psig): 3.56

Canister Dilution Factor: 1.53

Compound	Sample Result µg/m³	Sample Result ppbV	**Duplicate Sample Result µg/m³**	**Duplicate Sample Result** ppbV	Average µg/m³	**% RPD**	RPD Limit	**Data Qualifier**
trans-1,2-Dichloroethene	ND	ND	ND	ND	-	-	25	
Trichloroethene	ND	ND	ND	ND	-	-	25	
Tetrachloroethene	0.393	0.0580	0.283	0.0418	0.338	**33**	25	**J, R1**
1,2,4-Trimethylbenzene	ND	ND	ND	ND	-	-	25	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
J = The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
R1 = Duplicate precision not within the specified limits; however, the results are below the MRL and considered estimated.

Response Factor Report MS09

Method Path : I:\MS09\Methods\
Method File : R9032817.M
Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
Last Update : Wed Mar 29 08:54:58 2017
Response Via : Initial Calibration

3/31/17

Calibration Files
0.08=03281707.D 0.10=03281708.D 0.20=03281709.D 0.40=03281710.D 1.0 =03281711.D 5.0 =03281
50 =03281714.D 100 =03281715.D

		Compound	0.08	0.10	0.20	0.40	1.0	5.0	25	50	100	Avg	%RSD
1)	IR	Bromochloromethane...	----------ISTD----------										
2)	T	Propene	2.357	2.058	1.616	1.650	1.752	1.589	1.793	1.675	2.848	1.927	22.10
3)	T	Dichlorodifluo...	3.228	2.961	2.464	2.523	2.673	2.409	2.650	2.334	2.588	2.648	10.72
4)	T	Chloromethane			3.227	2.848	3.263	2.750	2.940	2.158	2.054	2.748	17.39
5)	T	1,2-Dichloro-1...	1.679	1.611	1.321	1.333	1.418	1.250	1.410	1.281	1.223	1.392	11.40
6)	T	Vinyl Chloride	3.672	3.144	2.851	2.703	3.079	2.778	3.113	2.831	2.557	2.970	11.09
7)	T	1,3-Butadiene	2.378	2.112	1.961	1.758	2.082	2.017	2.366	2.218	1.921	2.090	9.82
8)	T	Bromomethane	1.563	1.448	1.341	1.238	1.288	1.264	1.490	1.365	1.312	1.368	8.07
9)	T	Chloroethane	1.369	1.153	1.343	1.092	1.147	1.097	1.407	1.309	1.243	1.240	9.80
10)	T	Ethanol	1.546	1.351	1.540	1.105	1.213	1.075	1.518	1.458	1.350	1.351	13.56
11)	T	Acetonitrile	3.881	3.392	4.031	2.856	2.989	2.740	3.016	3.784	3.681	3.374	14.44
12)	T	Acrolein			1.066	0.880	0.991	0.880	1.017	1.188	1.140	1.023	11.61
13)	T	Acetone	1.671	1.489	1.546	1.125	1.212	1.082	1.166	1.335	1.207	1.315	15.81
14)	T	Trichlorofluor...	2.521	2.375	2.239	2.040	2.126	1.873	2.081	2.137	2.060	2.161	8.93
15)	T	2-Propanol (Is...	4.276	3.929	4.658	3.557	3.910	3.489	4.100	4.754	3.271	3.994	12.80
16)	T	Acrylonitrile				1.753	2.002	1.872	2.185	2.570	2.521	2.150	15.73
17)	T	1,1-Dichloroet...	1.507	1.489	1.451	1.262	1.399	1.197	1.386	1.418	1.386	1.388	7.28
18)	T	2-Methyl-2-Pro...	4.112	3.791	4.048	3.387	3.763	3.437	4.039	4.433	3.298	3.812	10.04
19)	T	Methylene Chlo...	2.205	1.909	1.801	1.441	1.536	1.324	1.506	1.585	1.553	1.651	16.52
20)	T	3-Chloro-1-pro...	2.308	2.267	2.633	2.060	2.244	2.055	2.382	2.934	2.894	2.420	13.60
21)	T	Trichlorotrifl...	1.312	1.192	1.065	1.006	1.129	0.954	1.100	1.022	1.005	1.087	10.23
22)	T	Carbon Disulfide	8.738	7.520	6.811	5.460	5.526	4.892	5.618	6.054	5.781	6.267	19.35
23)	T	trans-1,2-Dich...	2.243	1.967	2.229	1.860	2.116	1.902	2.192	2.465	2.411	2.154	9.90
24)	T	1,1-Dichloroet...	2.953	2.818	2.973	2.510	2.626	2.388	2.663	2.978	2.889	2.755	7.89
25)	T	Methyl tert-Bu...	4.776	4.341	4.478	3.797	4.179	3.929	4.465	4.817	4.656	4.382	8.17
26)	T	Vinyl Acetate					0.223	0.242	0.326	0.356	0.343	0.298	20.46
27)	T	2-Butanone (MEK)	0.793	0.892	0.912	0.877	1.039	0.935	1.094	1.196	1.175	0.990	14.27
28)	T	cis-1,2-Dichlo...	2.202	2.153	2.259	1.870	2.015	1.831	2.086	2.344	2.285	2.116	8.56
29)	T	Diisopropyl Ether	1.424	1.383	1.483	1.120	1.208	1.084	1.231	1.276	1.163	1.264	11.03
30)	T	Ethyl Acetate	0.460	0.524	0.612	0.507	0.566	0.520	0.603	0.681	0.592	0.563	11.88
31)	T	n-Hexane	3.250	3.019	3.158	2.522	2.718	2.432	2.695	3.026	2.576	2.822	10.53
32)	T	Chloroform	2.810	2.569	2.653	2.176	2.392	2.120	2.406	2.540	2.459	2.458	8.88
33)	S	1,2-Dichloroet...	1.569	1.560	1.859	1.563	1.573	1.585	1.556	1.800	1.799	1.652	7.70
34)	T	Tetrahydrofura...	1.165	1.019	1.150	0.890	1.033	0.910	1.044	1.150	1.122	1.054	9.76
35)	T	Ethyl tert-But...	1.635	1.567	1.629	1.482	1.670	1.512	1.738	1.830	1.785	1.650	7.22
36)	T	1,2-Dichloroet...	2.179	1.966	1.987	1.653	1.821	1.618	1.811	1.997	1.925	1.884	9.42
37)	IR	1,4-Difluorobenzen...	----------ISTD----------										
38)	T	1,1,1-Trichlor...	0.453	0.429	0.406	0.358	0.396	0.354	0.404	0.405	0.393	0.400	7.76
39)	T	Isopropyl Acetate	0.218	0.186	0.205	0.168	0.193	0.179	0.208	0.232	0.216	0.201	10.31
40)	T	1-Butanol	0.385	0.333	0.346	0.285	0.311	0.302	0.354	0.404	0.377	0.344	11.67
41)	T	Benzene	1.642	1.450	1.387	1.263	1.218	1.087	1.228	1.271	1.218	1.307	12.49
42)	T	Carbon Tetrach...	0.402	0.359	0.338	0.304	0.326	0.296	0.341	0.334	0.323	0.336	9.30
43)	T	Cyclohexane	0.537	0.485	0.453	0.409	0.457	0.409	0.468	0.478	0.443	0.460	8.60
44)	T	tert-Amyl Meth...	0.965	0.896	0.863	0.763	0.823	0.764	0.887	0.938	0.901	0.867	8.20
45)	T	1,2-Dichloropr...	0.381	0.349	0.341	0.288	0.319	0.276	0.316	0.349	0.338	0.329	9.91
46)	T	Bromodichlorom...	0.417	0.383	0.373	0.324	0.367	0.333	0.385	0.401	0.389	0.374	8.05
47)	T	Trichloroethene	0.381	0.357	0.293	0.291	0.292	0.262	0.300	0.281	0.273	0.303	13.04
48)	T	1,4-Dioxane	0.252	0.249	0.225	0.218	0.241	0.220	0.258	0.264	0.259	0.243	7.28
49)	T	2,2,4-Trimethy...	1.634	1.440	1.526	1.223	1.334	1.197	1.369	1.519	1.414	1.406	10.20
50)	T	Methyl Methacr...	0.107	0.097	0.094	0.094	0.114	0.104	0.126	0.125	0.121	0.109	11.79
51)	T	n-Heptane	0.378	0.285	0.331	0.284	0.308	0.276	0.319	0.341	0.331	0.317	10.39
52)	T	cis-1,3-Dichlo...	0.428	0.460	0.443	0.410	0.485	0.442	0.510	0.542	0.519	0.471	9.58
53)	T	4-Methyl-2-pen...	0.276	0.265	0.289	0.248	0.299	0.272	0.313	0.355	0.343	0.296	12.13
54)	T	trans-1,3-Dich...	0.358	0.325	0.374	0.337	0.414	0.390	0.459	0.486	0.469	0.401	14.76

55)	T	1,1,2-Trichlor...	0.298	0.286	0.252	0.253	0.282	0.250	0.288	0.289	0.281	0.276	6.71
56)	IR	Chlorobenzene-d5 (...	----------ISTD----------										
57)	S	Toluene-d8 (SS2)	2.494	2.168	2.389	2.477	2.471	2.444	2.461	2.334	2.343	2.398	4.35
58)	T	Toluene	3.483	2.723	2.557	2.532	2.755	2.411	2.806	2.537	2.406	2.690	12.27
59)	T	2-Hexanone	1.567	1.242	1.424	1.266	1.511	1.394	1.641	1.777	1.718	1.505	12.59
60)	T	Dibromochlorom...	0.674	0.552	0.537	0.581	0.666	0.584	0.691	0.604	0.594	0.609	9.03
61)	T	1,2-Dibromoethane	0.679	0.608	0.563	0.589	0.674	0.601	0.710	0.636	0.623	0.631	7.56
62)	T	n-Butyl Acetate	1.695	1.269	1.543	1.353	1.661	1.550	1.846	2.021	1.940	1.653	15.37
63)	T	n-Octane	0.684	0.611	0.627	0.548	0.619	0.548	0.638	0.661	0.632	0.619	7.37
64)	T	Tetrachloroethene	0.748	0.621	0.531	0.594	0.654	0.573	0.661	0.552	0.550	0.609	11.40
65)	T	Chlorobenzene	2.250	1.911	1.571	1.592	1.731	1.512	1.738	1.534	1.468	1.701	14.62
66)	T	Ethylbenzene	3.468	3.105	2.631	2.604	2.947	2.685	3.117	2.870	2.700	2.903	9.91
67)	T	m- & p-Xylenes	2.601	2.192	2.050	2.042	2.267	2.063	2.419	2.227	2.109	2.219	8.51
68)	T	Bromoform	0.529	0.383	0.382	0.442	0.507	0.462	0.568	0.470	0.477	0.469	13.23
69)	T	Styrene	1.857	1.609	1.437	1.543	1.760	1.657	1.961	1.760	1.677	1.696	9.41
70)	T	o-Xylene	2.746	2.332	2.028	2.048	2.323	2.106	2.461	2.266	2.135	2.272	10.11
71)	T	n-Nonane	1.597	1.538	1.441	1.226	1.448	1.306	1.508	1.648	1.496	1.468	9.08
72)	T	1,1,2,2-Tetrac...	1.042	0.886	0.880	0.906	1.139	1.027	1.216	1.178	1.126	1.045	12.41
73)	S	Bromofluoroben...	0.669	0.583	0.566	0.680	0.674	0.679	0.688	0.576	0.578	0.633	8.57
74)	T	Cumene	3.432	2.868	2.500	2.640	2.930	2.638	3.047	2.712	2.515	2.809	10.62
75)	T	alpha-Pinene	1.597	1.369	1.212	1.349	1.495	1.403	1.651	1.533	1.438	1.450	9.34
76)	T	n-Propylbenzene	4.007	3.530	3.073	3.218	3.590	3.293	3.815	3.470	3.136	3.459	9.07
77)	T	3-Ethyltoluene	3.129	2.692	2.447	2.587	2.931	2.699	3.073	2.811	2.639	2.779	8.18
78)	T	4-Ethyltoluene	2.913	2.645	2.378	2.422	2.742	2.491	2.990	2.582	2.336	2.611	8.92
79)	T	1,3,5-Trimethy...	2.550	2.244	1.900	2.106	2.366	2.176	2.544	2.279	2.125	2.254	9.35
80)	T	alpha-Methylst...	1.272	1.044	0.938	1.010	1.241	1.172	1.413	1.242	1.181	1.168	12.66
81)	T	2-Ethyltoluene	3.333	2.640	2.344	2.540	2.872	2.595	3.010	2.688	2.485	2.723	11.13
82)	T	1,2,4-Trimethy...	2.547	2.123	1.896	2.059	2.408	2.224	2.656	2.374	2.010	2.255	11.40
83)	T	n-Decane				1.262	1.527	1.394	1.635	1.692	1.423	1.489	10.79
84)	T	Benzyl Chloride				1.588	2.080	2.072	2.540	2.394	2.132	2.134	15.36
85)	T	1,3-Dichlorobe...	1.614	1.237	1.110	1.221	1.352	1.224	1.459	1.240	1.192	1.294	12.01
86)	T	1,4-Dichlorobe...	1.677	1.323	1.057	1.235	1.362	1.233	1.459	1.231	1.185	1.307	13.70
87)	T	sec-Butylbenzene	3.506	2.907	2.708	2.928	3.303	2.997	3.469	3.072	2.775	3.074	9.44
88)	T	4-Isopropyltol...	3.307	2.719	2.356	2.675	3.057	2.753	3.237	2.745	2.226	2.786	13.10
89)	T	1,2,3-Trimethy...	2.621	2.023	1.959	2.064	2.412	2.247	2.698	2.403	1.997	2.269	12.26
90)	T	1,2-Dichlorobe...	1.584	1.206	1.015	1.190	1.300	1.166	1.404	1.185	1.107	1.240	13.65
91)	T	d-Limonene				0.880	1.049	1.021	1.260	1.234	1.058	1.084	13.10
92)	T	1,2-Dibromo-3-...				0.320	0.418	0.397	0.486	0.408	0.410	0.407	13.10
93)	T	n-Undecane				1.114	1.539	1.453	1.757	1.824	1.576	1.544	16.35
94)	T	1,2,4-Trichlor...				0.764	0.924	0.856	1.079	0.900	0.900	0.904	11.39
95)	T	Naphthalene	4.063	2.912	2.366	2.586	3.122	3.019	3.728	3.181	2.874	3.095	17.04
96)	T	n-Dodecane				1.011	1.454	1.383	1.847	1.908	1.606	1.535	21.54
97)	T	Hexachlorobuta...	0.597	0.507	0.357	0.485	0.526	0.483	0.592	0.493	0.502	0.505	13.93
98)	T	Cyclohexanone	1.174	0.951	0.933	0.818	0.961	0.903	1.074	1.129	1.079	1.003	11.68
99)	T	tert-Butylbenzene	2.549	2.120	1.860	2.049	2.295	2.107	2.450	2.122	1.789	2.149	11.62
100)	T	n-Butylbenzene	2.823	2.305	2.264	2.324	2.700	2.525	2.946	2.709	2.405	2.556	9.71

(#) = Out of Range

R9032817.M Fri Mar 31 11:13:07 2017

Evaluate Continuing Calibration Report

Data File: I:\MS09\Data\2017 04\03\04031703.D
Acq On : 3 Apr 2017 10:28 Operator: SC
Sample : CCV R9040317 5.0ng
Misc : S29-03031701/S31-03281707 (4/26)
ALS Vial : 5 Sample Multiplier: 1

4/3/17

Quant Time: Apr 03 10:53:51 2017
Quant Method : I:\MS09\Methods\R9032817.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Mar 29 08:54:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
1	IR	Bromochloromethane (IS1)	1.000	1.000	0.0	104	-0.03
2	T	Propene	1.927	2.056	-6.7	135	0.00
3	T	Dichlorodifluoromethane (CF	2.648	2.854	-7.8	123	0.00
4	T	Chloromethane	2.748	3.195	-16.3	121	-0.02
5	T	1,2-Dichloro-1,1,2,2-tetraf	1.392	1.387	0.4	116	0.00
6	T	Vinyl Chloride	2.970	3.142	-5.8	118	-0.01
7	T	1,3-Butadiene	2.090	2.511	-20.1	130	-0.01
8	T	Bromomethane	1.368	1.484	-8.5	122	-0.02
9	T	Chloroethane	1.240	1.523	-22.8	144	-0.02
10	T	Ethanol	1.351	1.732	-28.2	168	-0.09
11	T	Acetonitrile	3.374	4.581	-35.8#	174	-0.06
12	T	Acrolein	1.023	1.369	-33.8#	162	-0.04
13	T	Acetone	1.315	1.625	-23.6	156	-0.05
14	T	Trichlorofluoromethane	2.161	2.348	-8.7	131	-0.02
15	T	2-Propanol (Isopropanol)	3.994	5.576	-39.6#	166	-0.07
16	T	Acrylonitrile	2.150	2.909	-35.3#	162	-0.05
17	T	1,1-Dichloroethene	1.388	1.541	-11.0	134	-0.02
18	T	2-Methyl-2-Propanol (tert-B	3.812	4.999	-31.1#	151	-0.07
19	T	Methylene Chloride	1.651	1.756	-6.4	138	-0.04
20	T	3-Chloro-1-propene (Allyl C	2.420	3.400	-40.5#	172	-0.04
21	T	Trichlorotrifluoroethane	1.087	1.089	-0.2	119	-0.02
22	T	Carbon Disulfide	6.267	6.744	-7.6	144	-0.02
23	T	trans-1,2-Dichloroethene	2.154	2.775	-28.8	152	-0.03
24	T	1,1-Dichloroethane	2.755	3.397	-23.3	148	-0.03
25	T	Methyl tert-Butyl Ether	4.382	5.324	-21.5	141	-0.02
26	T	Vinyl Acetate	0.298	0.335	-12.4	144	-0.04
27	T	2-Butanone (MEK)	0.990	1.301	-31.4#	145	-0.04
28	T	cis-1,2-Dichloroethene	2.116	2.633	-24.4	150	-0.03
29	T	Diisopropyl Ether	1.264	1.375	-8.8	132	-0.02
30	T	Ethyl Acetate	0.563	0.752	-33.6#	151	-0.04
31	T	n-Hexane	2.822	3.382	-19.8	145	-0.01
32	T	Chloroform	2.458	2.804	-14.1	138	-0.04
33	S	1,2-Dichloroethane-d4(SS1)	1.652	1.879	-13.7	123	-0.03
34	T	Tetrahydrofuran (THF)	1.054	1.246	-18.2	143	-0.02
35	T	Ethyl tert-Butyl Ether	1.650	1.960	-18.8	135	-0.02
36	T	1,2-Dichloroethane	1.884	2.238	-18.8	144	-0.03
37	IR	1,4-Difluorobenzene (IS2)	1.000	1.000	0.0	108	-0.02
38	T	1,1,1-Trichloroethane	0.400	0.433	-8.2	132	-0.02
39	T	Isopropyl Acetate	0.201	0.249	-23.9	150	-0.02
40	T	1-Butanol	0.344	0.442	-28.5	157	-0.05
41	T	Benzene	1.307	1.378	-5.4	136	-0.02
42	T	Carbon Tetrachloride	0.336	0.351	-4.5	128	-0.02
43	T	Cyclohexane	0.460	0.514	-11.7	135	-0.02
44	T	tert-Amyl Methyl Ether	0.867	1.010	-16.5	142	-0.01
45	T	1,2-Dichloropropane	0.329	0.377	-14.6	147	-0.02
46	T	Bromodichloromethane	0.374	0.423	-13.1	137	-0.02
47	T	Trichloroethene	0.303	0.288	5.0	118	-0.02
48	T	1,4-Dioxane	0.243	0.271	-11.5	133	-0.02
49	T	2,2,4-Trimethylpentane (Iso	1.406	1.707	-21.4	153	-0.02
50	T	Methyl Methacrylate	0.109	0.123	-12.8	127	-0.02
51	T	n-Heptane	0.317	0.354	-11.7	138	-0.02
52	T	cis-1,3-Dichloropropene	0.471	0.567	-20.4	138	-0.01
53	T	4-Methyl-2-pentanone	0.296	0.380	-28.4	150	-0.02
54	T	trans-1,3-Dichloropropene	0.401	0.503	-25.4	139	-0.02

Evaluate Continuing Calibration Report

Data File: I:\MS09\Data\2017 04\03\04031703.D
Acq On : 3 Apr 2017 10:28 Operator: SC
Sample : CCV R9040317 5.0ng
Misc : S29-03031701/S31-03281707 (4/26)
ALS Vial : 5 Sample Multiplier: 1

Quant Time: Apr 03 10:53:51 2017
Quant Method : I:\MS09\Methods\R9032817.M
Quant Title : EPA TO-15 per SOP VOA-TO15 (CASS TO-15/GC-MS)
QLast Update : Wed Mar 29 08:54:58 2017
Response via : Initial Calibration
DataAcq Meth:TO15.M

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.33min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)
55	T	1,1,2-Trichloroethane	0.276	0.303	-9.8	130	-0.01
56	IR	Chlorobenzene-d5 (IS3)	1.000	1.000	0.0	111	0.00
57	S	Toluene-d8 (SS2)	2.398	2.400	-0.1	109	-0.01
58	T	Toluene	2.690	2.812	-4.5	130	-0.02
59	T	2-Hexanone	1.505	2.023	-34.4#	162	-0.02
60	T	Dibromochloromethane	0.609	0.628	-3.1	120	-0.01
61	T	1,2-Dibromoethane	0.631	0.680	-7.8	126	-0.01
62	T	n-Butyl Acetate	1.653	2.307	-39.6#	166	-0.01
63	T	n-Octane	0.619	0.732	-18.3	149	-0.01
64	T	Tetrachloroethene	0.609	0.559	8.2	109	0.00
65	T	Chlorobenzene	1.701	1.646	3.2	121	-0.01
66	T	Ethylbenzene	2.903	3.155	-8.7	131	-0.01
67	T	m- & p-Xylenes	2.219	2.443	-10.1	132	-0.02
68	T	Bromoform	0.469	0.461	1.7	111	-0.01
69	T	Styrene	1.696	1.832	-8.0	123	-0.01
70	T	o-Xylene	2.272	2.448	-7.7	129	-0.02
71	T	n-Nonane	1.468	1.871	-27.5	160	-0.01
72	T	1,1,2,2-Tetrachloroethane	1.045	1.237	-18.4	134	-0.01
73	S	Bromofluorobenzene (SS3)	0.633	0.551	13.0	90	0.00
74	T	Cumene	2.809	2.947	-4.9	124	-0.01
75	T	alpha-Pinene	1.450	1.604	-10.6	127	0.00
76	T	n-Propylbenzene	3.459	3.824	-10.6	129	-0.01
77	T	3-Ethyltoluene	2.779	3.043	-9.5	126	-0.01
78	T	4-Ethyltoluene	2.611	2.736	-4.8	122	-0.01
79	T	1,3,5-Trimethylbenzene	2.254	2.433	-7.9	125	-0.01
80	T	alpha-Methylstyrene	1.168	1.221	-4.5	116	-0.01
81	T	2-Ethyltoluene	2.723	2.897	-6.4	124	-0.01
82	T	1,2,4-Trimethylbenzene	2.255	2.474	-9.7	124	-0.02
83	T	n-Decane	1.489	1.847	-24.0	148	-0.01
84	T	Benzyl Chloride	2.134	2.286	-7.1	123	-0.02
85	T	1,3-Dichlorobenzene	1.294	1.235	4.6	112	-0.02
86	T	1,4-Dichlorobenzene	1.307	1.261	3.5	114	-0.01
87	T	sec-Butylbenzene	3.074	3.300	-7.4	123	0.00
88	T	4-Isopropyltoluene (p-Cymen	2.786	2.944	-5.7	119	-0.01
89	T	1,2,3-Trimethylbenzene	2.269	2.489	-9.7	123	-0.01
90	T	1,2-Dichlorobenzene	1.240	1.185	4.4	113	-0.01
91	T	d-Limonene	1.084	1.259	-16.1	137	-0.01
92	T	1,2-Dibromo-3-Chloropropane	0.407	0.398	2.2	112	0.00
93	T	n-Undecane	1.544	1.879	-21.7	144	0.00
94	T	1,2,4-Trichlorobenzene	0.904	0.809	10.5	105	0.00
95	T	Naphthalene	3.095	2.929	5.4	108	-0.01
96	T	n-Dodecane	1.535	1.692	-10.2	136	-0.01
97	T	Hexachlorobutadiene	0.505	0.457	9.5	105	0.00
98	T	Cyclohexanone	1.003	1.240	-23.6	153	-0.02
99	T	tert-Butylbenzene	2.149	2.260	-5.2	119	-0.01
100	T	n-Butylbenzene	2.556	2.895	-13.3	128	0.00

(#) = Out of Range SPCC's out = 0 CCC's out = 0

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www.alsglobal.com

LABORATORY REPORT

July 10, 2017

Cole Grover
AECOM Environment
207 North Broadway, Suite 315
Billings, MT 59101

RE: Mission Wye / 60508912

Dear Cole:

Enclosed are the results of the samples submitted to our laboratory on June 23, 2017. For your reference, these analyses have been assigned our service request number P1703049.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Kaneko
By Kate Kaneko at 11:44 am, 07/10/17

Kate Kaneko
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

Client: AECOM Environment
Project: Mission Wye / 60508912

Service Request No: P1703049

CASE NARRATIVE

The samples were received intact under chain of custody on June 23, 2017 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Volatile Organic Compound Analysis

The samples were analyzed for selected volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph / mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

The containers were cleaned, prior to sampling, down to the method reporting limit (MRL) reported for this project. Please note, projects which require reporting below the MRL could have results between the MRL and method detection limit (MDL) that are biased high.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.

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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2016036
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1177034
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-004
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-16-7
Utah DOH (NELAP)	http://health.utah.gov/lab/environmental-lab-certification/	CA016272016-6
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: AECOM Environment
Project ID: Mission Wye / 60508912

Service Request: P1703049

Date Received: 6/23/2017
Time Received: 09:25

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	Container ID	Pi1 (psig)	Pf1 (psig)	TO-15 - VOC Cans
SVE-CEV/06192017	P1703049-001	Air	6/19/2017	10:32	AS01000	-4.94	3.68	X
MID-T/06192017	P1703049-002	Air	6/19/2017	10:25	AC01649	-4.25	3.55	X
SVE-EV/06192017	P1703049-003	Air	6/19/2017	10:15	AC02214	-4.83	3.61	X
SVE-DUP/06192017	P1703049-004	Air	6/19/2017	10:25	AS00678	-4.82	3.66	X

Air - Chain of Custody Record & Analytical Service Request

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10-Day-Standard

ALS Project No: P1703049

Company Name & Address (Reporting Information): AECOM

Project Name: Mission Wye

Project Number: 60508912

Project Manager: Cole Grover

P.O. # / Billing Information: AECOM

Phone:

Fax:

Email Address for Result Reporting: Cole.Grover@AECOM.com

Sampler (Print & Sign): Brad Ruff

ALS Contact:

Analysis Method

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method		Comments e.g. Actual Preservative or specific instructions
SVE-CEV/06192017	1	6/19/17	1032	20496	—	-20	-5	6L	TO-15		
MID-T/06192017	2		1025	6457	—	-24	-5				
SVE-EV/06192017	3		1015	12178	—	-25	-5				
SVE-DUP/06192017	4		1025	00678	—	-25	-5				

Report Tier Levels - please select

Tier I - Results (Default in not specified) ____
Tier II (Results + QC Summaries ____
Tier III (Results + QC & Calibration Summaries) X
Tier IV (Date Validation Package) 10% Surcharge ____

EDD required (YES) / No
Type: ____ Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date: 6/20/17	Time: 0800	Received by: (Signature)	Date:	Time:
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date: 6/21/17	Time: 0925

Cooler / Blank Temperature ____°C

ALS Environmental
Sample Acceptance Check Form

Client: AECOM Environment Work order: P1703049
Project: Mission Wye / 60508912
Sample(s) received on: 6/23/17 Date opened: 6/23/17 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☒	☐	☐
	Location of seal(s)? Box sealing. Sealing Lid?	☒	☐	☐
	Were signature and date included?	☒	☐	☐
	Were seals intact?	☒	☐	☐
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1703049-001.01	6.0 L Silonite Can					
P1703049-002.01	6.0 L Ambient Can					
P1703049-003.01	6.0 L Ambient Can					
P1703049-004.01	6.0 L Silonite Can					

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-CEV/06192017** ALS Project ID: P1703049
Client Project ID: **Mission Wye / 60508912** ALS Sample ID: P1703049-001

Test Code: EPA TO-15 Date Collected: 6/19/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/23/17
Analyst: Wida Ang Date Analyzed: 6/26 - 6/27/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes: 0.10 Liter(s)
Container ID: AS01000

Initial Pressure (psig): -4.94 Final Pressure (psig): 3.68

Canister Dilution Factor: 1.88

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.94	0.36	ND	0.24	0.090	
79-01-6	Trichloroethene	**94**	0.94	0.26	**18**	0.17	0.049	
127-18-4	Tetrachloroethene	**630**	9.4	2.6	**94**	1.4	0.39	**D**
95-63-6	1,2,4-Trimethylbenzene	ND	0.94	0.28	ND	0.19	0.057	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.
D = The reported result is from a dilution.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **MID-T/06192017** ALS Project ID: P1703049
Client Project ID: **Mission Wye / 60508912** ALS Sample ID: P1703049-002

Test Code: EPA TO-15 Date Collected: 6/19/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/23/17
Analyst: Wida Ang Date Analyzed: 6/26/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC01649

Initial Pressure (psig): -4.25 Final Pressure (psig): 3.55

Canister Dilution Factor: 1.75

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.88	0.33	ND	0.22	0.084	
79-01-6	Trichloroethene	ND	0.88	0.25	ND	0.16	0.046	
127-18-4	Tetrachloroethene	ND	0.88	0.25	ND	0.13	0.036	
95-63-6	1,2,4-Trimethylbenzene	ND	0.88	0.26	ND	0.18	0.053	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-EV/06192017** ALS Project ID: P1703049
Client Project ID: **Mission Wye / 60508912** ALS Sample ID: P1703049-003

Test Code: EPA TO-15 Date Collected: 6/19/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/23/17
Analyst: Wida Ang Date Analyzed: 6/26/17
Sample Type: 6.0 L Summa Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AC02214

Initial Pressure (psig): -4.83 Final Pressure (psig): 3.61

Canister Dilution Factor: 1.86

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.93	0.35	ND	0.23	0.089	
79-01-6	Trichloroethene	ND	0.93	0.26	ND	0.17	0.048	
127-18-4	Tetrachloroethene	ND	0.93	0.26	ND	0.14	0.038	
95-63-6	1,2,4-Trimethylbenzene	ND	0.93	0.28	ND	0.19	0.057	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **SVE-DUP/06192017** ALS Project ID: P1703049
Client Project ID: **Mission Wye / 60508912** ALS Sample ID: P1703049-004

Test Code: EPA TO-15 Date Collected: 6/19/17
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: 6/23/17
Analyst: Wida Ang Date Analyzed: 6/26/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 1.00 Liter(s)
Test Notes:
Container ID: AS00678

Initial Pressure (psig): -4.82 Final Pressure (psig): 3.66

Canister Dilution Factor: 1.86

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.93	0.35	ND	0.23	0.089	
79-01-6	Trichloroethene	ND	0.93	0.26	ND	0.17	0.048	
127-18-4	Tetrachloroethene	ND	0.93	0.26	ND	0.14	0.038	
95-63-6	1,2,4-Trimethylbenzene	ND	0.93	0.28	ND	0.19	0.057	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye / 60508912**

ALS Project ID: P1703049
ALS Sample ID: P170626-MB

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Silonite Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 6/26/17
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **AECOM Environment**
Client Sample ID: **Method Blank**
Client Project ID: **Mission Wye / 60508912**

ALS Project ID: P1703049
ALS Sample ID: P170627-MB

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9
Analyst: Wida Ang
Sample Type: 6.0 L Silonite Canister
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 6/27/17
Volume(s) Analyzed: 1.00 Liter(s)

Canister Dilution Factor: 1.00

CAS #	Compound	Result µg/m³	MRL µg/m³	MDL µg/m³	Result ppbV	MRL ppbV	MDL ppbV	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	ND	0.50	0.19	ND	0.13	0.048	
79-01-6	Trichloroethene	ND	0.50	0.14	ND	0.093	0.026	
127-18-4	Tetrachloroethene	ND	0.50	0.14	ND	0.074	0.021	
95-63-6	1,2,4-Trimethylbenzene	ND	0.50	0.15	ND	0.10	0.031	

ND = Compound was analyzed for, but not detected above the laboratory detection limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

SURROGATE SPIKE RECOVERY RESULTS

Client: **AECOM Environment**
Client Project ID: **Mission Wye / 60508912** ALS Project ID: P1703049

Test Code: EPA TO-15
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date(s) Collected: 6/19/17
Analyst: Wida Ang Date(s) Received: 6/23/17
Sample Type: 6.0 L Silonite Canister(s) Date(s) Analyzed: 6/26 - 6/27/17
Test Notes:

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4 Percent Recovered	Toluene-d8 Percent Recovered	Bromofluorobenzene Percent Recovered	Acceptance Limits	Data Qualifier
Method Blank	P170626-MB	**99**	**102**	**97**	70-130	
Method Blank	P170627-MB	**104**	**101**	**97**	70-130	
Lab Control Sample	P170626-LCS	**98**	**101**	**99**	70-130	
Lab Control Sample	P170627-LCS	**98**	**100**	**96**	70-130	
SVE-CEV/06192017	P1703049-001	**103**	**98**	**93**	70-130	
MID-T/06192017	P1703049-002	**104**	**98**	**95**	70-130	
SVE-EV/06192017	P1703049-003	**104**	**100**	**98**	70-130	
SVE-DUP/06192017	P1703049-004	**101**	**100**	**96**	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1703049
Client Project ID: **Mission Wye / 60508912** ALS Sample ID: P170626-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 6/26/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	213	**227**	**107**	74-123	
79-01-6	Trichloroethene	212	**199**	**94**	68-114	
127-18-4	Tetrachloroethene	213	**206**	**97**	65-130	
95-63-6	1,2,4-Trimethylbenzene	212	**223**	**105**	67-129	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **AECOM Environment**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1703049
Client Project ID: **Mission Wye / 60508912** ALS Sample ID: P170627-LCS

Test Code: EPA TO-15 Date Collected: NA
Instrument ID: Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9 Date Received: NA
Analyst: Wida Ang Date Analyzed: 6/27/17
Sample Type: 6.0 L Silonite Canister Volume(s) Analyzed: 0.125 Liter(s)
Test Notes:

CAS #	Compound	Spike Amount µg/m³	Result µg/m³	% Recovery	ALS Acceptance Limits	Data Qualifier
156-60-5	trans-1,2-Dichloroethene	213	**223**	**105**	74-123	
79-01-6	Trichloroethene	212	**197**	**93**	68-114	
127-18-4	Tetrachloroethene	213	**205**	**96**	65-130	
95-63-6	1,2,4-Trimethylbenzene	212	**224**	**106**	67-129	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.
Reported results are shown in concentration units and as a result of the calculation, may vary slightly.

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December 11, 2015

Shelly Young
AECOM, Inc.
207 North Broadway, Suite 315
Billings, MT 59101

RE: Project: BNSF-Mission Wye
Pace Project No.: 10332107

Dear Shelly Young:
Enclosed are the analytical results for sample(s) received by the laboratory on December 04, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

cc: Mr. Yueh Chuang, BNSF Railway
Cole Grover, AECOM
Anne Kakai, AECOM

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CERTIFICATIONS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

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
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10332107001	**MW-9/12022015**	Water	12/02/15 13:42	12/04/15 10:10
10332107002	**FB-01**	Water	12/02/15 13:35	12/04/15 10:10
10332107003	**EB-01**	Water	12/02/15 13:45	12/04/15 10:10
10332107004	**MW-4/12022015**	Water	12/02/15 14:32	12/04/15 10:10
10332107005	**MW-DUP/12022015**	Water	12/02/15 15:00	12/04/15 10:10
10332107006	**MW-3/12022015**	Water	12/02/15 15:15	12/04/15 10:10
10332107007	**Trip Blank**	Water	12/02/15 00:00	12/04/15 10:10

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SAMPLE ANALYTE COUNT

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10332107001	**MW-9/12022015**	EPA 8260B	DJB	70	PASI-M
10332107002	**FB-01**	EPA 8260B	DJB	70	PASI-M
10332107003	**EB-01**	EPA 8260B	DJB	70	PASI-M
10332107004	**MW-4/12022015**	EPA 8260B	DJB	70	PASI-M
10332107005	**MW-DUP/12022015**	EPA 8260B	DJB	70	PASI-M
10332107006	**MW-3/12022015**	EPA 8260B	DJB	70	PASI-M
10332107007	**Trip Blank**	EPA 8260B	DJB	70	PASI-M

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PROJECT NARRATIVE

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: December 11, 2015

General Information:
7 samples were analyzed for EPA 8260B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

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.

QC Batch: MSV/33999

SS: This analyte did not meet the secondary source verification criteria for the initial calibration. The reported result should be considered an estimated value.

- LCS (Lab ID: 2150651)
  - Acetone
  - Tetrahydrofuran
- MS (Lab ID: 2150652)
  - Acetone
  - Tetrahydrofuran
- MSD (Lab ID: 2150653)
  - Acetone
  - Tetrahydrofuran

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.

QC Batch: MSV/33999

IS: The internal standard recovery associated with this result exceeds the lower control limit. The reported result should be considered an estimated value.

- MSD (Lab ID: 2150653)
  - Acetone
  - Tetrahydrofuran

Surrogates:
All surrogates 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.

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PROJECT NARRATIVE

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: December 11, 2015

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: MSV/33999

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10332007008

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2150652)
  - Acetone
  - Tetrahydrofuran
- MSD (Lab ID: 2150653)
  - Acetone
  - Tetrahydrofuran

R1: RPD value was outside control limits.

- MSD (Lab ID: 2150653)
  - 2-Butanone (MEK)

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Sample: MW-9/12022015 **Lab ID: 10332107001** Collected: 12/02/15 13:42 Received: 12/04/15 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		12/08/15 17:45	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		12/08/15 17:45	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		12/08/15 17:45	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		12/08/15 17:45	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		12/08/15 17:45	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		12/08/15 17:45	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		12/08/15 17:45	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		12/08/15 17:45	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		12/08/15 17:45	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		12/08/15 17:45	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		12/08/15 17:45	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		12/08/15 17:45	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		12/08/15 17:45	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		12/08/15 17:45	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		12/08/15 17:45	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		12/08/15 17:45	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		12/08/15 17:45	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		12/08/15 17:45	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		12/08/15 17:45	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		12/08/15 17:45	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		12/08/15 17:45	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		12/08/15 17:45	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		12/08/15 17:45	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		12/08/15 17:45	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		12/08/15 17:45	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		12/08/15 17:45	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		12/08/15 17:45	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		12/08/15 17:45	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		12/08/15 17:45	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		12/08/15 17:45	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		12/08/15 17:45	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		12/08/15 17:45	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		12/08/15 17:45	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		12/08/15 17:45	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		12/08/15 17:45	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		12/08/15 17:45	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		12/08/15 17:45	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		12/08/15 17:45	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		12/08/15 17:45	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		12/08/15 17:45	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		12/08/15 17:45	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		12/08/15 17:45	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		12/08/15 17:45	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		12/08/15 17:45	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		12/08/15 17:45	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		12/08/15 17:45	108-10-1	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Sample: MW-9/12022015 **Lab ID: 10332107001** Collected: 12/02/15 13:42 Received: 12/04/15 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		12/08/15 17:45	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		12/08/15 17:45	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		12/08/15 17:45	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		12/08/15 17:45	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		12/08/15 17:45	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		12/08/15 17:45	79-34-5	
Tetrachloroethene	**2.4**	ug/L	1.0	0.19	1		12/08/15 17:45	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		12/08/15 17:45	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		12/08/15 17:45	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		12/08/15 17:45	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		12/08/15 17:45	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		12/08/15 17:45	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		12/08/15 17:45	79-00-5	
Trichloroethene	**0.43**	ug/L	0.40	0.14	1		12/08/15 17:45	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		12/08/15 17:45	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		12/08/15 17:45	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		12/08/15 17:45	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		12/08/15 17:45	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		12/08/15 17:45	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		12/08/15 17:45	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		12/08/15 17:45	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	104	%.	75-125		1		12/08/15 17:45	17060-07-0	
Toluene-d8 (S)	100	%.	75-125		1		12/08/15 17:45	2037-26-5	
4-Bromofluorobenzene (S)	99	%.	75-125		1		12/08/15 17:45	460-00-4	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Sample: FB-01 **Lab ID: 10332107002** Collected: 12/02/15 13:35 Received: 12/04/15 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		12/08/15 18:01	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		12/08/15 18:01	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		12/08/15 18:01	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		12/08/15 18:01	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		12/08/15 18:01	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		12/08/15 18:01	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		12/08/15 18:01	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		12/08/15 18:01	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		12/08/15 18:01	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		12/08/15 18:01	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		12/08/15 18:01	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		12/08/15 18:01	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		12/08/15 18:01	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		12/08/15 18:01	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		12/08/15 18:01	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		12/08/15 18:01	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		12/08/15 18:01	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		12/08/15 18:01	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		12/08/15 18:01	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		12/08/15 18:01	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		12/08/15 18:01	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		12/08/15 18:01	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		12/08/15 18:01	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		12/08/15 18:01	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		12/08/15 18:01	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		12/08/15 18:01	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		12/08/15 18:01	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		12/08/15 18:01	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		12/08/15 18:01	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		12/08/15 18:01	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		12/08/15 18:01	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		12/08/15 18:01	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		12/08/15 18:01	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		12/08/15 18:01	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		12/08/15 18:01	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		12/08/15 18:01	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		12/08/15 18:01	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		12/08/15 18:01	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		12/08/15 18:01	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		12/08/15 18:01	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		12/08/15 18:01	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		12/08/15 18:01	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		12/08/15 18:01	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		12/08/15 18:01	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		12/08/15 18:01	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		12/08/15 18:01	108-10-1	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Sample: FB-01 **Lab ID: 10332107002** Collected: 12/02/15 13:35 Received: 12/04/15 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		12/08/15 18:01	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		12/08/15 18:01	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		12/08/15 18:01	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		12/08/15 18:01	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		12/08/15 18:01	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		12/08/15 18:01	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.19	1		12/08/15 18:01	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		12/08/15 18:01	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		12/08/15 18:01	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		12/08/15 18:01	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		12/08/15 18:01	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		12/08/15 18:01	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		12/08/15 18:01	79-00-5	
Trichloroethene	ND	ug/L	0.40	0.14	1		12/08/15 18:01	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		12/08/15 18:01	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		12/08/15 18:01	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		12/08/15 18:01	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		12/08/15 18:01	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		12/08/15 18:01	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		12/08/15 18:01	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		12/08/15 18:01	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	100	%.	75-125		1		12/08/15 18:01	17060-07-0	
Toluene-d8 (S)	100	%.	75-125		1		12/08/15 18:01	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	75-125		1		12/08/15 18:01	460-00-4	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Sample: EB-01 **Lab ID: 10332107003** Collected: 12/02/15 13:45 Received: 12/04/15 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		12/08/15 18:16	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		12/08/15 18:16	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		12/08/15 18:16	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		12/08/15 18:16	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		12/08/15 18:16	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		12/08/15 18:16	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		12/08/15 18:16	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		12/08/15 18:16	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		12/08/15 18:16	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		12/08/15 18:16	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		12/08/15 18:16	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		12/08/15 18:16	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		12/08/15 18:16	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		12/08/15 18:16	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		12/08/15 18:16	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		12/08/15 18:16	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		12/08/15 18:16	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		12/08/15 18:16	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		12/08/15 18:16	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		12/08/15 18:16	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		12/08/15 18:16	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		12/08/15 18:16	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		12/08/15 18:16	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		12/08/15 18:16	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		12/08/15 18:16	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		12/08/15 18:16	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		12/08/15 18:16	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		12/08/15 18:16	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		12/08/15 18:16	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		12/08/15 18:16	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		12/08/15 18:16	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		12/08/15 18:16	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		12/08/15 18:16	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		12/08/15 18:16	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		12/08/15 18:16	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		12/08/15 18:16	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		12/08/15 18:16	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		12/08/15 18:16	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		12/08/15 18:16	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		12/08/15 18:16	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		12/08/15 18:16	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		12/08/15 18:16	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		12/08/15 18:16	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		12/08/15 18:16	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		12/08/15 18:16	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		12/08/15 18:16	108-10-1	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Sample: EB-01 **Lab ID: 10332107003** Collected: 12/02/15 13:45 Received: 12/04/15 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		12/08/15 18:16	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		12/08/15 18:16	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		12/08/15 18:16	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		12/08/15 18:16	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		12/08/15 18:16	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		12/08/15 18:16	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.19	1		12/08/15 18:16	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		12/08/15 18:16	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		12/08/15 18:16	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		12/08/15 18:16	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		12/08/15 18:16	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		12/08/15 18:16	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		12/08/15 18:16	79-00-5	
Trichloroethene	ND	ug/L	0.40	0.14	1		12/08/15 18:16	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		12/08/15 18:16	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		12/08/15 18:16	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		12/08/15 18:16	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		12/08/15 18:16	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		12/08/15 18:16	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		12/08/15 18:16	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		12/08/15 18:16	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	107	%.	75-125		1		12/08/15 18:16	17060-07-0	
Toluene-d8 (S)	108	%.	75-125		1		12/08/15 18:16	2037-26-5	
4-Bromofluorobenzene (S)	96	%.	75-125		1		12/08/15 18:16	460-00-4	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Sample: MW-4/12022015 **Lab ID: 10332107004** Collected: 12/02/15 14:32 Received: 12/04/15 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		12/08/15 18:31	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		12/08/15 18:31	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		12/08/15 18:31	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		12/08/15 18:31	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		12/08/15 18:31	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		12/08/15 18:31	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		12/08/15 18:31	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		12/08/15 18:31	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		12/08/15 18:31	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		12/08/15 18:31	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		12/08/15 18:31	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		12/08/15 18:31	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		12/08/15 18:31	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		12/08/15 18:31	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		12/08/15 18:31	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		12/08/15 18:31	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		12/08/15 18:31	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		12/08/15 18:31	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		12/08/15 18:31	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		12/08/15 18:31	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		12/08/15 18:31	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		12/08/15 18:31	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		12/08/15 18:31	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		12/08/15 18:31	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		12/08/15 18:31	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		12/08/15 18:31	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		12/08/15 18:31	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		12/08/15 18:31	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		12/08/15 18:31	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		12/08/15 18:31	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		12/08/15 18:31	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		12/08/15 18:31	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		12/08/15 18:31	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		12/08/15 18:31	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		12/08/15 18:31	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		12/08/15 18:31	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		12/08/15 18:31	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		12/08/15 18:31	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		12/08/15 18:31	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		12/08/15 18:31	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		12/08/15 18:31	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		12/08/15 18:31	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		12/08/15 18:31	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		12/08/15 18:31	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		12/08/15 18:31	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		12/08/15 18:31	108-10-1	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Sample: MW-4/12022015 **Lab ID: 10332107004** Collected: 12/02/15 14:32 Received: 12/04/15 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		12/08/15 18:31	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		12/08/15 18:31	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		12/08/15 18:31	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		12/08/15 18:31	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		12/08/15 18:31	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		12/08/15 18:31	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.19	1		12/08/15 18:31	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		12/08/15 18:31	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		12/08/15 18:31	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		12/08/15 18:31	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		12/08/15 18:31	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		12/08/15 18:31	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		12/08/15 18:31	79-00-5	
Trichloroethene	**0.26J**	ug/L	0.40	0.14	1		12/08/15 18:31	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		12/08/15 18:31	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		12/08/15 18:31	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		12/08/15 18:31	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		12/08/15 18:31	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		12/08/15 18:31	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		12/08/15 18:31	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		12/08/15 18:31	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	109	%.	75-125		1		12/08/15 18:31	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		12/08/15 18:31	2037-26-5	
4-Bromofluorobenzene (S)	99	%.	75-125		1		12/08/15 18:31	460-00-4	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Sample: MW-DUP/12022015 **Lab ID: 10332107005** Collected: 12/02/15 15:00 Received: 12/04/15 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		12/08/15 18:47	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		12/08/15 18:47	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		12/08/15 18:47	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		12/08/15 18:47	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		12/08/15 18:47	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		12/08/15 18:47	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		12/08/15 18:47	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		12/08/15 18:47	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		12/08/15 18:47	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		12/08/15 18:47	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		12/08/15 18:47	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		12/08/15 18:47	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		12/08/15 18:47	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		12/08/15 18:47	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		12/08/15 18:47	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		12/08/15 18:47	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		12/08/15 18:47	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		12/08/15 18:47	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		12/08/15 18:47	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		12/08/15 18:47	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		12/08/15 18:47	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		12/08/15 18:47	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		12/08/15 18:47	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		12/08/15 18:47	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		12/08/15 18:47	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		12/08/15 18:47	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		12/08/15 18:47	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		12/08/15 18:47	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		12/08/15 18:47	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		12/08/15 18:47	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		12/08/15 18:47	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		12/08/15 18:47	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		12/08/15 18:47	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		12/08/15 18:47	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		12/08/15 18:47	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		12/08/15 18:47	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		12/08/15 18:47	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		12/08/15 18:47	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		12/08/15 18:47	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		12/08/15 18:47	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		12/08/15 18:47	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		12/08/15 18:47	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		12/08/15 18:47	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		12/08/15 18:47	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		12/08/15 18:47	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		12/08/15 18:47	108-10-1	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Sample: MW-DUP/12022015 **Lab ID: 10332107005** Collected: 12/02/15 15:00 Received: 12/04/15 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		12/08/15 18:47	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		12/08/15 18:47	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		12/08/15 18:47	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		12/08/15 18:47	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		12/08/15 18:47	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		12/08/15 18:47	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.19	1		12/08/15 18:47	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		12/08/15 18:47	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		12/08/15 18:47	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		12/08/15 18:47	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		12/08/15 18:47	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		12/08/15 18:47	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		12/08/15 18:47	79-00-5	
Trichloroethene	ND	ug/L	0.40	0.14	1		12/08/15 18:47	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		12/08/15 18:47	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		12/08/15 18:47	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		12/08/15 18:47	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		12/08/15 18:47	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		12/08/15 18:47	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		12/08/15 18:47	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		12/08/15 18:47	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	113	%.	75-125		1		12/08/15 18:47	17060-07-0	
Toluene-d8 (S)	96	%.	75-125		1		12/08/15 18:47	2037-26-5	
4-Bromofluorobenzene (S)	99	%.	75-125		1		12/08/15 18:47	460-00-4	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Sample: MW-3/12022015 **Lab ID: 10332107006** Collected: 12/02/15 15:15 Received: 12/04/15 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		12/08/15 19:02	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		12/08/15 19:02	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		12/08/15 19:02	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		12/08/15 19:02	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		12/08/15 19:02	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		12/08/15 19:02	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		12/08/15 19:02	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		12/08/15 19:02	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		12/08/15 19:02	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		12/08/15 19:02	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		12/08/15 19:02	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		12/08/15 19:02	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		12/08/15 19:02	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		12/08/15 19:02	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		12/08/15 19:02	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		12/08/15 19:02	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		12/08/15 19:02	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		12/08/15 19:02	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		12/08/15 19:02	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		12/08/15 19:02	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		12/08/15 19:02	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		12/08/15 19:02	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		12/08/15 19:02	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		12/08/15 19:02	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		12/08/15 19:02	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		12/08/15 19:02	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		12/08/15 19:02	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		12/08/15 19:02	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		12/08/15 19:02	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		12/08/15 19:02	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		12/08/15 19:02	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		12/08/15 19:02	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		12/08/15 19:02	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		12/08/15 19:02	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		12/08/15 19:02	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		12/08/15 19:02	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		12/08/15 19:02	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		12/08/15 19:02	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		12/08/15 19:02	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		12/08/15 19:02	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		12/08/15 19:02	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		12/08/15 19:02	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		12/08/15 19:02	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		12/08/15 19:02	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		12/08/15 19:02	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		12/08/15 19:02	108-10-1	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Sample: MW-3/12022015 **Lab ID: 10332107006** Collected: 12/02/15 15:15 Received: 12/04/15 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		12/08/15 19:02	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		12/08/15 19:02	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		12/08/15 19:02	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		12/08/15 19:02	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		12/08/15 19:02	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		12/08/15 19:02	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.19	1		12/08/15 19:02	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		12/08/15 19:02	109-99-9	
Toluene	ND	ug/L	1.0	0.13	1		12/08/15 19:02	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		12/08/15 19:02	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		12/08/15 19:02	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		12/08/15 19:02	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		12/08/15 19:02	79-00-5	
Trichloroethene	ND	ug/L	0.40	0.14	1		12/08/15 19:02	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		12/08/15 19:02	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		12/08/15 19:02	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		12/08/15 19:02	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		12/08/15 19:02	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		12/08/15 19:02	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		12/08/15 19:02	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		12/08/15 19:02	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	112	%.	75-125		1		12/08/15 19:02	17060-07-0	
Toluene-d8 (S)	101	%.	75-125		1		12/08/15 19:02	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	75-125		1		12/08/15 19:02	460-00-4	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Sample: Trip Blank **Lab ID: 10332107007** Collected: 12/02/15 00:00 Received: 12/04/15 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	ND	ug/L	20.0	7.1	1		12/08/15 14:08	67-64-1	
Allyl chloride	ND	ug/L	4.0	0.58	1		12/08/15 14:08	107-05-1	
Benzene	ND	ug/L	1.0	0.21	1		12/08/15 14:08	71-43-2	
Bromobenzene	ND	ug/L	1.0	0.25	1		12/08/15 14:08	108-86-1	
Bromochloromethane	ND	ug/L	1.0	0.34	1		12/08/15 14:08	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	0.18	1		12/08/15 14:08	75-27-4	
Bromoform	ND	ug/L	4.0	0.41	1		12/08/15 14:08	75-25-2	
Bromomethane	ND	ug/L	4.0	0.36	1		12/08/15 14:08	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	2.5	1		12/08/15 14:08	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	0.083	1		12/08/15 14:08	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	0.16	1		12/08/15 14:08	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	0.18	1		12/08/15 14:08	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	0.35	1		12/08/15 14:08	56-23-5	
Chlorobenzene	ND	ug/L	1.0	0.23	1		12/08/15 14:08	108-90-7	
Chloroethane	ND	ug/L	1.0	0.34	1		12/08/15 14:08	75-00-3	
Chloroform	ND	ug/L	1.0	0.27	1		12/08/15 14:08	67-66-3	
Chloromethane	ND	ug/L	4.0	0.64	1		12/08/15 14:08	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	0.22	1		12/08/15 14:08	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	0.24	1		12/08/15 14:08	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	0.70	1		12/08/15 14:08	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	0.16	1		12/08/15 14:08	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	0.23	1		12/08/15 14:08	106-93-4	
Dibromomethane	ND	ug/L	4.0	0.31	1		12/08/15 14:08	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	0.22	1		12/08/15 14:08	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	0.21	1		12/08/15 14:08	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	0.16	1		12/08/15 14:08	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	0.49	1		12/08/15 14:08	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	0.22	1		12/08/15 14:08	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	0.17	1		12/08/15 14:08	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	0.22	1		12/08/15 14:08	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	0.25	1		12/08/15 14:08	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	0.21	1		12/08/15 14:08	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	0.22	1		12/08/15 14:08	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	0.42	1		12/08/15 14:08	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	0.24	1		12/08/15 14:08	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	0.36	1		12/08/15 14:08	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	0.16	1		12/08/15 14:08	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	0.21	1		12/08/15 14:08	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	0.22	1		12/08/15 14:08	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	0.38	1		12/08/15 14:08	60-29-7	
Ethylbenzene	ND	ug/L	1.0	0.23	1		12/08/15 14:08	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	0.48	1		12/08/15 14:08	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	0.17	1		12/08/15 14:08	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	0.16	1		12/08/15 14:08	99-87-6	
Methylene Chloride	ND	ug/L	4.0	0.56	1		12/08/15 14:08	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	2.4	1		12/08/15 14:08	108-10-1	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Sample: Trip Blank **Lab ID: 10332107007** Collected: 12/02/15 00:00 Received: 12/04/15 10:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	ND	ug/L	1.0	0.20	1		12/08/15 14:08	1634-04-4	
Naphthalene	ND	ug/L	4.0	0.14	1		12/08/15 14:08	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	0.21	1		12/08/15 14:08	103-65-1	
Styrene	ND	ug/L	1.0	0.11	1		12/08/15 14:08	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	0.20	1		12/08/15 14:08	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	0.22	1		12/08/15 14:08	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	0.19	1		12/08/15 14:08	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	4.0	1		12/08/15 14:08	109-99-9	
Toluene	**0.19J**	ug/L	1.0	0.13	1		12/08/15 14:08	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	0.23	1		12/08/15 14:08	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	0.22	1		12/08/15 14:08	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	0.20	1		12/08/15 14:08	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	0.24	1		12/08/15 14:08	79-00-5	
Trichloroethene	ND	ug/L	0.40	0.14	1		12/08/15 14:08	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	0.18	1		12/08/15 14:08	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	0.50	1		12/08/15 14:08	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	0.42	1		12/08/15 14:08	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	0.16	1		12/08/15 14:08	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	0.20	1		12/08/15 14:08	108-67-8	
Vinyl chloride	ND	ug/L	0.40	0.15	1		12/08/15 14:08	75-01-4	
Xylene (Total)	ND	ug/L	3.0	0.60	1		12/08/15 14:08	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	101	%.	75-125		1		12/08/15 14:08	17060-07-0	
Toluene-d8 (S)	96	%.	75-125		1		12/08/15 14:08	2037-26-5	
4-Bromofluorobenzene (S)	100	%.	75-125		1		12/08/15 14:08	460-00-4	

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QUALITY CONTROL DATA

Project: BNSF-Mission Wye
Pace Project No.: 10332107

QC Batch: MSV/33999 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260B MSV 465 W
Associated Lab Samples: 10332107001, 10332107002, 10332107003, 10332107004, 10332107005, 10332107006, 10332107007

METHOD BLANK: 2150650 Matrix: Water
Associated Lab Samples: 10332107001, 10332107002, 10332107003, 10332107004, 10332107005, 10332107006, 10332107007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	1.0	0.20	12/08/15 11:34	
1,1,1-Trichloroethane	ug/L	ND	1.0	0.20	12/08/15 11:34	
1,1,2,2-Tetrachloroethane	ug/L	ND	1.0	0.22	12/08/15 11:34	
1,1,2-Trichloroethane	ug/L	ND	1.0	0.24	12/08/15 11:34	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	1.0	0.42	12/08/15 11:34	
1,1-Dichloroethane	ug/L	ND	1.0	0.22	12/08/15 11:34	
1,1-Dichloroethene	ug/L	ND	1.0	0.22	12/08/15 11:34	
1,1-Dichloropropene	ug/L	ND	1.0	0.16	12/08/15 11:34	
1,2,3-Trichlorobenzene	ug/L	ND	1.0	0.23	12/08/15 11:34	
1,2,3-Trichloropropane	ug/L	ND	4.0	0.50	12/08/15 11:34	
1,2,4-Trichlorobenzene	ug/L	ND	1.0	0.22	12/08/15 11:34	
1,2,4-Trimethylbenzene	ug/L	ND	1.0	0.16	12/08/15 11:34	
1,2-Dibromo-3-chloropropane	ug/L	ND	4.0	0.70	12/08/15 11:34	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	0.23	12/08/15 11:34	
1,2-Dichlorobenzene	ug/L	ND	1.0	0.22	12/08/15 11:34	
1,2-Dichloroethane	ug/L	ND	1.0	0.17	12/08/15 11:34	
1,2-Dichloropropane	ug/L	ND	4.0	0.42	12/08/15 11:34	
1,3,5-Trimethylbenzene	ug/L	ND	1.0	0.20	12/08/15 11:34	
1,3-Dichlorobenzene	ug/L	ND	1.0	0.21	12/08/15 11:34	
1,3-Dichloropropane	ug/L	ND	1.0	0.24	12/08/15 11:34	
1,4-Dichlorobenzene	ug/L	ND	1.0	0.16	12/08/15 11:34	
2,2-Dichloropropane	ug/L	ND	4.0	0.36	12/08/15 11:34	
2-Butanone (MEK)	ug/L	ND	5.0	2.5	12/08/15 11:34	
2-Chlorotoluene	ug/L	ND	1.0	0.22	12/08/15 11:34	
4-Chlorotoluene	ug/L	ND	1.0	0.24	12/08/15 11:34	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	5.0	2.4	12/08/15 11:34	
Acetone	ug/L	ND	20.0	7.1	12/08/15 11:34	
Allyl chloride	ug/L	ND	4.0	0.58	12/08/15 11:34	
Benzene	ug/L	ND	1.0	0.21	12/08/15 11:34	
Bromobenzene	ug/L	ND	1.0	0.25	12/08/15 11:34	
Bromochloromethane	ug/L	ND	1.0	0.34	12/08/15 11:34	
Bromodichloromethane	ug/L	ND	1.0	0.18	12/08/15 11:34	
Bromoform	ug/L	ND	4.0	0.41	12/08/15 11:34	
Bromomethane	ug/L	ND	4.0	0.36	12/08/15 11:34	
Carbon tetrachloride	ug/L	ND	1.0	0.35	12/08/15 11:34	
Chlorobenzene	ug/L	ND	1.0	0.23	12/08/15 11:34	
Chloroethane	ug/L	ND	1.0	0.34	12/08/15 11:34	
Chloroform	ug/L	ND	1.0	0.27	12/08/15 11:34	
Chloromethane	ug/L	ND	4.0	0.64	12/08/15 11:34	
cis-1,2-Dichloroethene	ug/L	ND	1.0	0.25	12/08/15 11:34	
cis-1,3-Dichloropropene	ug/L	ND	4.0	0.21	12/08/15 11:34	

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QUALITY CONTROL DATA

Project: BNSF-Mission Wye
Pace Project No.: 10332107

METHOD BLANK: 2150650 Matrix: Water
Associated Lab Samples: 10332107001, 10332107002, 10332107003, 10332107004, 10332107005, 10332107006, 10332107007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Dibromochloromethane	ug/L	ND	1.0	0.16	12/08/15 11:34	
Dibromomethane	ug/L	ND	4.0	0.31	12/08/15 11:34	
Dichlorodifluoromethane	ug/L	ND	1.0	0.49	12/08/15 11:34	
Dichlorofluoromethane	ug/L	ND	1.0	0.22	12/08/15 11:34	
Diethyl ether (Ethyl ether)	ug/L	ND	4.0	0.38	12/08/15 11:34	
Ethylbenzene	ug/L	ND	1.0	0.23	12/08/15 11:34	
Hexachloro-1,3-butadiene	ug/L	ND	1.0	0.48	12/08/15 11:34	
Isopropylbenzene (Cumene)	ug/L	ND	1.0	0.17	12/08/15 11:34	
Methyl-tert-butyl ether	ug/L	ND	1.0	0.20	12/08/15 11:34	
Methylene Chloride	ug/L	ND	4.0	0.56	12/08/15 11:34	
n-Butylbenzene	ug/L	ND	1.0	0.083	12/08/15 11:34	
n-Propylbenzene	ug/L	ND	1.0	0.21	12/08/15 11:34	
Naphthalene	ug/L	ND	4.0	0.14	12/08/15 11:34	
p-Isopropyltoluene	ug/L	ND	1.0	0.16	12/08/15 11:34	
sec-Butylbenzene	ug/L	ND	1.0	0.16	12/08/15 11:34	
Styrene	ug/L	ND	1.0	0.11	12/08/15 11:34	
tert-Butylbenzene	ug/L	ND	1.0	0.18	12/08/15 11:34	
Tetrachloroethene	ug/L	ND	1.0	0.19	12/08/15 11:34	
Tetrahydrofuran	ug/L	ND	10.0	4.0	12/08/15 11:34	
Toluene	ug/L	ND	1.0	0.13	12/08/15 11:34	
trans-1,2-Dichloroethene	ug/L	ND	1.0	0.21	12/08/15 11:34	
trans-1,3-Dichloropropene	ug/L	ND	4.0	0.22	12/08/15 11:34	
Trichloroethene	ug/L	ND	0.40	0.14	12/08/15 11:34	
Trichlorofluoromethane	ug/L	ND	1.0	0.18	12/08/15 11:34	
Vinyl chloride	ug/L	ND	0.40	0.15	12/08/15 11:34	
Xylene (Total)	ug/L	ND	3.0	0.60	12/08/15 11:34	
1,2-Dichloroethane-d4 (S)	%.	104	75-125		12/08/15 11:34	
4-Bromofluorobenzene (S)	%.	95	75-125		12/08/15 11:34	
Toluene-d8 (S)	%.	93	75-125		12/08/15 11:34	

LABORATORY CONTROL SAMPLE: 2150651

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	21.7	108	75-125	
1,1,1-Trichloroethane	ug/L	20	23.8	119	75-125	
1,1,2,2-Tetrachloroethane	ug/L	20	20.5	103	75-125	
1,1,2-Trichloroethane	ug/L	20	23.2	116	75-125	
1,1,2-Trichlorotrifluoroethane	ug/L	20	21.1	105	60-135	
1,1-Dichloroethane	ug/L	20	23.8	119	69-125	
1,1-Dichloroethene	ug/L	20	20.9	104	68-125	
1,1-Dichloropropene	ug/L	20	20.8	104	74-125	
1,2,3-Trichlorobenzene	ug/L	20	22.3	112	69-136	
1,2,3-Trichloropropane	ug/L	20	20.7	104	75-125	
1,2,4-Trichlorobenzene	ug/L	20	21.8	109	73-127	

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QUALITY CONTROL DATA

Project: BNSF-Mission Wye
Pace Project No.: 10332107

LABORATORY CONTROL SAMPLE: 2150651

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	19.9	100	75-125	
1,2-Dibromo-3-chloropropane	ug/L	50	51.7	103	65-145	
1,2-Dibromoethane (EDB)	ug/L	20	22.5	112	75-125	
1,2-Dichlorobenzene	ug/L	20	21.0	105	75-125	
1,2-Dichloroethane	ug/L	20	23.2	116	73-125	
1,2-Dichloropropane	ug/L	20	22.1	110	75-125	
1,3,5-Trimethylbenzene	ug/L	20	19.7	98	75-125	
1,3-Dichlorobenzene	ug/L	20	20.2	101	74-125	
1,3-Dichloropropane	ug/L	20	21.4	107	75-125	
1,4-Dichlorobenzene	ug/L	20	19.6	98	75-125	
2,2-Dichloropropane	ug/L	20	24.6	123	59-139	
2-Butanone (MEK)	ug/L	100	112	112	63-130	
2-Chlorotoluene	ug/L	20	19.4	97	72-125	
4-Chlorotoluene	ug/L	20	20.2	101	73-125	
4-Methyl-2-pentanone (MIBK)	ug/L	100	107	107	71-126	
Acetone	ug/L	100	73.7	74	69-131	SS
Allyl chloride	ug/L	20	22.3	112	67-125	
Benzene	ug/L	20	22.4	112	71-125	
Bromobenzene	ug/L	20	20.9	105	75-125	
Bromochloromethane	ug/L	20	21.7	109	75-125	
Bromodichloromethane	ug/L	20	23.2	116	75-125	
Bromoform	ug/L	20	21.6	108	70-125	
Bromomethane	ug/L	20	20.0	100	30-150	
Carbon tetrachloride	ug/L	20	20.3	102	75-126	
Chlorobenzene	ug/L	20	20.2	101	75-125	
Chloroethane	ug/L	20	21.3	107	65-134	
Chloroform	ug/L	20	22.2	111	75-125	
Chloromethane	ug/L	20	23.7	118	39-150	
cis-1,2-Dichloroethene	ug/L	20	23.0	115	72-125	
cis-1,3-Dichloropropene	ug/L	20	22.6	113	75-125	
Dibromochloromethane	ug/L	20	20.9	104	75-125	
Dibromomethane	ug/L	20	21.4	107	75-125	
Dichlorodifluoromethane	ug/L	20	22.6	113	50-134	
Dichlorofluoromethane	ug/L	20	22.0	110	69-125	
Diethyl ether (Ethyl ether)	ug/L	20	23.3	117	72-125	
Ethylbenzene	ug/L	20	19.7	98	75-125	
Hexachloro-1,3-butadiene	ug/L	20	21.2	106	70-138	
Isopropylbenzene (Cumene)	ug/L	20	18.1	90	75-125	
Methyl-tert-butyl ether	ug/L	20	23.3	116	73-125	
Methylene Chloride	ug/L	20	19.7	99	73-125	
n-Butylbenzene	ug/L	20	20.5	102	72-133	
n-Propylbenzene	ug/L	20	18.3	91	72-126	
Naphthalene	ug/L	20	20.1	100	70-127	
p-Isopropyltoluene	ug/L	20	19.9	100	72-132	
sec-Butylbenzene	ug/L	20	17.3	87	73-132	
Styrene	ug/L	20	20.6	103	75-125	
tert-Butylbenzene	ug/L	20	19.1	95	73-128	

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QUALITY CONTROL DATA

Project: BNSF-Mission Wye
Pace Project No.: 10332107

LABORATORY CONTROL SAMPLE: 2150651

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	ug/L	20	18.9	94	74-125	
Tetrahydrofuran	ug/L	200	159	79	62-133	SS
Toluene	ug/L	20	19.8	99	74-125	
trans-1,2-Dichloroethene	ug/L	20	22.9	115	69-125	
trans-1,3-Dichloropropene	ug/L	20	21.5	107	75-125	
Trichloroethene	ug/L	20	21.9	109	75-125	
Trichlorofluoromethane	ug/L	20	18.9	95	74-127	
Vinyl chloride	ug/L	20	20.4	102	66-132	
Xylene (Total)	ug/L	60	58.4	97	75-125	
1,2-Dichloroethane-d4 (S)	%.			108	75-125	
4-Bromofluorobenzene (S)	%.			98	75-125	
Toluene-d8 (S)	%.			94	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2150652 2150653

Parameter	Units	10332007008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1,2-Tetrachloroethane	ug/L	ND	20	20	21.9	21.9	110	110	70-138	0	30	
1,1,1-Trichloroethane	ug/L	ND	20	20	26.1	22.6	130	113	55-150	14	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	20	20	23.1	21.1	115	105	64-140	9	30	
1,1,2-Trichloroethane	ug/L	ND	20	20	22.3	23.4	111	117	67-137	5	30	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	20	20	25.2	24.0	126	120	51-150	5	30	
1,1-Dichloroethane	ug/L	ND	20	20	26.3	24.4	131	122	49-150	8	30	
1,1-Dichloroethene	ug/L	ND	20	20	25.8	24.5	126	120	40-150	5	30	
1,1-Dichloropropene	ug/L	ND	20	20	24.5	22.5	122	113	50-150	8	30	
1,2,3-Trichlorobenzene	ug/L	ND	20	20	23.3	22.2	117	111	59-148	5	30	
1,2,3-Trichloropropane	ug/L	ND	20	20	24.2	21.0	121	105	65-141	14	30	
1,2,4-Trichlorobenzene	ug/L	ND	20	20	22.2	21.7	111	108	61-140	2	30	
1,2,4-Trimethylbenzene	ug/L	ND	20	20	20.6	20.7	103	104	58-141	1	30	
1,2-Dibromo-3-chloropropane	ug/L	ND	50	50	58.3	44.6	117	89	53-150	27	30	
1,2-Dibromoethane (EDB)	ug/L	ND	20	20	23.4	23.3	117	117	65-137	0	30	
1,2-Dichlorobenzene	ug/L	ND	20	20	21.6	22.0	108	110	66-133	2	30	
1,2-Dichloroethane	ug/L	ND	20	20	26.0	22.0	130	110	54-138	17	30	
1,2-Dichloropropane	ug/L	ND	20	20	24.2	23.1	121	115	62-138	5	30	
1,3,5-Trimethylbenzene	ug/L	ND	20	20	20.8	21.0	104	105	58-140	1	30	
1,3-Dichlorobenzene	ug/L	ND	20	20	21.6	21.4	108	107	66-132	1	30	
1,3-Dichloropropane	ug/L	ND	20	20	22.5	22.8	112	114	66-134	1	30	
1,4-Dichlorobenzene	ug/L	ND	20	20	20.5	21.0	102	105	65-129	3	30	
2,2-Dichloropropane	ug/L	ND	20	20	17.1	16.1	86	81	40-150	6	30	
2-Butanone (MEK)	ug/L	ND	100	100	138	85.6	138	86	51-147	47	30	R1
2-Chlorotoluene	ug/L	ND	20	20	20.6	20.8	103	104	58-147	1	30	
4-Chlorotoluene	ug/L	ND	20	20	20.7	20.6	104	103	64-138	1	30	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	100	125	108	125	108	59-143	14	30	

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QUALITY CONTROL DATA

Project: BNSF-Mission Wye
Pace Project No.: 10332107

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2150652 2150653

Parameter	Units	10332007008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Acetone	ug/L	ND	100	100	152	152	152	152	63-147	0	30	IS,M1, SS
Allyl chloride	ug/L	ND	20	20	22.7	21.5	114	107	45-150	6	30	
Benzene	ug/L	1.2	20	20	25.6	24.1	122	115	53-139	6	30	
Bromobenzene	ug/L	ND	20	20	21.5	21.3	108	106	66-136	1	30	
Bromochloromethane	ug/L	ND	20	20	23.7	20.5	118	103	64-136	14	30	
Bromodichloromethane	ug/L	ND	20	20	23.9	23.3	119	117	66-138	2	30	
Bromoform	ug/L	ND	20	20	21.4	18.1	107	90	59-136	17	30	
Bromomethane	ug/L	ND	20	20	22.1	19.8	110	99	30-150	11	30	
Carbon tetrachloride	ug/L	ND	20	20	22.5	21.5	112	107	56-150	5	30	
Chlorobenzene	ug/L	ND	20	20	21.5	21.8	108	109	65-133	1	30	
Chloroethane	ug/L	ND	20	20	21.3	19.8	107	99	48-150	7	30	
Chloroform	ug/L	ND	20	20	25.2	22.3	126	111	57-145	12	30	
Chloromethane	ug/L	ND	20	20	25.7	23.7	129	118	30-150	8	30	
cis-1,2-Dichloroethene	ug/L	68.0	20	20	96.9	92.4	145	122	49-150	5	30	
cis-1,3-Dichloropropene	ug/L	ND	20	20	20.7	20.9	104	105	64-130	1	30	
Dibromochloromethane	ug/L	ND	20	20	21.8	19.9	109	99	68-138	9	30	
Dibromomethane	ug/L	ND	20	20	25.4	24.3	127	122	67-134	4	30	
Dichlorodifluoromethane	ug/L	ND	20	20	27.4	25.5	137	128	45-150	7	30	
Dichlorofluoromethane	ug/L	2.3	20	20	26.7	23.7	122	107	54-150	12	30	
Diethyl ether (Ethyl ether)	ug/L	ND	20	20	23.4	22.8	117	114	50-145	3	30	
Ethylbenzene	ug/L	ND	20	20	21.0	21.5	105	108	55-139	3	30	
Hexachloro-1,3-butadiene	ug/L	ND	20	20	19.2	21.3	96	106	49-150	10	30	
Isopropylbenzene (Cumene)	ug/L	ND	20	20	19.3	18.0	97	90	64-142	7	30	
Methyl-tert-butyl ether	ug/L	ND	20	20	24.6	22.3	123	111	62-129	10	30	
Methylene Chloride	ug/L	ND	20	20	20.9	18.9	104	94	57-132	10	30	
n-Butylbenzene	ug/L	ND	20	20	20.5	21.3	102	107	55-150	4	30	
n-Propylbenzene	ug/L	ND	20	20	19.1	19.2	95	96	59-142	1	30	
Naphthalene	ug/L	ND	20	20	22.9	20.4	114	102	51-150	11	30	
p-Isopropyltoluene	ug/L	ND	20	20	21.2	20.4	106	102	60-149	4	30	
sec-Butylbenzene	ug/L	ND	20	20	18.5	19.2	92	96	60-150	4	30	
Styrene	ug/L	ND	20	20	20.8	21.3	104	107	68-134	3	30	
tert-Butylbenzene	ug/L	ND	20	20	21.2	20.7	106	104	62-146	2	30	
Tetrachloroethene	ug/L	ND	20	20	19.8	21.3	99	107	50-150	7	30	
Tetrahydrofuran	ug/L	ND	200	200	333	309	166	154	59-145	7	30	IS,M1, SS
Toluene	ug/L	ND	20	20	20.9	22.2	105	111	52-148	6	30	
trans-1,2-Dichloroethene	ug/L	3.1	20	20	27.6	26.6	123	118	45-150	4	30	
trans-1,3-Dichloropropene	ug/L	ND	20	20	21.3	19.9	106	100	68-132	7	30	
Trichloroethene	ug/L	4.0	20	20	28.6	28.6	123	123	52-150	0	30	
Trichlorofluoromethane	ug/L	ND	20	20	22.8	20.3	114	101	55-150	12	30	
Vinyl chloride	ug/L	4.6	20	20	28.1	26.5	118	110	43-150	6	30	
Xylene (Total)	ug/L	ND	60	60	60.7	62.1	101	103	54-144	2	30	
1,2-Dichloroethane-d4 (S)	%.						108	103	75-125			
4-Bromofluorobenzene (S)	%.						98	97	75-125			
Toluene-d8 (S)	%.						94	99	75-125			

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QUALIFIERS

Project: BNSF-Mission Wye
Pace Project No.: 10332107

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

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 decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

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

IS	The internal standard recovery associated with this result exceeds the lower control limit. The reported result should be considered an estimated value.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.
SS	This analyte did not meet the secondary source verification criteria for the initial calibration. The reported result should be considered an estimated value.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BNSF-Mission Wye
Pace Project No.: 10332107

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10332107001	**MW-9/12022015**	EPA 8260B	MSV/33999		
10332107002	**FB-01**	EPA 8260B	MSV/33999		
10332107003	**EB-01**	EPA 8260B	MSV/33999		
10332107004	**MW-4/12022015**	EPA 8260B	MSV/33999		
10332107005	**MW-DUP/12022015**	EPA 8260B	MSV/33999		
10332107006	**MW-3/12022015**	EPA 8260B	MSV/33999		
10332107007	**Trip Blank**	EPA 8260B	MSV/33999		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10332107

Page: of

1928979

Section A Required Client Information:

Company: AECOM
Address: 207 N. Broadway, Ste. 315, Billings, MT 59101
Email To: shelly.young@aecom.com
Phone: 406-896-4582 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: Shelly Young
Copy To: Cole Grover, cole.grover@aecom.com
Purchase Order No.:
Project Name: BNSF - Mission Wye
Project Number:

Section C Invoice Information:

Attention: Shelly Young
Company Name: AECOM
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #: 32797

REGULATORY AGENCY

☐ NPDES ☒ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MT

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N): Y

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	COLLECTED Composite Start TIME	COLLECTED Composite End/Grab DATE	COLLECTED Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test: VOCs - 8260B	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-9/12022015	WT				12-2-2015	1342		3				X					X		001
2	FB-01	WT					1335		3				X					X		002
3	EB-01	WT					1345		3				X					X		003
4	MW-4/12022015	WT					1432		3				X					X		004
5	MW-DUP/12022015	WT					1500		3				X					X		005
6	MW-3/12022015	WT					1515		3				X					X		006
7	Trip Blank	WT				—	—		2				X					X		007
8																				
9																				
10																				
11																				
12																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Cole Grover / AECOM	12-3-15	1200	[illegible] Pace	12/4/15	1010	5.6	Y	N	Y

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER:
SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 23Feb2015 Page 1 of 1
	Document No.: **F-MN-L-213-rev.13**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: AECOM

Project #: WO#: 10332107

10332107

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 8092 0353 7895

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

Thermometer Used: ☐ B88A9130516413 ☒ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 5.3 **Cooler Temp Corrected (°C):** 5.6 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Correction Factor:** +0.3 **Date and Initials of Person Examining Contents:** BM 12/4/15

USDA Regulated Soil (☒ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				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. Note if sediment is visible in the dissolved container
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 #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☒ Yes	☐ No	☐ N/A	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): 090315-3BUF				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: CMD **Date:** 12-4-15

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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March 25, 2016

Shelly Young
AECOM, Inc.
207 North Broadway, Suite 315
Billings, MT 59101

RE: Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Dear Shelly Young:
Enclosed are the analytical results for sample(s) received by the laboratory on March 17, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

This report is revised to correct the sample ID for FB-01/03152016.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

cc: Mr. Yueh Chuang, BNSF Railway
Cole Grover, AECOM

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CERTIFICATIONS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
525 N 8th Street, Salina, KS 67401
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: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10341911001	**MW-9/03152016**	Water	03/15/16 16:14	03/17/16 09:45
10341911002	**FB-01/03152016**	Water	03/15/16 16:05	03/17/16 09:45
10341911003	**EB-01/03152016**	Water	03/15/16 16:25	03/17/16 09:45
10341911004	**MW-DUP/03152016**	Water	03/15/16 17:00	03/17/16 09:45
10341911005	**MW-4/03152016**	Water	03/15/16 17:07	03/17/16 09:45
10341911006	**MW-3/03152016**	Water	03/15/16 17:52	03/17/16 09:45
10341911007	**Trip Blank**	Water	03/15/16 00:00	03/17/16 09:45

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SAMPLE ANALYTE COUNT

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10341911001	**MW-9/03152016**	EPA 8260B	PRD	70	PASI-M
10341911002	**FB-01/03152016**	EPA 8260B	PRD	70	PASI-M
10341911003	**EB-01/03152016**	EPA 8260B	PRD	70	PASI-M
10341911004	**MW-DUP/03152016**	EPA 8260B	PRD	70	PASI-M
10341911005	**MW-4/03152016**	EPA 8260B	PRD	70	PASI-M
10341911006	**MW-3/03152016**	EPA 8260B	PRD	70	PASI-M
10341911007	**Trip Blank**	EPA 8260B	PRD	70	PASI-M

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PROJECT NARRATIVE

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: March 25, 2016

General Information:
7 samples were analyzed for EPA 8260B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

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.

QC Batch: MSV/34962

CL: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.

- BLANK (Lab ID: 2215533)
  - Bromomethane
- EB-01/03152016 (Lab ID: 10341911003)
  - Bromomethane
- FB-01/03152016 (Lab ID: 10341911002)
  - Bromomethane
- LCS (Lab ID: 2215534)
  - Bromomethane
- MS (Lab ID: 2215829)
  - Bromomethane
- MSD (Lab ID: 2215830)
  - Bromomethane
- MW-3/03152016 (Lab ID: 10341911006)
  - Bromomethane
- MW-4/03152016 (Lab ID: 10341911005)
  - Bromomethane
- MW-DUP/03152016 (Lab ID: 10341911004)
  - Bromomethane
- Trip Blank (Lab ID: 10341911007)
  - Bromomethane

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates were within QC limits with any exceptions noted below.

QC Batch: MSV/34962

S0: Surrogate recovery outside laboratory control limits.

- MS (Lab ID: 2215829)

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PROJECT NARRATIVE

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: March 25, 2016

QC Batch: MSV/34962

S0: Surrogate recovery outside laboratory control limits.

- 4-Bromofluorobenzene (S)

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: MSV/34949

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10341996001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2215492)
  - Bromobenzene
  - Tetrahydrofuran
- MSD (Lab ID: 2215493)
  - Trichlorofluoromethane

R1: RPD value was outside control limits.

- MSD (Lab ID: 2215493)
  - Tetrahydrofuran

QC Batch: MSV/34962

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10341996012

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2215829)
  - 1,2,3-Trichloropropane
  - Dichlorodifluoromethane
  - Hexachloro-1,3-butadiene
- MSD (Lab ID: 2215830)
  - Dichlorodifluoromethane

R1: RPD value was outside control limits.

- MSD (Lab ID: 2215830)
  - 1,1,2,2-Tetrachloroethane
  - 1,2,3-Trichloropropane
  - 1,3,5-Trimethylbenzene
  - 2-Chlorotoluene
  - 4-Chlorotoluene
  - Bromobenzene
  - n-Propylbenzene

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PROJECT NARRATIVE

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: March 25, 2016

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Sample: MW-9/03152016 **Lab ID: 10341911001** Collected: 03/15/16 16:14 Received: 03/17/16 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<7.1**	ug/L	20.0	7.1	1		03/22/16 20:37	67-64-1	
Allyl chloride	**<0.58**	ug/L	4.0	0.58	1		03/22/16 20:37	107-05-1	
Benzene	**<0.21**	ug/L	1.0	0.21	1		03/22/16 20:37	71-43-2	
Bromobenzene	**<0.25**	ug/L	1.0	0.25	1		03/22/16 20:37	108-86-1	
Bromochloromethane	**<0.34**	ug/L	1.0	0.34	1		03/22/16 20:37	74-97-5	
Bromodichloromethane	**<0.18**	ug/L	1.0	0.18	1		03/22/16 20:37	75-27-4	
Bromoform	**<0.41**	ug/L	4.0	0.41	1		03/22/16 20:37	75-25-2	
Bromomethane	**<0.36**	ug/L	4.0	0.36	1		03/22/16 20:37	74-83-9	
2-Butanone (MEK)	**<2.5**	ug/L	5.0	2.5	1		03/22/16 20:37	78-93-3	
n-Butylbenzene	**<0.083**	ug/L	1.0	0.083	1		03/22/16 20:37	104-51-8	
sec-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		03/22/16 20:37	135-98-8	
tert-Butylbenzene	**<0.18**	ug/L	1.0	0.18	1		03/22/16 20:37	98-06-6	
Carbon tetrachloride	**<0.35**	ug/L	1.0	0.35	1		03/22/16 20:37	56-23-5	
Chlorobenzene	**<0.23**	ug/L	1.0	0.23	1		03/22/16 20:37	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		03/22/16 20:37	75-00-3	
Chloroform	**<0.27**	ug/L	1.0	0.27	1		03/22/16 20:37	67-66-3	
Chloromethane	**<0.64**	ug/L	4.0	0.64	1		03/22/16 20:37	74-87-3	
2-Chlorotoluene	**<0.22**	ug/L	1.0	0.22	1		03/22/16 20:37	95-49-8	
4-Chlorotoluene	**<0.24**	ug/L	1.0	0.24	1		03/22/16 20:37	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.70**	ug/L	4.0	0.70	1		03/22/16 20:37	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		03/22/16 20:37	124-48-1	
1,2-Dibromoethane (EDB)	**<0.23**	ug/L	1.0	0.23	1		03/22/16 20:37	106-93-4	
Dibromomethane	**<0.31**	ug/L	4.0	0.31	1		03/22/16 20:37	74-95-3	
1,2-Dichlorobenzene	**<0.22**	ug/L	1.0	0.22	1		03/22/16 20:37	95-50-1	
1,3-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		03/22/16 20:37	541-73-1	
1,4-Dichlorobenzene	**<0.16**	ug/L	1.0	0.16	1		03/22/16 20:37	106-46-7	
Dichlorodifluoromethane	**<0.49**	ug/L	1.0	0.49	1		03/22/16 20:37	75-71-8	
1,1-Dichloroethane	**<0.22**	ug/L	1.0	0.22	1		03/22/16 20:37	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		03/22/16 20:37	107-06-2	
1,1-Dichloroethene	**<0.22**	ug/L	1.0	0.22	1		03/22/16 20:37	75-35-4	
cis-1,2-Dichloroethene	**<0.25**	ug/L	1.0	0.25	1		03/22/16 20:37	156-59-2	
trans-1,2-Dichloroethene	**<0.21**	ug/L	1.0	0.21	1		03/22/16 20:37	156-60-5	
Dichlorofluoromethane	**<0.22**	ug/L	1.0	0.22	1		03/22/16 20:37	75-43-4	
1,2-Dichloropropane	**<0.42**	ug/L	4.0	0.42	1		03/22/16 20:37	78-87-5	
1,3-Dichloropropane	**<0.24**	ug/L	1.0	0.24	1		03/22/16 20:37	142-28-9	
2,2-Dichloropropane	**<0.36**	ug/L	4.0	0.36	1		03/22/16 20:37	594-20-7	
1,1-Dichloropropene	**<0.16**	ug/L	1.0	0.16	1		03/22/16 20:37	563-58-6	
cis-1,3-Dichloropropene	**<0.21**	ug/L	4.0	0.21	1		03/22/16 20:37	10061-01-5	
trans-1,3-Dichloropropene	**<0.22**	ug/L	4.0	0.22	1		03/22/16 20:37	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.38**	ug/L	4.0	0.38	1		03/22/16 20:37	60-29-7	
Ethylbenzene	**<0.23**	ug/L	1.0	0.23	1		03/22/16 20:37	100-41-4	
Hexachloro-1,3-butadiene	**<0.48**	ug/L	1.0	0.48	1		03/22/16 20:37	87-68-3	
Isopropylbenzene (Cumene)	**<0.17**	ug/L	1.0	0.17	1		03/22/16 20:37	98-82-8	
p-Isopropyltoluene	**<0.16**	ug/L	1.0	0.16	1		03/22/16 20:37	99-87-6	
Methylene Chloride	**<0.56**	ug/L	4.0	0.56	1		03/22/16 20:37	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<2.4**	ug/L	5.0	2.4	1		03/22/16 20:37	108-10-1	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Sample: MW-9/03152016 **Lab ID: 10341911001** Collected: 03/15/16 16:14 Received: 03/17/16 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.20**	ug/L	1.0	0.20	1		03/22/16 20:37	1634-04-4	
Naphthalene	**<0.14**	ug/L	4.0	0.14	1		03/22/16 20:37	91-20-3	
n-Propylbenzene	**<0.21**	ug/L	1.0	0.21	1		03/22/16 20:37	103-65-1	
Styrene	**<0.11**	ug/L	1.0	0.11	1		03/22/16 20:37	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.20**	ug/L	1.0	0.20	1		03/22/16 20:37	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		03/22/16 20:37	79-34-5	
Tetrachloroethene	**1.4**	ug/L	1.0	0.19	1		03/22/16 20:37	127-18-4	
Tetrahydrofuran	**<4.0**	ug/L	10.0	4.0	1		03/22/16 20:37	109-99-9	
Toluene	**<0.13**	ug/L	1.0	0.13	1		03/22/16 20:37	108-88-3	
1,2,3-Trichlorobenzene	**<0.23**	ug/L	1.0	0.23	1		03/22/16 20:37	87-61-6	
1,2,4-Trichlorobenzene	**<0.22**	ug/L	1.0	0.22	1		03/22/16 20:37	120-82-1	
1,1,1-Trichloroethane	**<0.20**	ug/L	1.0	0.20	1		03/22/16 20:37	71-55-6	
1,1,2-Trichloroethane	**<0.24**	ug/L	1.0	0.24	1		03/22/16 20:37	79-00-5	
Trichloroethene	**0.26J**	ug/L	0.40	0.14	1		03/22/16 20:37	79-01-6	
Trichlorofluoromethane	**<0.18**	ug/L	1.0	0.18	1		03/22/16 20:37	75-69-4	
1,2,3-Trichloropropane	**<0.50**	ug/L	4.0	0.50	1		03/22/16 20:37	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.42**	ug/L	1.0	0.42	1		03/22/16 20:37	76-13-1	
1,2,4-Trimethylbenzene	**<0.16**	ug/L	1.0	0.16	1		03/22/16 20:37	95-63-6	
1,3,5-Trimethylbenzene	**<0.20**	ug/L	1.0	0.20	1		03/22/16 20:37	108-67-8	
Vinyl chloride	**<0.15**	ug/L	0.40	0.15	1		03/22/16 20:37	75-01-4	
Xylene (Total)	**<0.60**	ug/L	3.0	0.60	1		03/22/16 20:37	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	102	%.	75-125		1		03/22/16 20:37	17060-07-0	
Toluene-d8 (S)	118	%.	75-125		1		03/22/16 20:37	2037-26-5	
4-Bromofluorobenzene (S)	94	%.	75-125		1		03/22/16 20:37	460-00-4	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Sample: FB-01/03152016 **Lab ID: 10341911002** Collected: 03/15/16 16:05 Received: 03/17/16 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**16.7J**	ug/L	20.0	7.1	1		03/23/16 23:31	67-64-1	
Allyl chloride	**<0.58**	ug/L	4.0	0.58	1		03/23/16 23:31	107-05-1	
Benzene	**<0.21**	ug/L	1.0	0.21	1		03/23/16 23:31	71-43-2	
Bromobenzene	**<0.25**	ug/L	1.0	0.25	1		03/23/16 23:31	108-86-1	
Bromochloromethane	**<0.34**	ug/L	1.0	0.34	1		03/23/16 23:31	74-97-5	
Bromodichloromethane	**<0.18**	ug/L	1.0	0.18	1		03/23/16 23:31	75-27-4	
Bromoform	**<0.41**	ug/L	4.0	0.41	1		03/23/16 23:31	75-25-2	
Bromomethane	**<0.36**	ug/L	4.0	0.36	1		03/23/16 23:31	74-83-9	CL
2-Butanone (MEK)	**5.4**	ug/L	5.0	2.5	1		03/23/16 23:31	78-93-3	
n-Butylbenzene	**<0.083**	ug/L	1.0	0.083	1		03/23/16 23:31	104-51-8	
sec-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 23:31	135-98-8	
tert-Butylbenzene	**<0.18**	ug/L	1.0	0.18	1		03/23/16 23:31	98-06-6	
Carbon tetrachloride	**<0.35**	ug/L	1.0	0.35	1		03/23/16 23:31	56-23-5	
Chlorobenzene	**<0.23**	ug/L	1.0	0.23	1		03/23/16 23:31	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		03/23/16 23:31	75-00-3	
Chloroform	**<0.27**	ug/L	1.0	0.27	1		03/23/16 23:31	67-66-3	
Chloromethane	**<0.64**	ug/L	4.0	0.64	1		03/23/16 23:31	74-87-3	
2-Chlorotoluene	**<0.22**	ug/L	1.0	0.22	1		03/23/16 23:31	95-49-8	
4-Chlorotoluene	**<0.24**	ug/L	1.0	0.24	1		03/23/16 23:31	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.70**	ug/L	4.0	0.70	1		03/23/16 23:31	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		03/23/16 23:31	124-48-1	
1,2-Dibromoethane (EDB)	**<0.23**	ug/L	1.0	0.23	1		03/23/16 23:31	106-93-4	
Dibromomethane	**<0.31**	ug/L	4.0	0.31	1		03/23/16 23:31	74-95-3	
1,2-Dichlorobenzene	**<0.22**	ug/L	1.0	0.22	1		03/23/16 23:31	95-50-1	
1,3-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		03/23/16 23:31	541-73-1	
1,4-Dichlorobenzene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 23:31	106-46-7	
Dichlorodifluoromethane	**<0.49**	ug/L	1.0	0.49	1		03/23/16 23:31	75-71-8	
1,1-Dichloroethane	**<0.22**	ug/L	1.0	0.22	1		03/23/16 23:31	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		03/23/16 23:31	107-06-2	
1,1-Dichloroethene	**<0.22**	ug/L	1.0	0.22	1		03/23/16 23:31	75-35-4	
cis-1,2-Dichloroethene	**<0.25**	ug/L	1.0	0.25	1		03/23/16 23:31	156-59-2	
trans-1,2-Dichloroethene	**<0.21**	ug/L	1.0	0.21	1		03/23/16 23:31	156-60-5	
Dichlorofluoromethane	**<0.22**	ug/L	1.0	0.22	1		03/23/16 23:31	75-43-4	
1,2-Dichloropropane	**<0.42**	ug/L	4.0	0.42	1		03/23/16 23:31	78-87-5	
1,3-Dichloropropane	**<0.24**	ug/L	1.0	0.24	1		03/23/16 23:31	142-28-9	
2,2-Dichloropropane	**<0.36**	ug/L	4.0	0.36	1		03/23/16 23:31	594-20-7	
1,1-Dichloropropene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 23:31	563-58-6	
cis-1,3-Dichloropropene	**<0.21**	ug/L	4.0	0.21	1		03/23/16 23:31	10061-01-5	
trans-1,3-Dichloropropene	**<0.22**	ug/L	4.0	0.22	1		03/23/16 23:31	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.38**	ug/L	4.0	0.38	1		03/23/16 23:31	60-29-7	
Ethylbenzene	**<0.23**	ug/L	1.0	0.23	1		03/23/16 23:31	100-41-4	
Hexachloro-1,3-butadiene	**<0.48**	ug/L	1.0	0.48	1		03/23/16 23:31	87-68-3	
Isopropylbenzene (Cumene)	**<0.17**	ug/L	1.0	0.17	1		03/23/16 23:31	98-82-8	
p-Isopropyltoluene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 23:31	99-87-6	
Methylene Chloride	**<0.56**	ug/L	4.0	0.56	1		03/23/16 23:31	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<2.4**	ug/L	5.0	2.4	1		03/23/16 23:31	108-10-1	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Sample: FB-01/03152016 **Lab ID: 10341911002** Collected: 03/15/16 16:05 Received: 03/17/16 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.20**	ug/L	1.0	0.20	1		03/23/16 23:31	1634-04-4	
Naphthalene	**<0.14**	ug/L	4.0	0.14	1		03/23/16 23:31	91-20-3	
n-Propylbenzene	**<0.21**	ug/L	1.0	0.21	1		03/23/16 23:31	103-65-1	
Styrene	**<0.11**	ug/L	1.0	0.11	1		03/23/16 23:31	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.20**	ug/L	1.0	0.20	1		03/23/16 23:31	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		03/23/16 23:31	79-34-5	
Tetrachloroethene	**<0.19**	ug/L	1.0	0.19	1		03/23/16 23:31	127-18-4	
Tetrahydrofuran	**4.7J**	ug/L	10.0	4.0	1		03/23/16 23:31	109-99-9	
Toluene	**0.34J**	ug/L	1.0	0.13	1		03/23/16 23:31	108-88-3	
1,2,3-Trichlorobenzene	**<0.23**	ug/L	1.0	0.23	1		03/23/16 23:31	87-61-6	
1,2,4-Trichlorobenzene	**<0.22**	ug/L	1.0	0.22	1		03/23/16 23:31	120-82-1	
1,1,1-Trichloroethane	**<0.20**	ug/L	1.0	0.20	1		03/23/16 23:31	71-55-6	
1,1,2-Trichloroethane	**<0.24**	ug/L	1.0	0.24	1		03/23/16 23:31	79-00-5	
Trichloroethene	**<0.14**	ug/L	0.40	0.14	1		03/23/16 23:31	79-01-6	
Trichlorofluoromethane	**<0.18**	ug/L	1.0	0.18	1		03/23/16 23:31	75-69-4	
1,2,3-Trichloropropane	**<0.50**	ug/L	4.0	0.50	1		03/23/16 23:31	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.42**	ug/L	1.0	0.42	1		03/23/16 23:31	76-13-1	
1,2,4-Trimethylbenzene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 23:31	95-63-6	
1,3,5-Trimethylbenzene	**<0.20**	ug/L	1.0	0.20	1		03/23/16 23:31	108-67-8	
Vinyl chloride	**<0.15**	ug/L	0.40	0.15	1		03/23/16 23:31	75-01-4	
Xylene (Total)	**<0.60**	ug/L	3.0	0.60	1		03/23/16 23:31	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	100	%.	75-125		1		03/23/16 23:31	17060-07-0	
Toluene-d8 (S)	110	%.	75-125		1		03/23/16 23:31	2037-26-5	
4-Bromofluorobenzene (S)	89	%.	75-125		1		03/23/16 23:31	460-00-4	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Sample: EB-01/03152016 **Lab ID: 10341911003** Collected: 03/15/16 16:25 Received: 03/17/16 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**17.0J**	ug/L	20.0	7.1	1		03/23/16 23:46	67-64-1	
Allyl chloride	**<0.58**	ug/L	4.0	0.58	1		03/23/16 23:46	107-05-1	
Benzene	**<0.21**	ug/L	1.0	0.21	1		03/23/16 23:46	71-43-2	
Bromobenzene	**<0.25**	ug/L	1.0	0.25	1		03/23/16 23:46	108-86-1	
Bromochloromethane	**<0.34**	ug/L	1.0	0.34	1		03/23/16 23:46	74-97-5	
Bromodichloromethane	**<0.18**	ug/L	1.0	0.18	1		03/23/16 23:46	75-27-4	
Bromoform	**<0.41**	ug/L	4.0	0.41	1		03/23/16 23:46	75-25-2	
Bromomethane	**<0.36**	ug/L	4.0	0.36	1		03/23/16 23:46	74-83-9	CL
2-Butanone (MEK)	**7.2**	ug/L	5.0	2.5	1		03/23/16 23:46	78-93-3	
n-Butylbenzene	**<0.083**	ug/L	1.0	0.083	1		03/23/16 23:46	104-51-8	
sec-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 23:46	135-98-8	
tert-Butylbenzene	**<0.18**	ug/L	1.0	0.18	1		03/23/16 23:46	98-06-6	
Carbon tetrachloride	**<0.35**	ug/L	1.0	0.35	1		03/23/16 23:46	56-23-5	
Chlorobenzene	**<0.23**	ug/L	1.0	0.23	1		03/23/16 23:46	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		03/23/16 23:46	75-00-3	
Chloroform	**<0.27**	ug/L	1.0	0.27	1		03/23/16 23:46	67-66-3	
Chloromethane	**<0.64**	ug/L	4.0	0.64	1		03/23/16 23:46	74-87-3	
2-Chlorotoluene	**<0.22**	ug/L	1.0	0.22	1		03/23/16 23:46	95-49-8	
4-Chlorotoluene	**<0.24**	ug/L	1.0	0.24	1		03/23/16 23:46	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.70**	ug/L	4.0	0.70	1		03/23/16 23:46	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		03/23/16 23:46	124-48-1	
1,2-Dibromoethane (EDB)	**<0.23**	ug/L	1.0	0.23	1		03/23/16 23:46	106-93-4	
Dibromomethane	**<0.31**	ug/L	4.0	0.31	1		03/23/16 23:46	74-95-3	
1,2-Dichlorobenzene	**<0.22**	ug/L	1.0	0.22	1		03/23/16 23:46	95-50-1	
1,3-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		03/23/16 23:46	541-73-1	
1,4-Dichlorobenzene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 23:46	106-46-7	
Dichlorodifluoromethane	**<0.49**	ug/L	1.0	0.49	1		03/23/16 23:46	75-71-8	
1,1-Dichloroethane	**<0.22**	ug/L	1.0	0.22	1		03/23/16 23:46	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		03/23/16 23:46	107-06-2	
1,1-Dichloroethene	**<0.22**	ug/L	1.0	0.22	1		03/23/16 23:46	75-35-4	
cis-1,2-Dichloroethene	**<0.25**	ug/L	1.0	0.25	1		03/23/16 23:46	156-59-2	
trans-1,2-Dichloroethene	**<0.21**	ug/L	1.0	0.21	1		03/23/16 23:46	156-60-5	
Dichlorofluoromethane	**<0.22**	ug/L	1.0	0.22	1		03/23/16 23:46	75-43-4	
1,2-Dichloropropane	**<0.42**	ug/L	4.0	0.42	1		03/23/16 23:46	78-87-5	
1,3-Dichloropropane	**<0.24**	ug/L	1.0	0.24	1		03/23/16 23:46	142-28-9	
2,2-Dichloropropane	**<0.36**	ug/L	4.0	0.36	1		03/23/16 23:46	594-20-7	
1,1-Dichloropropene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 23:46	563-58-6	
cis-1,3-Dichloropropene	**<0.21**	ug/L	4.0	0.21	1		03/23/16 23:46	10061-01-5	
trans-1,3-Dichloropropene	**<0.22**	ug/L	4.0	0.22	1		03/23/16 23:46	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.38**	ug/L	4.0	0.38	1		03/23/16 23:46	60-29-7	
Ethylbenzene	**<0.23**	ug/L	1.0	0.23	1		03/23/16 23:46	100-41-4	
Hexachloro-1,3-butadiene	**<0.48**	ug/L	1.0	0.48	1		03/23/16 23:46	87-68-3	
Isopropylbenzene (Cumene)	**<0.17**	ug/L	1.0	0.17	1		03/23/16 23:46	98-82-8	
p-Isopropyltoluene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 23:46	99-87-6	
Methylene Chloride	**<0.56**	ug/L	4.0	0.56	1		03/23/16 23:46	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<2.4**	ug/L	5.0	2.4	1		03/23/16 23:46	108-10-1	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Sample: EB-01/03152016 **Lab ID: 10341911003** Collected: 03/15/16 16:25 Received: 03/17/16 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.20**	ug/L	1.0	0.20	1		03/23/16 23:46	1634-04-4	
Naphthalene	**<0.14**	ug/L	4.0	0.14	1		03/23/16 23:46	91-20-3	
n-Propylbenzene	**<0.21**	ug/L	1.0	0.21	1		03/23/16 23:46	103-65-1	
Styrene	**<0.11**	ug/L	1.0	0.11	1		03/23/16 23:46	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.20**	ug/L	1.0	0.20	1		03/23/16 23:46	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		03/23/16 23:46	79-34-5	
Tetrachloroethene	**<0.19**	ug/L	1.0	0.19	1		03/23/16 23:46	127-18-4	
Tetrahydrofuran	**5.0J**	ug/L	10.0	4.0	1		03/23/16 23:46	109-99-9	
Toluene	**0.37J**	ug/L	1.0	0.13	1		03/23/16 23:46	108-88-3	
1,2,3-Trichlorobenzene	**<0.23**	ug/L	1.0	0.23	1		03/23/16 23:46	87-61-6	
1,2,4-Trichlorobenzene	**<0.22**	ug/L	1.0	0.22	1		03/23/16 23:46	120-82-1	
1,1,1-Trichloroethane	**<0.20**	ug/L	1.0	0.20	1		03/23/16 23:46	71-55-6	
1,1,2-Trichloroethane	**<0.24**	ug/L	1.0	0.24	1		03/23/16 23:46	79-00-5	
Trichloroethene	**<0.14**	ug/L	0.40	0.14	1		03/23/16 23:46	79-01-6	
Trichlorofluoromethane	**<0.18**	ug/L	1.0	0.18	1		03/23/16 23:46	75-69-4	
1,2,3-Trichloropropane	**<0.50**	ug/L	4.0	0.50	1		03/23/16 23:46	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.42**	ug/L	1.0	0.42	1		03/23/16 23:46	76-13-1	
1,2,4-Trimethylbenzene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 23:46	95-63-6	
1,3,5-Trimethylbenzene	**<0.20**	ug/L	1.0	0.20	1		03/23/16 23:46	108-67-8	
Vinyl chloride	**<0.15**	ug/L	0.40	0.15	1		03/23/16 23:46	75-01-4	
Xylene (Total)	**<0.60**	ug/L	3.0	0.60	1		03/23/16 23:46	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	100	%.	75-125		1		03/23/16 23:46	17060-07-0	
Toluene-d8 (S)	125	%.	75-125		1		03/23/16 23:46	2037-26-5	
4-Bromofluorobenzene (S)	95	%.	75-125		1		03/23/16 23:46	460-00-4	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Sample: MW-DUP/03152016 **Lab ID: 10341911004** Collected: 03/15/16 17:00 Received: 03/17/16 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<7.1**	ug/L	20.0	7.1	1		03/24/16 01:46	67-64-1	
Allyl chloride	**<0.58**	ug/L	4.0	0.58	1		03/24/16 01:46	107-05-1	
Benzene	**<0.21**	ug/L	1.0	0.21	1		03/24/16 01:46	71-43-2	
Bromobenzene	**<0.25**	ug/L	1.0	0.25	1		03/24/16 01:46	108-86-1	
Bromochloromethane	**<0.34**	ug/L	1.0	0.34	1		03/24/16 01:46	74-97-5	
Bromodichloromethane	**<0.18**	ug/L	1.0	0.18	1		03/24/16 01:46	75-27-4	
Bromoform	**<0.41**	ug/L	4.0	0.41	1		03/24/16 01:46	75-25-2	
Bromomethane	**<0.36**	ug/L	4.0	0.36	1		03/24/16 01:46	74-83-9	CL
2-Butanone (MEK)	**<2.5**	ug/L	5.0	2.5	1		03/24/16 01:46	78-93-3	
n-Butylbenzene	**<0.083**	ug/L	1.0	0.083	1		03/24/16 01:46	104-51-8	
sec-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 01:46	135-98-8	
tert-Butylbenzene	**<0.18**	ug/L	1.0	0.18	1		03/24/16 01:46	98-06-6	
Carbon tetrachloride	**<0.35**	ug/L	1.0	0.35	1		03/24/16 01:46	56-23-5	
Chlorobenzene	**<0.23**	ug/L	1.0	0.23	1		03/24/16 01:46	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		03/24/16 01:46	75-00-3	
Chloroform	**<0.27**	ug/L	1.0	0.27	1		03/24/16 01:46	67-66-3	
Chloromethane	**<0.64**	ug/L	4.0	0.64	1		03/24/16 01:46	74-87-3	
2-Chlorotoluene	**<0.22**	ug/L	1.0	0.22	1		03/24/16 01:46	95-49-8	
4-Chlorotoluene	**<0.24**	ug/L	1.0	0.24	1		03/24/16 01:46	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.70**	ug/L	4.0	0.70	1		03/24/16 01:46	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		03/24/16 01:46	124-48-1	
1,2-Dibromoethane (EDB)	**<0.23**	ug/L	1.0	0.23	1		03/24/16 01:46	106-93-4	
Dibromomethane	**<0.31**	ug/L	4.0	0.31	1		03/24/16 01:46	74-95-3	
1,2-Dichlorobenzene	**<0.22**	ug/L	1.0	0.22	1		03/24/16 01:46	95-50-1	
1,3-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		03/24/16 01:46	541-73-1	
1,4-Dichlorobenzene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 01:46	106-46-7	
Dichlorodifluoromethane	**<0.49**	ug/L	1.0	0.49	1		03/24/16 01:46	75-71-8	
1,1-Dichloroethane	**<0.22**	ug/L	1.0	0.22	1		03/24/16 01:46	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		03/24/16 01:46	107-06-2	
1,1-Dichloroethene	**<0.22**	ug/L	1.0	0.22	1		03/24/16 01:46	75-35-4	
cis-1,2-Dichloroethene	**<0.25**	ug/L	1.0	0.25	1		03/24/16 01:46	156-59-2	
trans-1,2-Dichloroethene	**<0.21**	ug/L	1.0	0.21	1		03/24/16 01:46	156-60-5	
Dichlorofluoromethane	**<0.22**	ug/L	1.0	0.22	1		03/24/16 01:46	75-43-4	
1,2-Dichloropropane	**<0.42**	ug/L	4.0	0.42	1		03/24/16 01:46	78-87-5	
1,3-Dichloropropane	**<0.24**	ug/L	1.0	0.24	1		03/24/16 01:46	142-28-9	
2,2-Dichloropropane	**<0.36**	ug/L	4.0	0.36	1		03/24/16 01:46	594-20-7	
1,1-Dichloropropene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 01:46	563-58-6	
cis-1,3-Dichloropropene	**<0.21**	ug/L	4.0	0.21	1		03/24/16 01:46	10061-01-5	
trans-1,3-Dichloropropene	**<0.22**	ug/L	4.0	0.22	1		03/24/16 01:46	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.38**	ug/L	4.0	0.38	1		03/24/16 01:46	60-29-7	
Ethylbenzene	**<0.23**	ug/L	1.0	0.23	1		03/24/16 01:46	100-41-4	
Hexachloro-1,3-butadiene	**<0.48**	ug/L	1.0	0.48	1		03/24/16 01:46	87-68-3	
Isopropylbenzene (Cumene)	**<0.17**	ug/L	1.0	0.17	1		03/24/16 01:46	98-82-8	
p-Isopropyltoluene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 01:46	99-87-6	
Methylene Chloride	**<0.56**	ug/L	4.0	0.56	1		03/24/16 01:46	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<2.4**	ug/L	5.0	2.4	1		03/24/16 01:46	108-10-1	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Sample: MW-DUP/03152016 **Lab ID: 10341911004** Collected: 03/15/16 17:00 Received: 03/17/16 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.20**	ug/L	1.0	0.20	1		03/24/16 01:46	1634-04-4	
Naphthalene	**<0.14**	ug/L	4.0	0.14	1		03/24/16 01:46	91-20-3	
n-Propylbenzene	**<0.21**	ug/L	1.0	0.21	1		03/24/16 01:46	103-65-1	
Styrene	**<0.11**	ug/L	1.0	0.11	1		03/24/16 01:46	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.20**	ug/L	1.0	0.20	1		03/24/16 01:46	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		03/24/16 01:46	79-34-5	
Tetrachloroethene	**<0.19**	ug/L	1.0	0.19	1		03/24/16 01:46	127-18-4	
Tetrahydrofuran	**<4.0**	ug/L	10.0	4.0	1		03/24/16 01:46	109-99-9	
Toluene	**<0.13**	ug/L	1.0	0.13	1		03/24/16 01:46	108-88-3	
1,2,3-Trichlorobenzene	**<0.23**	ug/L	1.0	0.23	1		03/24/16 01:46	87-61-6	
1,2,4-Trichlorobenzene	**<0.22**	ug/L	1.0	0.22	1		03/24/16 01:46	120-82-1	
1,1,1-Trichloroethane	**<0.20**	ug/L	1.0	0.20	1		03/24/16 01:46	71-55-6	
1,1,2-Trichloroethane	**<0.24**	ug/L	1.0	0.24	1		03/24/16 01:46	79-00-5	
Trichloroethene	**<0.14**	ug/L	0.40	0.14	1		03/24/16 01:46	79-01-6	
Trichlorofluoromethane	**<0.18**	ug/L	1.0	0.18	1		03/24/16 01:46	75-69-4	
1,2,3-Trichloropropane	**<0.50**	ug/L	4.0	0.50	1		03/24/16 01:46	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.42**	ug/L	1.0	0.42	1		03/24/16 01:46	76-13-1	
1,2,4-Trimethylbenzene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 01:46	95-63-6	
1,3,5-Trimethylbenzene	**<0.20**	ug/L	1.0	0.20	1		03/24/16 01:46	108-67-8	
Vinyl chloride	**<0.15**	ug/L	0.40	0.15	1		03/24/16 01:46	75-01-4	
Xylene (Total)	**<0.60**	ug/L	3.0	0.60	1		03/24/16 01:46	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	90	%.	75-125		1		03/24/16 01:46	17060-07-0	
Toluene-d8 (S)	122	%.	75-125		1		03/24/16 01:46	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	75-125		1		03/24/16 01:46	460-00-4	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Sample: MW-4/03152016 **Lab ID: 10341911005** Collected: 03/15/16 17:07 Received: 03/17/16 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<7.1**	ug/L	20.0	7.1	1		03/24/16 02:01	67-64-1	
Allyl chloride	**<0.58**	ug/L	4.0	0.58	1		03/24/16 02:01	107-05-1	
Benzene	**<0.21**	ug/L	1.0	0.21	1		03/24/16 02:01	71-43-2	
Bromobenzene	**<0.25**	ug/L	1.0	0.25	1		03/24/16 02:01	108-86-1	
Bromochloromethane	**<0.34**	ug/L	1.0	0.34	1		03/24/16 02:01	74-97-5	
Bromodichloromethane	**<0.18**	ug/L	1.0	0.18	1		03/24/16 02:01	75-27-4	
Bromoform	**<0.41**	ug/L	4.0	0.41	1		03/24/16 02:01	75-25-2	
Bromomethane	**<0.36**	ug/L	4.0	0.36	1		03/24/16 02:01	74-83-9	CL
2-Butanone (MEK)	**<2.5**	ug/L	5.0	2.5	1		03/24/16 02:01	78-93-3	
n-Butylbenzene	**<0.083**	ug/L	1.0	0.083	1		03/24/16 02:01	104-51-8	
sec-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 02:01	135-98-8	
tert-Butylbenzene	**<0.18**	ug/L	1.0	0.18	1		03/24/16 02:01	98-06-6	
Carbon tetrachloride	**<0.35**	ug/L	1.0	0.35	1		03/24/16 02:01	56-23-5	
Chlorobenzene	**<0.23**	ug/L	1.0	0.23	1		03/24/16 02:01	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		03/24/16 02:01	75-00-3	
Chloroform	**<0.27**	ug/L	1.0	0.27	1		03/24/16 02:01	67-66-3	
Chloromethane	**<0.64**	ug/L	4.0	0.64	1		03/24/16 02:01	74-87-3	
2-Chlorotoluene	**<0.22**	ug/L	1.0	0.22	1		03/24/16 02:01	95-49-8	
4-Chlorotoluene	**<0.24**	ug/L	1.0	0.24	1		03/24/16 02:01	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.70**	ug/L	4.0	0.70	1		03/24/16 02:01	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		03/24/16 02:01	124-48-1	
1,2-Dibromoethane (EDB)	**<0.23**	ug/L	1.0	0.23	1		03/24/16 02:01	106-93-4	
Dibromomethane	**<0.31**	ug/L	4.0	0.31	1		03/24/16 02:01	74-95-3	
1,2-Dichlorobenzene	**<0.22**	ug/L	1.0	0.22	1		03/24/16 02:01	95-50-1	
1,3-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		03/24/16 02:01	541-73-1	
1,4-Dichlorobenzene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 02:01	106-46-7	
Dichlorodifluoromethane	**<0.49**	ug/L	1.0	0.49	1		03/24/16 02:01	75-71-8	
1,1-Dichloroethane	**<0.22**	ug/L	1.0	0.22	1		03/24/16 02:01	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		03/24/16 02:01	107-06-2	
1,1-Dichloroethene	**<0.22**	ug/L	1.0	0.22	1		03/24/16 02:01	75-35-4	
cis-1,2-Dichloroethene	**<0.25**	ug/L	1.0	0.25	1		03/24/16 02:01	156-59-2	
trans-1,2-Dichloroethene	**<0.21**	ug/L	1.0	0.21	1		03/24/16 02:01	156-60-5	
Dichlorofluoromethane	**<0.22**	ug/L	1.0	0.22	1		03/24/16 02:01	75-43-4	
1,2-Dichloropropane	**<0.42**	ug/L	4.0	0.42	1		03/24/16 02:01	78-87-5	
1,3-Dichloropropane	**<0.24**	ug/L	1.0	0.24	1		03/24/16 02:01	142-28-9	
2,2-Dichloropropane	**<0.36**	ug/L	4.0	0.36	1		03/24/16 02:01	594-20-7	
1,1-Dichloropropene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 02:01	563-58-6	
cis-1,3-Dichloropropene	**<0.21**	ug/L	4.0	0.21	1		03/24/16 02:01	10061-01-5	
trans-1,3-Dichloropropene	**<0.22**	ug/L	4.0	0.22	1		03/24/16 02:01	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.38**	ug/L	4.0	0.38	1		03/24/16 02:01	60-29-7	
Ethylbenzene	**<0.23**	ug/L	1.0	0.23	1		03/24/16 02:01	100-41-4	
Hexachloro-1,3-butadiene	**<0.48**	ug/L	1.0	0.48	1		03/24/16 02:01	87-68-3	
Isopropylbenzene (Cumene)	**<0.17**	ug/L	1.0	0.17	1		03/24/16 02:01	98-82-8	
p-Isopropyltoluene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 02:01	99-87-6	
Methylene Chloride	**<0.56**	ug/L	4.0	0.56	1		03/24/16 02:01	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<2.4**	ug/L	5.0	2.4	1		03/24/16 02:01	108-10-1	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Sample: MW-4/03152016 **Lab ID: 10341911005** Collected: 03/15/16 17:07 Received: 03/17/16 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.20**	ug/L	1.0	0.20	1		03/24/16 02:01	1634-04-4	
Naphthalene	**<0.14**	ug/L	4.0	0.14	1		03/24/16 02:01	91-20-3	
n-Propylbenzene	**<0.21**	ug/L	1.0	0.21	1		03/24/16 02:01	103-65-1	
Styrene	**<0.11**	ug/L	1.0	0.11	1		03/24/16 02:01	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.20**	ug/L	1.0	0.20	1		03/24/16 02:01	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		03/24/16 02:01	79-34-5	
Tetrachloroethene	**<0.19**	ug/L	1.0	0.19	1		03/24/16 02:01	127-18-4	
Tetrahydrofuran	**<4.0**	ug/L	10.0	4.0	1		03/24/16 02:01	109-99-9	
Toluene	**<0.13**	ug/L	1.0	0.13	1		03/24/16 02:01	108-88-3	
1,2,3-Trichlorobenzene	**<0.23**	ug/L	1.0	0.23	1		03/24/16 02:01	87-61-6	
1,2,4-Trichlorobenzene	**<0.22**	ug/L	1.0	0.22	1		03/24/16 02:01	120-82-1	
1,1,1-Trichloroethane	**<0.20**	ug/L	1.0	0.20	1		03/24/16 02:01	71-55-6	
1,1,2-Trichloroethane	**<0.24**	ug/L	1.0	0.24	1		03/24/16 02:01	79-00-5	
Trichloroethene	**0.24J**	ug/L	0.40	0.14	1		03/24/16 02:01	79-01-6	
Trichlorofluoromethane	**<0.18**	ug/L	1.0	0.18	1		03/24/16 02:01	75-69-4	
1,2,3-Trichloropropane	**<0.50**	ug/L	4.0	0.50	1		03/24/16 02:01	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.42**	ug/L	1.0	0.42	1		03/24/16 02:01	76-13-1	
1,2,4-Trimethylbenzene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 02:01	95-63-6	
1,3,5-Trimethylbenzene	**<0.20**	ug/L	1.0	0.20	1		03/24/16 02:01	108-67-8	
Vinyl chloride	**<0.15**	ug/L	0.40	0.15	1		03/24/16 02:01	75-01-4	
Xylene (Total)	**<0.60**	ug/L	3.0	0.60	1		03/24/16 02:01	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	98	%.	75-125		1		03/24/16 02:01	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		03/24/16 02:01	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	75-125		1		03/24/16 02:01	460-00-4	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Sample: MW-3/03152016 **Lab ID: 10341911006** Collected: 03/15/16 17:52 Received: 03/17/16 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<7.1**	ug/L	20.0	7.1	1		03/24/16 00:01	67-64-1	
Allyl chloride	**<0.58**	ug/L	4.0	0.58	1		03/24/16 00:01	107-05-1	
Benzene	**<0.21**	ug/L	1.0	0.21	1		03/24/16 00:01	71-43-2	
Bromobenzene	**<0.25**	ug/L	1.0	0.25	1		03/24/16 00:01	108-86-1	
Bromochloromethane	**<0.34**	ug/L	1.0	0.34	1		03/24/16 00:01	74-97-5	
Bromodichloromethane	**<0.18**	ug/L	1.0	0.18	1		03/24/16 00:01	75-27-4	
Bromoform	**<0.41**	ug/L	4.0	0.41	1		03/24/16 00:01	75-25-2	
Bromomethane	**<0.36**	ug/L	4.0	0.36	1		03/24/16 00:01	74-83-9	CL
2-Butanone (MEK)	**<2.5**	ug/L	5.0	2.5	1		03/24/16 00:01	78-93-3	
n-Butylbenzene	**<0.083**	ug/L	1.0	0.083	1		03/24/16 00:01	104-51-8	
sec-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 00:01	135-98-8	
tert-Butylbenzene	**<0.18**	ug/L	1.0	0.18	1		03/24/16 00:01	98-06-6	
Carbon tetrachloride	**<0.35**	ug/L	1.0	0.35	1		03/24/16 00:01	56-23-5	
Chlorobenzene	**<0.23**	ug/L	1.0	0.23	1		03/24/16 00:01	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		03/24/16 00:01	75-00-3	
Chloroform	**<0.27**	ug/L	1.0	0.27	1		03/24/16 00:01	67-66-3	
Chloromethane	**<0.64**	ug/L	4.0	0.64	1		03/24/16 00:01	74-87-3	
2-Chlorotoluene	**<0.22**	ug/L	1.0	0.22	1		03/24/16 00:01	95-49-8	
4-Chlorotoluene	**<0.24**	ug/L	1.0	0.24	1		03/24/16 00:01	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.70**	ug/L	4.0	0.70	1		03/24/16 00:01	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		03/24/16 00:01	124-48-1	
1,2-Dibromoethane (EDB)	**<0.23**	ug/L	1.0	0.23	1		03/24/16 00:01	106-93-4	
Dibromomethane	**<0.31**	ug/L	4.0	0.31	1		03/24/16 00:01	74-95-3	
1,2-Dichlorobenzene	**<0.22**	ug/L	1.0	0.22	1		03/24/16 00:01	95-50-1	
1,3-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		03/24/16 00:01	541-73-1	
1,4-Dichlorobenzene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 00:01	106-46-7	
Dichlorodifluoromethane	**<0.49**	ug/L	1.0	0.49	1		03/24/16 00:01	75-71-8	
1,1-Dichloroethane	**<0.22**	ug/L	1.0	0.22	1		03/24/16 00:01	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		03/24/16 00:01	107-06-2	
1,1-Dichloroethene	**<0.22**	ug/L	1.0	0.22	1		03/24/16 00:01	75-35-4	
cis-1,2-Dichloroethene	**<0.25**	ug/L	1.0	0.25	1		03/24/16 00:01	156-59-2	
trans-1,2-Dichloroethene	**<0.21**	ug/L	1.0	0.21	1		03/24/16 00:01	156-60-5	
Dichlorofluoromethane	**<0.22**	ug/L	1.0	0.22	1		03/24/16 00:01	75-43-4	
1,2-Dichloropropane	**<0.42**	ug/L	4.0	0.42	1		03/24/16 00:01	78-87-5	
1,3-Dichloropropane	**<0.24**	ug/L	1.0	0.24	1		03/24/16 00:01	142-28-9	
2,2-Dichloropropane	**<0.36**	ug/L	4.0	0.36	1		03/24/16 00:01	594-20-7	
1,1-Dichloropropene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 00:01	563-58-6	
cis-1,3-Dichloropropene	**<0.21**	ug/L	4.0	0.21	1		03/24/16 00:01	10061-01-5	
trans-1,3-Dichloropropene	**<0.22**	ug/L	4.0	0.22	1		03/24/16 00:01	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.38**	ug/L	4.0	0.38	1		03/24/16 00:01	60-29-7	
Ethylbenzene	**<0.23**	ug/L	1.0	0.23	1		03/24/16 00:01	100-41-4	
Hexachloro-1,3-butadiene	**<0.48**	ug/L	1.0	0.48	1		03/24/16 00:01	87-68-3	
Isopropylbenzene (Cumene)	**<0.17**	ug/L	1.0	0.17	1		03/24/16 00:01	98-82-8	
p-Isopropyltoluene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 00:01	99-87-6	
Methylene Chloride	**<0.56**	ug/L	4.0	0.56	1		03/24/16 00:01	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<2.4**	ug/L	5.0	2.4	1		03/24/16 00:01	108-10-1	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Sample: MW-3/03152016 **Lab ID: 10341911006** Collected: 03/15/16 17:52 Received: 03/17/16 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.20**	ug/L	1.0	0.20	1		03/24/16 00:01	1634-04-4	
Naphthalene	**<0.14**	ug/L	4.0	0.14	1		03/24/16 00:01	91-20-3	
n-Propylbenzene	**<0.21**	ug/L	1.0	0.21	1		03/24/16 00:01	103-65-1	
Styrene	**<0.11**	ug/L	1.0	0.11	1		03/24/16 00:01	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.20**	ug/L	1.0	0.20	1		03/24/16 00:01	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		03/24/16 00:01	79-34-5	
Tetrachloroethene	**<0.19**	ug/L	1.0	0.19	1		03/24/16 00:01	127-18-4	
Tetrahydrofuran	**<4.0**	ug/L	10.0	4.0	1		03/24/16 00:01	109-99-9	
Toluene	**<0.13**	ug/L	1.0	0.13	1		03/24/16 00:01	108-88-3	
1,2,3-Trichlorobenzene	**<0.23**	ug/L	1.0	0.23	1		03/24/16 00:01	87-61-6	
1,2,4-Trichlorobenzene	**<0.22**	ug/L	1.0	0.22	1		03/24/16 00:01	120-82-1	
1,1,1-Trichloroethane	**<0.20**	ug/L	1.0	0.20	1		03/24/16 00:01	71-55-6	
1,1,2-Trichloroethane	**<0.24**	ug/L	1.0	0.24	1		03/24/16 00:01	79-00-5	
Trichloroethene	**<0.14**	ug/L	0.40	0.14	1		03/24/16 00:01	79-01-6	
Trichlorofluoromethane	**<0.18**	ug/L	1.0	0.18	1		03/24/16 00:01	75-69-4	
1,2,3-Trichloropropane	**<0.50**	ug/L	4.0	0.50	1		03/24/16 00:01	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.42**	ug/L	1.0	0.42	1		03/24/16 00:01	76-13-1	
1,2,4-Trimethylbenzene	**<0.16**	ug/L	1.0	0.16	1		03/24/16 00:01	95-63-6	
1,3,5-Trimethylbenzene	**<0.20**	ug/L	1.0	0.20	1		03/24/16 00:01	108-67-8	
Vinyl chloride	**<0.15**	ug/L	0.40	0.15	1		03/24/16 00:01	75-01-4	
Xylene (Total)	**<0.60**	ug/L	3.0	0.60	1		03/24/16 00:01	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	103	%.	75-125		1		03/24/16 00:01	17060-07-0	
Toluene-d8 (S)	97	%.	75-125		1		03/24/16 00:01	2037-26-5	
4-Bromofluorobenzene (S)	94	%.	75-125		1		03/24/16 00:01	460-00-4	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Sample: Trip Blank **Lab ID: 10341911007** Collected: 03/15/16 00:00 Received: 03/17/16 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<7.1**	ug/L	20.0	7.1	1		03/23/16 21:17	67-64-1	
Allyl chloride	**<0.58**	ug/L	4.0	0.58	1		03/23/16 21:17	107-05-1	
Benzene	**<0.21**	ug/L	1.0	0.21	1		03/23/16 21:17	71-43-2	
Bromobenzene	**<0.25**	ug/L	1.0	0.25	1		03/23/16 21:17	108-86-1	
Bromochloromethane	**<0.34**	ug/L	1.0	0.34	1		03/23/16 21:17	74-97-5	
Bromodichloromethane	**<0.18**	ug/L	1.0	0.18	1		03/23/16 21:17	75-27-4	
Bromoform	**<0.41**	ug/L	4.0	0.41	1		03/23/16 21:17	75-25-2	
Bromomethane	**<0.36**	ug/L	4.0	0.36	1		03/23/16 21:17	74-83-9	CL
2-Butanone (MEK)	**<2.5**	ug/L	5.0	2.5	1		03/23/16 21:17	78-93-3	
n-Butylbenzene	**<0.083**	ug/L	1.0	0.083	1		03/23/16 21:17	104-51-8	
sec-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 21:17	135-98-8	
tert-Butylbenzene	**<0.18**	ug/L	1.0	0.18	1		03/23/16 21:17	98-06-6	
Carbon tetrachloride	**<0.35**	ug/L	1.0	0.35	1		03/23/16 21:17	56-23-5	
Chlorobenzene	**<0.23**	ug/L	1.0	0.23	1		03/23/16 21:17	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		03/23/16 21:17	75-00-3	
Chloroform	**<0.27**	ug/L	1.0	0.27	1		03/23/16 21:17	67-66-3	
Chloromethane	**<0.64**	ug/L	4.0	0.64	1		03/23/16 21:17	74-87-3	
2-Chlorotoluene	**<0.22**	ug/L	1.0	0.22	1		03/23/16 21:17	95-49-8	
4-Chlorotoluene	**<0.24**	ug/L	1.0	0.24	1		03/23/16 21:17	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.70**	ug/L	4.0	0.70	1		03/23/16 21:17	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		03/23/16 21:17	124-48-1	
1,2-Dibromoethane (EDB)	**<0.23**	ug/L	1.0	0.23	1		03/23/16 21:17	106-93-4	
Dibromomethane	**<0.31**	ug/L	4.0	0.31	1		03/23/16 21:17	74-95-3	
1,2-Dichlorobenzene	**<0.22**	ug/L	1.0	0.22	1		03/23/16 21:17	95-50-1	
1,3-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		03/23/16 21:17	541-73-1	
1,4-Dichlorobenzene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 21:17	106-46-7	
Dichlorodifluoromethane	**<0.49**	ug/L	1.0	0.49	1		03/23/16 21:17	75-71-8	
1,1-Dichloroethane	**<0.22**	ug/L	1.0	0.22	1		03/23/16 21:17	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		03/23/16 21:17	107-06-2	
1,1-Dichloroethene	**<0.22**	ug/L	1.0	0.22	1		03/23/16 21:17	75-35-4	
cis-1,2-Dichloroethene	**<0.25**	ug/L	1.0	0.25	1		03/23/16 21:17	156-59-2	
trans-1,2-Dichloroethene	**<0.21**	ug/L	1.0	0.21	1		03/23/16 21:17	156-60-5	
Dichlorofluoromethane	**<0.22**	ug/L	1.0	0.22	1		03/23/16 21:17	75-43-4	
1,2-Dichloropropane	**<0.42**	ug/L	4.0	0.42	1		03/23/16 21:17	78-87-5	
1,3-Dichloropropane	**<0.24**	ug/L	1.0	0.24	1		03/23/16 21:17	142-28-9	
2,2-Dichloropropane	**<0.36**	ug/L	4.0	0.36	1		03/23/16 21:17	594-20-7	
1,1-Dichloropropene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 21:17	563-58-6	
cis-1,3-Dichloropropene	**<0.21**	ug/L	4.0	0.21	1		03/23/16 21:17	10061-01-5	
trans-1,3-Dichloropropene	**<0.22**	ug/L	4.0	0.22	1		03/23/16 21:17	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.38**	ug/L	4.0	0.38	1		03/23/16 21:17	60-29-7	
Ethylbenzene	**<0.23**	ug/L	1.0	0.23	1		03/23/16 21:17	100-41-4	
Hexachloro-1,3-butadiene	**<0.48**	ug/L	1.0	0.48	1		03/23/16 21:17	87-68-3	
Isopropylbenzene (Cumene)	**<0.17**	ug/L	1.0	0.17	1		03/23/16 21:17	98-82-8	
p-Isopropyltoluene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 21:17	99-87-6	
Methylene Chloride	**<0.56**	ug/L	4.0	0.56	1		03/23/16 21:17	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<2.4**	ug/L	5.0	2.4	1		03/23/16 21:17	108-10-1	

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ANALYTICAL RESULTS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Sample: Trip Blank **Lab ID: 10341911007** Collected: 03/15/16 00:00 Received: 03/17/16 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.20**	ug/L	1.0	0.20	1		03/23/16 21:17	1634-04-4	
Naphthalene	**<0.14**	ug/L	4.0	0.14	1		03/23/16 21:17	91-20-3	
n-Propylbenzene	**<0.21**	ug/L	1.0	0.21	1		03/23/16 21:17	103-65-1	
Styrene	**<0.11**	ug/L	1.0	0.11	1		03/23/16 21:17	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.20**	ug/L	1.0	0.20	1		03/23/16 21:17	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		03/23/16 21:17	79-34-5	
Tetrachloroethene	**<0.19**	ug/L	1.0	0.19	1		03/23/16 21:17	127-18-4	
Tetrahydrofuran	**<4.0**	ug/L	10.0	4.0	1		03/23/16 21:17	109-99-9	
Toluene	**<0.13**	ug/L	1.0	0.13	1		03/23/16 21:17	108-88-3	
1,2,3-Trichlorobenzene	**<0.23**	ug/L	1.0	0.23	1		03/23/16 21:17	87-61-6	
1,2,4-Trichlorobenzene	**<0.22**	ug/L	1.0	0.22	1		03/23/16 21:17	120-82-1	
1,1,1-Trichloroethane	**<0.20**	ug/L	1.0	0.20	1		03/23/16 21:17	71-55-6	
1,1,2-Trichloroethane	**<0.24**	ug/L	1.0	0.24	1		03/23/16 21:17	79-00-5	
Trichloroethene	**<0.14**	ug/L	0.40	0.14	1		03/23/16 21:17	79-01-6	
Trichlorofluoromethane	**<0.18**	ug/L	1.0	0.18	1		03/23/16 21:17	75-69-4	
1,2,3-Trichloropropane	**<0.50**	ug/L	4.0	0.50	1		03/23/16 21:17	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.42**	ug/L	1.0	0.42	1		03/23/16 21:17	76-13-1	
1,2,4-Trimethylbenzene	**<0.16**	ug/L	1.0	0.16	1		03/23/16 21:17	95-63-6	
1,3,5-Trimethylbenzene	**<0.20**	ug/L	1.0	0.20	1		03/23/16 21:17	108-67-8	
Vinyl chloride	**<0.15**	ug/L	0.40	0.15	1		03/23/16 21:17	75-01-4	
Xylene (Total)	**<0.60**	ug/L	3.0	0.60	1		03/23/16 21:17	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	101	%.	75-125		1		03/23/16 21:17	17060-07-0	
Toluene-d8 (S)	103	%.	75-125		1		03/23/16 21:17	2037-26-5	
4-Bromofluorobenzene (S)	104	%.	75-125		1		03/23/16 21:17	460-00-4	

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QUALITY CONTROL DATA

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

QC Batch: MSV/34949 | Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B | Analysis Description: 8260B MSV 465 W
Associated Lab Samples: 10341911001

METHOD BLANK: 2215009 | Matrix: Water
Associated Lab Samples: 10341911001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.20	1.0	0.20	03/22/16 15:39	
1,1,1-Trichloroethane	ug/L	<0.20	1.0	0.20	03/22/16 15:39	
1,1,2,2-Tetrachloroethane	ug/L	<0.22	1.0	0.22	03/22/16 15:39	
1,1,2-Trichloroethane	ug/L	<0.24	1.0	0.24	03/22/16 15:39	
1,1,2-Trichlorotrifluoroethane	ug/L	<0.42	1.0	0.42	03/22/16 15:39	
1,1-Dichloroethane	ug/L	<0.22	1.0	0.22	03/22/16 15:39	
1,1-Dichloroethene	ug/L	<0.22	1.0	0.22	03/22/16 15:39	
1,1-Dichloropropene	ug/L	<0.16	1.0	0.16	03/22/16 15:39	
1,2,3-Trichlorobenzene	ug/L	<0.23	1.0	0.23	03/22/16 15:39	
1,2,3-Trichloropropane	ug/L	<0.50	4.0	0.50	03/22/16 15:39	
1,2,4-Trichlorobenzene	ug/L	<0.22	1.0	0.22	03/22/16 15:39	
1,2,4-Trimethylbenzene	ug/L	<0.16	1.0	0.16	03/22/16 15:39	
1,2-Dibromo-3-chloropropane	ug/L	<0.70	4.0	0.70	03/22/16 15:39	
1,2-Dibromoethane (EDB)	ug/L	<0.23	1.0	0.23	03/22/16 15:39	
1,2-Dichlorobenzene	ug/L	<0.22	1.0	0.22	03/22/16 15:39	
1,2-Dichloroethane	ug/L	<0.17	1.0	0.17	03/22/16 15:39	
1,2-Dichloropropane	ug/L	<0.42	4.0	0.42	03/22/16 15:39	
1,3,5-Trimethylbenzene	ug/L	<0.20	1.0	0.20	03/22/16 15:39	
1,3-Dichlorobenzene	ug/L	<0.21	1.0	0.21	03/22/16 15:39	
1,3-Dichloropropane	ug/L	<0.24	1.0	0.24	03/22/16 15:39	
1,4-Dichlorobenzene	ug/L	<0.16	1.0	0.16	03/22/16 15:39	
2,2-Dichloropropane	ug/L	<0.36	4.0	0.36	03/22/16 15:39	
2-Butanone (MEK)	ug/L	<2.5	5.0	2.5	03/22/16 15:39	
2-Chlorotoluene	ug/L	<0.22	1.0	0.22	03/22/16 15:39	
4-Chlorotoluene	ug/L	<0.24	1.0	0.24	03/22/16 15:39	
4-Methyl-2-pentanone (MIBK)	ug/L	<2.4	5.0	2.4	03/22/16 15:39	
Acetone	ug/L	<7.1	20.0	7.1	03/22/16 15:39	
Allyl chloride	ug/L	<0.58	4.0	0.58	03/22/16 15:39	
Benzene	ug/L	<0.21	1.0	0.21	03/22/16 15:39	
Bromobenzene	ug/L	<0.25	1.0	0.25	03/22/16 15:39	
Bromochloromethane	ug/L	<0.34	1.0	0.34	03/22/16 15:39	
Bromodichloromethane	ug/L	<0.18	1.0	0.18	03/22/16 15:39	
Bromoform	ug/L	<0.41	4.0	0.41	03/22/16 15:39	
Bromomethane	ug/L	<0.36	4.0	0.36	03/22/16 15:39	
Carbon tetrachloride	ug/L	<0.35	1.0	0.35	03/22/16 15:39	
Chlorobenzene	ug/L	<0.23	1.0	0.23	03/22/16 15:39	
Chloroethane	ug/L	<0.34	1.0	0.34	03/22/16 15:39	
Chloroform	ug/L	<0.27	1.0	0.27	03/22/16 15:39	
Chloromethane	ug/L	<0.64	4.0	0.64	03/22/16 15:39	
cis-1,2-Dichloroethene	ug/L	<0.25	1.0	0.25	03/22/16 15:39	
cis-1,3-Dichloropropene	ug/L	<0.21	4.0	0.21	03/22/16 15:39	

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QUALITY CONTROL DATA

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

METHOD BLANK: 2215009 Matrix: Water
Associated Lab Samples: 10341911001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Dibromochloromethane	ug/L	<0.16	1.0	0.16	03/22/16 15:39	
Dibromomethane	ug/L	<0.31	4.0	0.31	03/22/16 15:39	
Dichlorodifluoromethane	ug/L	<0.49	1.0	0.49	03/22/16 15:39	
Dichlorofluoromethane	ug/L	<0.22	1.0	0.22	03/22/16 15:39	
Diethyl ether (Ethyl ether)	ug/L	<0.38	4.0	0.38	03/22/16 15:39	
Ethylbenzene	ug/L	<0.23	1.0	0.23	03/22/16 15:39	
Hexachloro-1,3-butadiene	ug/L	<0.48	1.0	0.48	03/22/16 15:39	
Isopropylbenzene (Cumene)	ug/L	<0.17	1.0	0.17	03/22/16 15:39	
Methyl-tert-butyl ether	ug/L	<0.20	1.0	0.20	03/22/16 15:39	
Methylene Chloride	ug/L	<0.56	4.0	0.56	03/22/16 15:39	
n-Butylbenzene	ug/L	<0.083	1.0	0.083	03/22/16 15:39	
n-Propylbenzene	ug/L	<0.21	1.0	0.21	03/22/16 15:39	
Naphthalene	ug/L	<0.14	4.0	0.14	03/22/16 15:39	
p-Isopropyltoluene	ug/L	<0.16	1.0	0.16	03/22/16 15:39	
sec-Butylbenzene	ug/L	<0.16	1.0	0.16	03/22/16 15:39	
Styrene	ug/L	<0.11	1.0	0.11	03/22/16 15:39	
tert-Butylbenzene	ug/L	<0.18	1.0	0.18	03/22/16 15:39	
Tetrachloroethene	ug/L	<0.19	1.0	0.19	03/22/16 15:39	
Tetrahydrofuran	ug/L	<4.0	10.0	4.0	03/22/16 15:39	
Toluene	ug/L	<0.13	1.0	0.13	03/22/16 15:39	
trans-1,2-Dichloroethene	ug/L	<0.21	1.0	0.21	03/22/16 15:39	
trans-1,3-Dichloropropene	ug/L	<0.22	4.0	0.22	03/22/16 15:39	
Trichloroethene	ug/L	<0.14	0.40	0.14	03/22/16 15:39	
Trichlorofluoromethane	ug/L	<0.18	1.0	0.18	03/22/16 15:39	
Vinyl chloride	ug/L	<0.15	0.40	0.15	03/22/16 15:39	
Xylene (Total)	ug/L	<0.60	3.0	0.60	03/22/16 15:39	
1,2-Dichloroethane-d4 (S)	%.	101	75-125		03/22/16 15:39	
4-Bromofluorobenzene (S)	%.	98	75-125		03/22/16 15:39	
Toluene-d8 (S)	%.	98	75-125		03/22/16 15:39	

LABORATORY CONTROL SAMPLE: 2215010

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	21.5	107	75-125	
1,1,1-Trichloroethane	ug/L	20	20.5	103	73-125	
1,1,2,2-Tetrachloroethane	ug/L	20	20.2	101	75-128	
1,1,2-Trichloroethane	ug/L	20	20.4	102	75-129	
1,1,2-Trichlorotrifluoroethane	ug/L	20	17.1	85	69-125	
1,1-Dichloroethane	ug/L	20	18.5	92	75-131	
1,1-Dichloroethene	ug/L	20	19.1	95	72-125	
1,1-Dichloropropene	ug/L	20	18.9	94	74-125	
1,2,3-Trichlorobenzene	ug/L	20	21.5	107	68-127	
1,2,3-Trichloropropane	ug/L	20	20.8	104	75-125	
1,2,4-Trichlorobenzene	ug/L	20	20.5	102	70-125	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

LABORATORY CONTROL SAMPLE: 2215010

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	19.7	98	75-130	
1,2-Dibromo-3-chloropropane	ug/L	50	52.5	105	74-125	
1,2-Dibromoethane (EDB)	ug/L	20	20.6	103	75-125	
1,2-Dichlorobenzene	ug/L	20	20.8	104	75-125	
1,2-Dichloroethane	ug/L	20	18.3	91	72-129	
1,2-Dichloropropane	ug/L	20	20.3	101	71-129	
1,3,5-Trimethylbenzene	ug/L	20	19.8	99	75-127	
1,3-Dichlorobenzene	ug/L	20	19.5	97	75-125	
1,3-Dichloropropane	ug/L	20	19.8	99	75-125	
1,4-Dichlorobenzene	ug/L	20	19.3	96	75-125	
2,2-Dichloropropane	ug/L	20	20.0	100	71-125	
2-Butanone (MEK)	ug/L	100	101	101	58-150	
2-Chlorotoluene	ug/L	20	19.4	97	75-125	
4-Chlorotoluene	ug/L	20	20.1	100	75-130	
4-Methyl-2-pentanone (MIBK)	ug/L	100	104	104	72-140	
Acetone	ug/L	100	97.4	97	69-137	
Allyl chloride	ug/L	20	18.1	91	68-132	
Benzene	ug/L	20	18.3	91	75-125	
Bromobenzene	ug/L	20	19.9	100	75-125	
Bromochloromethane	ug/L	20	20.2	101	75-125	
Bromodichloromethane	ug/L	20	21.1	106	69-128	
Bromoform	ug/L	20	19.2	96	75-125	
Bromomethane	ug/L	20	14.1	70	30-150	
Carbon tetrachloride	ug/L	20	20.2	101	74-125	
Chlorobenzene	ug/L	20	20.1	101	75-125	
Chloroethane	ug/L	20	16.2	81	60-150	
Chloroform	ug/L	20	18.3	91	75-126	
Chloromethane	ug/L	20	20.1	100	46-150	
cis-1,2-Dichloroethene	ug/L	20	20.1	100	75-126	
cis-1,3-Dichloropropene	ug/L	20	20.7	104	75-125	
Dibromochloromethane	ug/L	20	19.8	99	75-125	
Dibromomethane	ug/L	20	21.0	105	72-127	
Dichlorodifluoromethane	ug/L	20	19.6	98	58-135	
Dichlorofluoromethane	ug/L	20	18.4	92	68-149	
Diethyl ether (Ethyl ether)	ug/L	20	18.1	91	66-144	
Ethylbenzene	ug/L	20	19.3	97	75-125	
Hexachloro-1,3-butadiene	ug/L	20	22.2	111	73-125	
Isopropylbenzene (Cumene)	ug/L	20	23.8	119	69-140	
Methyl-tert-butyl ether	ug/L	20	18.6	93	75-126	
Methylene Chloride	ug/L	20	16.8	84	71-130	
n-Butylbenzene	ug/L	20	20.0	100	71-129	
n-Propylbenzene	ug/L	20	19.3	96	71-133	
Naphthalene	ug/L	20	21.1	106	59-137	
p-Isopropyltoluene	ug/L	20	20.4	102	74-127	
sec-Butylbenzene	ug/L	20	19.7	99	66-140	
Styrene	ug/L	20	21.8	109	75-125	
tert-Butylbenzene	ug/L	20	19.9	100	73-129	

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QUALITY CONTROL DATA

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

LABORATORY CONTROL SAMPLE: 2215010

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	ug/L	20	18.8	94	75-125	
Tetrahydrofuran	ug/L	200	192	96	71-129	
Toluene	ug/L	20	19.0	95	75-125	
trans-1,2-Dichloroethene	ug/L	20	19.5	97	75-125	
trans-1,3-Dichloropropene	ug/L	20	20.1	101	75-125	
Trichloroethene	ug/L	20	20.6	103	75-125	
Trichlorofluoromethane	ug/L	20	18.2	91	74-128	
Vinyl chloride	ug/L	20	21.2	106	71-131	
Xylene (Total)	ug/L	60	62.1	103	75-125	
1,2-Dichloroethane-d4 (S)	%.			97	75-125	
4-Bromofluorobenzene (S)	%.			98	75-125	
Toluene-d8 (S)	%.			98	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2215492 2215493

Parameter	Units	10341996001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1,2-Tetrachloroethane	ug/L	ND	20	20	24.5	22.5	123	113	75-125	9	30	
1,1,1-Trichloroethane	ug/L	ND	20	20	25.3	22.7	127	113	71-144	11	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	20	20	22.4	20.7	112	103	75-131	8	30	
1,1,2-Trichloroethane	ug/L	ND	20	20	24.6	20.5	123	102	75-125	18	30	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	20	20	21.6	25.0	108	125	75-150	14	30	
1,1-Dichloroethane	ug/L	ND	20	20	23.2	20.5	116	103	64-150	12	30	
1,1-Dichloroethene	ug/L	ND	20	20	21.7	22.6	108	113	68-150	4	30	
1,1-Dichloropropene	ug/L	ND	20	20	24.4	21.5	122	108	68-145	12	30	
1,2,3-Trichlorobenzene	ug/L	ND	20	20	22.4	22.9	112	114	57-142	2	30	
1,2,3-Trichloropropane	ug/L	ND	20	20	23.1	20.6	115	103	75-125	12	30	
1,2,4-Trichlorobenzene	ug/L	ND	20	20	21.3	22.4	107	112	60-135	5	30	
1,2,4-Trimethylbenzene	ug/L	ND	20	20	21.4	20.7	106	103	67-148	3	30	
1,2-Dibromo-3-chloropropane	ug/L	ND	50	50	55.5	50.1	111	100	32-137	10	30	
1,2-Dibromoethane (EDB)	ug/L	ND	20	20	23.4	20.6	117	103	75-125	13	30	
1,2-Dichlorobenzene	ug/L	ND	20	20	21.9	20.9	110	105	75-125	5	30	
1,2-Dichloroethane	ug/L	ND	20	20	21.3	19.3	106	96	62-138	10	30	
1,2-Dichloropropane	ug/L	ND	20	20	23.3	20.6	117	103	62-144	13	30	
1,3,5-Trimethylbenzene	ug/L	ND	20	20	21.8	21.0	109	105	67-148	4	30	
1,3-Dichlorobenzene	ug/L	ND	20	20	21.0	20.2	105	101	74-131	4	30	
1,3-Dichloropropane	ug/L	ND	20	20	23.8	20.2	119	101	75-127	17	30	
1,4-Dichlorobenzene	ug/L	ND	20	20	20.8	20.0	104	100	74-126	4	30	
2,2-Dichloropropane	ug/L	ND	20	20	25.0	19.5	125	98	56-146	24	30	
2-Butanone (MEK)	ug/L	ND	100	100	109	94.2	109	94	47-150	15	30	
2-Chlorotoluene	ug/L	ND	20	20	21.5	20.7	107	103	74-137	4	30	
4-Chlorotoluene	ug/L	ND	20	20	21.8	21.3	109	106	72-138	2	30	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	100	120	100	120	100	60-147	18	30	
Acetone	ug/L	ND	100	100	111	94.6	111	95	61-150	16	30	

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QUALITY CONTROL DATA

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2215492 2215493

Parameter	Units	10341996001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Allyl chloride	ug/L	ND	20	20	19.2	20.9	96	105	53-150	9	30	
Benzene	ug/L	ND	20	20	22.8	17.3	114	86	52-147	28	30	
Bromobenzene	ug/L	ND	20	20	27.6	21.1	138	106	75-129	27	30	M1
Bromochloromethane	ug/L	ND	20	20	24.4	20.5	122	103	72-128	17	30	
Bromodichloromethane	ug/L	ND	20	20	22.7	21.1	113	105	65-137	7	30	
Bromoform	ug/L	ND	20	20	16.8	15.7	84	79	59-133	6	30	
Bromomethane	ug/L	ND	20	20	16.9	16.3	84	82	30-150	3	30	
Carbon tetrachloride	ug/L	ND	20	20	25.3	23.1	126	116	73-144	9	30	
Chlorobenzene	ug/L	ND	20	20	23.4	20.8	117	104	75-126	12	30	
Chloroethane	ug/L	ND	20	20	22.1	25.0	111	125	55-150	12	30	
Chloroform	ug/L	ND	20	20	21.7	17.9	108	89	66-143	19	30	
Chloromethane	ug/L	ND	20	20	20.1	20.8	101	104	42-150	3	30	
cis-1,2-Dichloroethene	ug/L	ND	20	20	24.9	21.3	124	107	65-143	15	30	
cis-1,3-Dichloropropene	ug/L	ND	20	20	21.9	17.2	110	86	75-125	24	30	
Dibromochloromethane	ug/L	ND	20	20	21.9	18.7	109	94	75-125	16	30	
Dibromomethane	ug/L	ND	20	20	25.6	19.9	128	100	66-133	25	30	
Dichlorodifluoromethane	ug/L	ND	20	20	30.0	29.8	150	149	74-150	1	30	
Dichlorofluoromethane	ug/L	ND	20	20	21.9	27.3	110	137	68-150	22	30	
Diethyl ether (Ethyl ether)	ug/L	ND	20	20	18.3	18.7	91	94	57-148	2	30	
Ethylbenzene	ug/L	ND	20	20	21.9	19.7	109	98	67-149	11	30	
Hexachloro-1,3-butadiene	ug/L	ND	20	20	26.2	26.1	131	130	65-143	1	30	
Isopropylbenzene (Cumene)	ug/L	ND	20	20	22.5	20.7	112	104	64-150	8	30	
Methyl-tert-butyl ether	ug/L	ND	20	20	19.1	20.1	95	100	71-130	5	30	
Methylene Chloride	ug/L	ND	20	20	17.4	18.4	87	92	67-137	5	30	
n-Butylbenzene	ug/L	ND	20	20	21.5	21.8	108	109	70-138	1	30	
n-Propylbenzene	ug/L	ND	20	20	25.7	21.1	128	106	70-148	19	30	
Naphthalene	ug/L	ND	20	20	21.4	21.6	107	108	39-150	1	30	
p-Isopropyltoluene	ug/L	ND	20	20	22.1	22.2	110	111	74-138	0	30	
sec-Butylbenzene	ug/L	ND	20	20	22.1	22.2	110	111	64-150	0	30	
Styrene	ug/L	ND	20	20	23.0	20.4	115	102	75-132	12	30	
tert-Butylbenzene	ug/L	ND	20	20	22.0	22.0	110	110	75-138	0	30	
Tetrachloroethene	ug/L	ND	20	20	21.8	19.3	109	97	73-136	12	30	
Tetrahydrofuran	ug/L	ND	200	200	303	189	147	90	68-142	46	30	M1,R1
Toluene	ug/L	ND	20	20	23.3	19.8	117	99	69-139	17	30	
trans-1,2-Dichloroethene	ug/L	ND	20	20	21.1	21.8	105	109	75-135	3	30	
trans-1,3-Dichloropropene	ug/L	ND	20	20	22.9	18.8	114	94	66-136	19	30	
Trichloroethene	ug/L	ND	20	20	24.1	20.7	121	103	74-135	15	30	
Trichlorofluoromethane	ug/L	ND	20	20	27.1	31.3	136	157	75-150	14	30	M1
Vinyl chloride	ug/L	ND	20	20	25.5	26.3	127	131	69-150	3	30	
Xylene (Total)	ug/L	ND	60	60	68.9	62.0	115	103	70-147	10	30	
1,2-Dichloroethane-d4 (S)	%.						102	103	75-125			
4-Bromofluorobenzene (S)	%.						122	103	75-125			
Toluene-d8 (S)	%.						91	96	75-125			

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QUALITY CONTROL DATA

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

QC Batch: MSV/34962 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260B MSV 465 W
Associated Lab Samples: 10341911002, 10341911003, 10341911004, 10341911005, 10341911006, 10341911007

METHOD BLANK: 2215533 Matrix: Water
Associated Lab Samples: 10341911002, 10341911003, 10341911004, 10341911005, 10341911006, 10341911007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.20	1.0	0.20	03/23/16 21:02	
1,1,1-Trichloroethane	ug/L	<0.20	1.0	0.20	03/23/16 21:02	
1,1,2,2-Tetrachloroethane	ug/L	<0.22	1.0	0.22	03/23/16 21:02	
1,1,2-Trichloroethane	ug/L	<0.24	1.0	0.24	03/23/16 21:02	
1,1,2-Trichlorotrifluoroethane	ug/L	<0.42	1.0	0.42	03/23/16 21:02	
1,1-Dichloroethane	ug/L	<0.22	1.0	0.22	03/23/16 21:02	
1,1-Dichloroethene	ug/L	<0.22	1.0	0.22	03/23/16 21:02	
1,1-Dichloropropene	ug/L	<0.16	1.0	0.16	03/23/16 21:02	
1,2,3-Trichlorobenzene	ug/L	<0.23	1.0	0.23	03/23/16 21:02	
1,2,3-Trichloropropane	ug/L	<0.50	4.0	0.50	03/23/16 21:02	
1,2,4-Trichlorobenzene	ug/L	<0.22	1.0	0.22	03/23/16 21:02	
1,2,4-Trimethylbenzene	ug/L	<0.16	1.0	0.16	03/23/16 21:02	
1,2-Dibromo-3-chloropropane	ug/L	<0.70	4.0	0.70	03/23/16 21:02	
1,2-Dibromoethane (EDB)	ug/L	<0.23	1.0	0.23	03/23/16 21:02	
1,2-Dichlorobenzene	ug/L	<0.22	1.0	0.22	03/23/16 21:02	
1,2-Dichloroethane	ug/L	<0.17	1.0	0.17	03/23/16 21:02	
1,2-Dichloropropane	ug/L	<0.42	4.0	0.42	03/23/16 21:02	
1,3,5-Trimethylbenzene	ug/L	<0.20	1.0	0.20	03/23/16 21:02	
1,3-Dichlorobenzene	ug/L	<0.21	1.0	0.21	03/23/16 21:02	
1,3-Dichloropropane	ug/L	<0.24	1.0	0.24	03/23/16 21:02	
1,4-Dichlorobenzene	ug/L	<0.16	1.0	0.16	03/23/16 21:02	
2,2-Dichloropropane	ug/L	<0.36	4.0	0.36	03/23/16 21:02	
2-Butanone (MEK)	ug/L	<2.5	5.0	2.5	03/23/16 21:02	
2-Chlorotoluene	ug/L	<0.22	1.0	0.22	03/23/16 21:02	
4-Chlorotoluene	ug/L	<0.24	1.0	0.24	03/23/16 21:02	
4-Methyl-2-pentanone (MIBK)	ug/L	<2.4	5.0	2.4	03/23/16 21:02	
Acetone	ug/L	<7.1	20.0	7.1	03/23/16 21:02	
Allyl chloride	ug/L	<0.58	4.0	0.58	03/23/16 21:02	
Benzene	ug/L	<0.21	1.0	0.21	03/23/16 21:02	
Bromobenzene	ug/L	<0.25	1.0	0.25	03/23/16 21:02	
Bromochloromethane	ug/L	<0.34	1.0	0.34	03/23/16 21:02	
Bromodichloromethane	ug/L	<0.18	1.0	0.18	03/23/16 21:02	
Bromoform	ug/L	<0.41	4.0	0.41	03/23/16 21:02	
Bromomethane	ug/L	<0.36	4.0	0.36	03/23/16 21:02	CL
Carbon tetrachloride	ug/L	<0.35	1.0	0.35	03/23/16 21:02	
Chlorobenzene	ug/L	<0.23	1.0	0.23	03/23/16 21:02	
Chloroethane	ug/L	<0.34	1.0	0.34	03/23/16 21:02	
Chloroform	ug/L	<0.27	1.0	0.27	03/23/16 21:02	
Chloromethane	ug/L	<0.64	4.0	0.64	03/23/16 21:02	
cis-1,2-Dichloroethene	ug/L	<0.25	1.0	0.25	03/23/16 21:02	
cis-1,3-Dichloropropene	ug/L	<0.21	4.0	0.21	03/23/16 21:02	

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QUALITY CONTROL DATA

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

METHOD BLANK: 2215533 Matrix: Water
Associated Lab Samples: 10341911002, 10341911003, 10341911004, 10341911005, 10341911006, 10341911007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Dibromochloromethane	ug/L	<0.16	1.0	0.16	03/23/16 21:02	
Dibromomethane	ug/L	<0.31	4.0	0.31	03/23/16 21:02	
Dichlorodifluoromethane	ug/L	<0.49	1.0	0.49	03/23/16 21:02	
Dichlorofluoromethane	ug/L	<0.22	1.0	0.22	03/23/16 21:02	
Diethyl ether (Ethyl ether)	ug/L	<0.38	4.0	0.38	03/23/16 21:02	
Ethylbenzene	ug/L	<0.23	1.0	0.23	03/23/16 21:02	
Hexachloro-1,3-butadiene	ug/L	<0.48	1.0	0.48	03/23/16 21:02	
Isopropylbenzene (Cumene)	ug/L	<0.17	1.0	0.17	03/23/16 21:02	
Methyl-tert-butyl ether	ug/L	<0.20	1.0	0.20	03/23/16 21:02	
Methylene Chloride	ug/L	<0.56	4.0	0.56	03/23/16 21:02	
n-Butylbenzene	ug/L	<0.083	1.0	0.083	03/23/16 21:02	
n-Propylbenzene	ug/L	<0.21	1.0	0.21	03/23/16 21:02	
Naphthalene	ug/L	<0.14	4.0	0.14	03/23/16 21:02	
p-Isopropyltoluene	ug/L	<0.16	1.0	0.16	03/23/16 21:02	
sec-Butylbenzene	ug/L	<0.16	1.0	0.16	03/23/16 21:02	
Styrene	ug/L	<0.11	1.0	0.11	03/23/16 21:02	
tert-Butylbenzene	ug/L	<0.18	1.0	0.18	03/23/16 21:02	
Tetrachloroethene	ug/L	<0.19	1.0	0.19	03/23/16 21:02	
Tetrahydrofuran	ug/L	<4.0	10.0	4.0	03/23/16 21:02	
Toluene	ug/L	<0.13	1.0	0.13	03/23/16 21:02	
trans-1,2-Dichloroethene	ug/L	<0.21	1.0	0.21	03/23/16 21:02	
trans-1,3-Dichloropropene	ug/L	<0.22	4.0	0.22	03/23/16 21:02	
Trichloroethene	ug/L	<0.14	0.40	0.14	03/23/16 21:02	
Trichlorofluoromethane	ug/L	<0.18	1.0	0.18	03/23/16 21:02	
Vinyl chloride	ug/L	<0.15	0.40	0.15	03/23/16 21:02	
Xylene (Total)	ug/L	<0.60	3.0	0.60	03/23/16 21:02	
1,2-Dichloroethane-d4 (S)	%.	97	75-125		03/23/16 21:02	
4-Bromofluorobenzene (S)	%.	92	75-125		03/23/16 21:02	
Toluene-d8 (S)	%.	89	75-125		03/23/16 21:02	

LABORATORY CONTROL SAMPLE: 2215534

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	21.2	106	75-125	
1,1,1-Trichloroethane	ug/L	20	20.1	100	73-125	
1,1,2,2-Tetrachloroethane	ug/L	20	19.4	97	75-128	
1,1,2-Trichloroethane	ug/L	20	21.6	108	75-129	
1,1,2-Trichlorotrifluoroethane	ug/L	20	18.0	90	69-125	
1,1-Dichloroethane	ug/L	20	18.9	94	75-131	
1,1-Dichloroethene	ug/L	20	18.2	91	72-125	
1,1-Dichloropropene	ug/L	20	18.2	91	74-125	
1,2,3-Trichlorobenzene	ug/L	20	19.2	96	68-127	
1,2,3-Trichloropropane	ug/L	20	19.1	95	75-125	
1,2,4-Trichlorobenzene	ug/L	20	15.7	78	70-125	

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QUALITY CONTROL DATA

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

LABORATORY CONTROL SAMPLE: 2215534

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	19.4	97	75-130	
1,2-Dibromo-3-chloropropane	ug/L	50	43.2	86	74-125	
1,2-Dibromoethane (EDB)	ug/L	20	20.1	100	75-125	
1,2-Dichlorobenzene	ug/L	20	19.8	99	75-125	
1,2-Dichloroethane	ug/L	20	18.1	91	72-129	
1,2-Dichloropropane	ug/L	20	19.7	98	71-129	
1,3,5-Trimethylbenzene	ug/L	20	18.5	92	75-127	
1,3-Dichlorobenzene	ug/L	20	19.3	97	75-125	
1,3-Dichloropropane	ug/L	20	20.6	103	75-125	
1,4-Dichlorobenzene	ug/L	20	19.2	96	75-125	
2,2-Dichloropropane	ug/L	20	18.6	93	71-125	
2-Butanone (MEK)	ug/L	100	79.2	79	58-150	
2-Chlorotoluene	ug/L	20	17.6	88	75-125	
4-Chlorotoluene	ug/L	20	19.5	98	75-130	
4-Methyl-2-pentanone (MIBK)	ug/L	100	104	104	72-140	
Acetone	ug/L	100	84.8	85	69-137	
Allyl chloride	ug/L	20	18.3	91	68-132	
Benzene	ug/L	20	18.1	91	75-125	
Bromobenzene	ug/L	20	20.2	101	75-125	
Bromochloromethane	ug/L	20	18.8	94	75-125	
Bromodichloromethane	ug/L	20	20.8	104	69-128	
Bromoform	ug/L	20	19.4	97	75-125	
Bromomethane	ug/L	20	12.0	60	30-150	CL
Carbon tetrachloride	ug/L	20	19.9	99	74-125	
Chlorobenzene	ug/L	20	20.0	100	75-125	
Chloroethane	ug/L	20	13.8	69	60-150	
Chloroform	ug/L	20	17.6	88	75-126	
Chloromethane	ug/L	20	13.8	69	46-150	
cis-1,2-Dichloroethene	ug/L	20	20.3	101	75-126	
cis-1,3-Dichloropropene	ug/L	20	19.5	97	75-125	
Dibromochloromethane	ug/L	20	20.8	104	75-125	
Dibromomethane	ug/L	20	19.5	98	72-127	
Dichlorodifluoromethane	ug/L	20	19.8	99	58-135	
Dichlorofluoromethane	ug/L	20	16.7	84	68-149	
Diethyl ether (Ethyl ether)	ug/L	20	16.6	83	66-144	
Ethylbenzene	ug/L	20	18.8	94	75-125	
Hexachloro-1,3-butadiene	ug/L	20	17.9	89	73-125	
Isopropylbenzene (Cumene)	ug/L	20	21.0	105	69-140	
Methyl-tert-butyl ether	ug/L	20	18.1	90	75-126	
Methylene Chloride	ug/L	20	17.3	87	71-130	
n-Butylbenzene	ug/L	20	19.2	96	71-129	
n-Propylbenzene	ug/L	20	19.3	97	71-133	
Naphthalene	ug/L	20	17.3	86	59-137	
p-Isopropyltoluene	ug/L	20	19.9	99	74-127	
sec-Butylbenzene	ug/L	20	19.9	99	66-140	
Styrene	ug/L	20	20.7	103	75-125	
tert-Butylbenzene	ug/L	20	19.8	99	73-129	

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QUALITY CONTROL DATA

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

LABORATORY CONTROL SAMPLE: 2215534

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	ug/L	20	19.4	97	75-125	
Tetrahydrofuran	ug/L	200	172	86	71-129	
Toluene	ug/L	20	20.5	102	75-125	
trans-1,2-Dichloroethene	ug/L	20	19.9	99	75-125	
trans-1,3-Dichloropropene	ug/L	20	19.6	98	75-125	
Trichloroethene	ug/L	20	19.4	97	75-125	
Trichlorofluoromethane	ug/L	20	16.8	84	74-128	
Vinyl chloride	ug/L	20	16.5	82	71-131	
Xylene (Total)	ug/L	60	62.1	103	75-125	
1,2-Dichloroethane-d4 (S)	%.			103	75-125	
4-Bromofluorobenzene (S)	%.			101	75-125	
Toluene-d8 (S)	%.			103	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2215829 2215830

Parameter	Units	10341996012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1,2-Tetrachloroethane	ug/L	ND	20	20	19.9	20.4	99	102	75-125	3	30	
1,1,1-Trichloroethane	ug/L	ND	20	20	19.7	20.5	99	103	71-144	4	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	20	20	25.4	17.7	127	88	75-131	36	30	R1
1,1,2-Trichloroethane	ug/L	ND	20	20	18.8	18.7	94	93	75-125	1	30	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	20	20	24.1	30.0	121	150	75-150	22	30	
1,1-Dichloroethane	ug/L	ND	20	20	22.4	23.9	112	120	64-150	7	30	
1,1-Dichloroethene	ug/L	ND	20	20	22.1	27.8	111	139	68-150	23	30	
1,1-Dichloropropene	ug/L	ND	20	20	17.8	18.5	89	92	68-145	4	30	
1,2,3-Trichlorobenzene	ug/L	ND	20	20	23.9	20.4	120	102	57-142	16	30	
1,2,3-Trichloropropane	ug/L	ND	20	20	26.1	18.5	131	93	75-125	34	30	M1,R1
1,2,4-Trichlorobenzene	ug/L	ND	20	20	24.7	19.1	123	95	60-135	26	30	
1,2,4-Trimethylbenzene	ug/L	ND	20	20	18.3	18.4	91	92	67-148	0	30	
1,2-Dibromo-3-chloropropane	ug/L	ND	50	50	57.7	49.1	115	98	32-137	16	30	
1,2-Dibromoethane (EDB)	ug/L	ND	20	20	18.6	18.8	93	94	75-125	1	30	
1,2-Dichlorobenzene	ug/L	ND	20	20	19.2	18.5	96	93	75-125	3	30	
1,2-Dichloroethane	ug/L	ND	20	20	16.9	16.2	85	81	62-138	5	30	
1,2-Dichloropropane	ug/L	ND	20	20	18.6	17.5	93	88	62-144	6	30	
1,3,5-Trimethylbenzene	ug/L	ND	20	20	26.0	18.5	130	92	67-148	34	30	R1
1,3-Dichlorobenzene	ug/L	ND	20	20	18.0	17.7	90	88	74-131	2	30	
1,3-Dichloropropane	ug/L	ND	20	20	18.8	17.8	94	89	75-127	5	30	
1,4-Dichlorobenzene	ug/L	ND	20	20	18.1	17.5	90	87	74-126	3	30	
2,2-Dichloropropane	ug/L	ND	20	20	21.8	18.1	109	90	56-146	18	30	
2-Butanone (MEK)	ug/L	ND	100	100	76.0	85.2	76	85	47-150	11	30	
2-Chlorotoluene	ug/L	ND	20	20	25.5	18.3	128	91	74-137	33	30	R1
4-Chlorotoluene	ug/L	ND	20	20	25.7	18.1	129	91	72-138	35	30	R1
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	100	87.8	89.7	88	90	60-147	2	30	
Acetone	ug/L	ND	100	100	89.0	99.9	89	100	61-150	12	30	

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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1700 Elm Street - Suite 200
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(612)607-1700

QUALITY CONTROL DATA

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2215829 2215830

Parameter	Units	10341996012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Allyl chloride	ug/L	ND	20	20	22.5	23.3	112	117	53-150	4	30	
Benzene	ug/L	ND	20	20	17.1	16.4	85	82	52-147	4	30	
Bromobenzene	ug/L	ND	20	20	25.8	18.6	129	93	75-129	32	30	R1
Bromochloromethane	ug/L	ND	20	20	22.8	18.9	114	94	72-128	19	30	
Bromodichloromethane	ug/L	ND	20	20	20.1	19.6	100	98	65-137	2	30	
Bromoform	ug/L	ND	20	20	15.9	17.1	80	86	59-133	7	30	
Bromomethane	ug/L	ND	20	20	16.3	18.2	81	91	30-150	11	30	CL
Carbon tetrachloride	ug/L	ND	20	20	26.0	21.0	130	105	73-144	21	30	
Chlorobenzene	ug/L	ND	20	20	18.4	18.8	92	94	75-126	2	30	
Chloroethane	ug/L	ND	20	20	18.3	23.5	91	117	55-150	25	30	
Chloroform	ug/L	ND	20	20	21.3	16.4	107	82	66-143	26	30	
Chloromethane	ug/L	ND	20	20	20.1	26.3	100	131	42-150	27	30	
cis-1,2-Dichloroethene	ug/L	ND	20	20	24.4	21.4	122	107	65-143	13	30	
cis-1,3-Dichloropropene	ug/L	ND	20	20	18.9	17.9	95	90	75-125	5	30	
Dibromochloromethane	ug/L	ND	20	20	18.5	18.8	92	94	75-125	2	30	
Dibromomethane	ug/L	ND	20	20	19.5	19.7	98	98	66-133	1	30	
Dichlorodifluoromethane	ug/L	ND	20	20	31.4	35.6	157	178	74-150	13	30	M1
Dichlorofluoromethane	ug/L	ND	20	20	20.6	24.0	103	120	68-150	15	30	
Diethyl ether (Ethyl ether)	ug/L	ND	20	20	19.0	24.0	95	120	57-148	23	30	
Ethylbenzene	ug/L	ND	20	20	17.9	18.2	89	91	67-149	2	30	
Hexachloro-1,3-butadiene	ug/L	ND	20	20	28.8	24.1	144	121	65-143	18	30	M1
Isopropylbenzene (Cumene)	ug/L	ND	20	20	19.5	19.5	98	97	64-150	0	30	
Methyl-tert-butyl ether	ug/L	ND	20	20	21.6	23.4	108	117	71-130	8	30	
Methylene Chloride	ug/L	ND	20	20	21.2	18.8	106	94	67-137	12	30	
n-Butylbenzene	ug/L	ND	20	20	18.5	18.7	93	93	70-138	1	30	
n-Propylbenzene	ug/L	ND	20	20	25.9	18.2	130	91	70-148	35	30	R1
Naphthalene	ug/L	ND	20	20	22.7	18.4	114	92	39-150	21	30	
p-Isopropyltoluene	ug/L	ND	20	20	19.1	18.9	96	95	74-138	1	30	
sec-Butylbenzene	ug/L	ND	20	20	18.9	18.8	94	94	64-150	0	30	
Styrene	ug/L	ND	20	20	18.7	18.2	93	91	75-132	2	30	
tert-Butylbenzene	ug/L	ND	20	20	19.0	18.9	95	95	75-138	1	30	
Tetrachloroethene	ug/L	ND	20	20	18.2	18.6	91	93	73-136	2	30	
Tetrahydrofuran	ug/L	ND	200	200	155	146	78	73	68-142	6	30	
Toluene	ug/L	ND	20	20	17.8	17.9	89	89	69-139	0	30	
trans-1,2-Dichloroethene	ug/L	ND	20	20	21.6	25.7	108	128	75-135	18	30	
trans-1,3-Dichloropropene	ug/L	ND	20	20	17.5	18.3	88	91	66-136	4	30	
Trichloroethene	ug/L	ND	20	20	20.2	19.3	101	97	74-135	5	30	
Trichlorofluoromethane	ug/L	ND	20	20	24.1	28.3	121	141	75-150	16	30	
Vinyl chloride	ug/L	ND	20	20	22.5	27.6	113	138	69-150	20	30	
Xylene (Total)	ug/L	ND	60	60	57.5	56.4	96	94	70-147	2	30	
1,2-Dichloroethane-d4 (S)	%.						102	102	75-125			
4-Bromofluorobenzene (S)	%.						135	96	75-125			S0
Toluene-d8 (S)	%.						98	99	75-125			

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REPORT OF LABORATORY ANALYSIS

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(612)607-1700

QUALIFIERS

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

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 decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

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

CL	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.
S0	Surrogate recovery outside laboratory control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: BNSF-Mission Wye Revised
Pace Project No.: 10341911

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10341911001	**MW-9/03152016**	EPA 8260B	MSV/34949		
10341911002	**FB-01/03152016**	EPA 8260B	MSV/34962		
10341911003	**EB-01/03152016**	EPA 8260B	MSV/34962		
10341911004	**MW-DUP/03152016**	EPA 8260B	MSV/34962		
10341911005	**MW-4/03152016**	EPA 8260B	MSV/34962		
10341911006	**MW-3/03152016**	EPA 8260B	MSV/34962		
10341911007	**Trip Blank**	EPA 8260B	MSV/34962		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10341911

Page: 1 of 1

1928981

Section A Required Client Information:

Company: AECOM
Address: 207 N. Broadway, Ste. 315, Billings, MT 59101
Email To: shelly.young@aecom.com
Phone: Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: Shelly.young@aecom.com
Copy To: Cole.grover@aecom.com
Purchase Order No.: TT9095-QOS
Project Name: BNSF - Mission Wye
Project Number:

Section C Invoice Information:

Attention: Shelly Young / Cole Grover
Company Name: AECOM
Address: SAA
Pace Quote Reference:
Pace Project Manager: Carol Davies
Pace Profile #: 32797

REGULATORY AGENCY

☐ NPDES ☒ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MT

Section D Required Client Information

Matrix Codes MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N): Y

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	Composite Start TIME	Composite End/Grab DATE	Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test (Y/N)	VOCs (8260B)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-9/03152016	WT	G			3-15-16	1614		3				X						X		001
2	FB-01/03152016						1605		3				X						X		002
3	EB-01/03152016						1625		3				X						X		003
4	MW-DUP/03152016						1700		3				X						X		004
5	MW-4/03152016						1707		3				X						X		005
6	MW-3/03152016						1752		3				X						X		006
7	Trip Blank					—	—		2				X						X		007
8																					
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Cole R. Grover / AECOM	3-16-2016	1530	(illegible) / Pace	3/17/16	945	1.1	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Cole R. Grover
SIGNATURE of SAMPLER: Cole R. Grover
DATE Signed (MM/DD/YY): 3-16-2016

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 05Jan2016 Page 1 of 1
	Document No.: **F-MN-L-213-rev.15**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: AECOM

Project #: WO#: 10341911 (10341911)

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 7826 1203 1866

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

Thermometer Used: ☐ 151401163 ☑ B88A912167504 ☐ 151401164 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.0 **Cooler Temp Corrected (°C):** 1.1 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** +0.1 **Date and Initials of Person Examining Contents:** CMB 3/17/16

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or WA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				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. Note if sediment is visible in the dissolved container
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: water	☑ 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	
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☑ Yes	☐ No	☐ N/A	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: Carol Doug **Date:** 3/18/16

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

July 13, 2016

Shelly Young
AECOM, Inc.
207 North Broadway, Suite 315
Billings, MT 59101

RE: Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Dear Shelly Young:
Enclosed are the analytical results for sample(s) received by the laboratory on July 06, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

cc: Mr. Yueh Chuang, BNSF Railway
Mark Engdahl, BNSF Railway Company
Cole Grover, AECOM

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CERTIFICATIONS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
525 N 8th Street, Salina, KS 67401
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: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10354639001	**FB-01/06302016**	Water	06/30/16 11:15	07/06/16 09:50
10354639002	**MW-01/06302016**	Water	06/30/16 11:25	07/06/16 09:50
10354639003	**MW-9/06302016**	Water	06/30/16 13:02	07/06/16 09:50
10354639004	**MW-4/06302016**	Water	06/30/16 15:00	07/06/16 09:50
10354639005	**EB/01/06302016**	Water	06/30/16 15:05	07/06/16 09:50
10354639006	**MW-DUP/06302016**	Water	06/30/16 14:14	07/06/16 09:50
10354639007	**MW-3/06302016**	Water	06/30/16 15:55	07/06/16 09:50
10354639008	**MW-22/06302016**	Water	06/30/16 16:35	07/06/16 09:50
10354639009	**Trip Blank**	Water	06/30/16 00:00	07/06/16 09:50

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SAMPLE ANALYTE COUNT

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10354639001	**FB-01/06302016**	EPA 8260B	EMC	70	PASI-M
10354639002	**MW-01/06302016**	EPA 8260B	EMC	70	PASI-M
10354639003	**MW-9/06302016**	EPA 8260B	EMC	70	PASI-M
10354639004	**MW-4/06302016**	EPA 8260B	EMC	70	PASI-M
10354639005	**EB/01/06302016**	EPA 8260B	EMC	70	PASI-M
10354639006	**MW-DUP/06302016**	EPA 8260B	EMC	70	PASI-M
10354639007	**MW-3/06302016**	EPA 8260B	EMC	70	PASI-M
10354639008	**MW-22/06302016**	EPA 8260B	EMC	70	PASI-M
10354639009	**Trip Blank**	EPA 8260B	EMC	70	PASI-M

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PROJECT NARRATIVE

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: July 13, 2016

General Information:
9 samples were analyzed for EPA 8260B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

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.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates 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: 424665

B: Analyte was detected in the associated method blank.

- BLANK for HBN 424665 [MSV/3624 (Lab ID: 2313627)
  - 1,2,4-Trimethylbenzene
  - 1,2-Dichloroethane
  - 1,4-Dichlorobenzene
  - Acetone
  - Methylene Chloride
  - Naphthalene

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits 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:

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: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: FB-01/06302016 **Lab ID: 10354639001** Collected: 06/30/16 11:15 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/12/16 00:59	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/12/16 00:59	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 00:59	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/12/16 00:59	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/12/16 00:59	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/12/16 00:59	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/12/16 00:59	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/12/16 00:59	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/12/16 00:59	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/12/16 00:59	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/12/16 00:59	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/12/16 00:59	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/12/16 00:59	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/12/16 00:59	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/12/16 00:59	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/12/16 00:59	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/12/16 00:59	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/12/16 00:59	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/12/16 00:59	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/12/16 00:59	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/12/16 00:59	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/12/16 00:59	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/12/16 00:59	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/12/16 00:59	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/12/16 00:59	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/12/16 00:59	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/12/16 00:59	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 00:59	75-34-3	
1,2-Dichloroethane	**0.13J**	ug/L	1.0	0.072	1		07/12/16 00:59	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/12/16 00:59	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/12/16 00:59	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/12/16 00:59	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/12/16 00:59	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/12/16 00:59	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/12/16 00:59	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/12/16 00:59	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/12/16 00:59	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/12/16 00:59	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/12/16 00:59	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/12/16 00:59	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/12/16 00:59	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/12/16 00:59	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/12/16 00:59	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/12/16 00:59	99-87-6	
Methylene Chloride	**0.45J**	ug/L	4.0	0.097	1		07/12/16 00:59	75-09-2	B
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/12/16 00:59	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: FB-01/06302016 **Lab ID: 10354639001** Collected: 06/30/16 11:15 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/12/16 00:59	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/12/16 00:59	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/12/16 00:59	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/12/16 00:59	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 00:59	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 00:59	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/12/16 00:59	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/12/16 00:59	109-99-9	
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/12/16 00:59	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/12/16 00:59	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/12/16 00:59	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/12/16 00:59	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 00:59	79-00-5	
Trichloroethene	**<0.051**	ug/L	0.40	0.051	1		07/12/16 00:59	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 00:59	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/12/16 00:59	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/12/16 00:59	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/12/16 00:59	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 00:59	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/12/16 00:59	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/12/16 00:59	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	104	%.	75-125		1		07/12/16 00:59	17060-07-0	
Toluene-d8 (S)	97	%.	75-125		1		07/12/16 00:59	2037-26-5	
4-Bromofluorobenzene (S)	101	%.	75-125		1		07/12/16 00:59	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: MW-01/06302016 **Lab ID: 10354639002** Collected: 06/30/16 11:25 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/12/16 02:21	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/12/16 02:21	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 02:21	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/12/16 02:21	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/12/16 02:21	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/12/16 02:21	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/12/16 02:21	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/12/16 02:21	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/12/16 02:21	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/12/16 02:21	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/12/16 02:21	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/12/16 02:21	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/12/16 02:21	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/12/16 02:21	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/12/16 02:21	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/12/16 02:21	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/12/16 02:21	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/12/16 02:21	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/12/16 02:21	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/12/16 02:21	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/12/16 02:21	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/12/16 02:21	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/12/16 02:21	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/12/16 02:21	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/12/16 02:21	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/12/16 02:21	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/12/16 02:21	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 02:21	75-34-3	
1,2-Dichloroethane	**0.19J**	ug/L	1.0	0.072	1		07/12/16 02:21	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/12/16 02:21	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/12/16 02:21	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/12/16 02:21	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/12/16 02:21	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/12/16 02:21	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/12/16 02:21	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/12/16 02:21	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/12/16 02:21	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/12/16 02:21	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/12/16 02:21	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/12/16 02:21	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/12/16 02:21	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/12/16 02:21	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/12/16 02:21	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/12/16 02:21	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/12/16 02:21	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/12/16 02:21	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: MW-01/06302016 **Lab ID: 10354639002** Collected: 06/30/16 11:25 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/12/16 02:21	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/12/16 02:21	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/12/16 02:21	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/12/16 02:21	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 02:21	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 02:21	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/12/16 02:21	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/12/16 02:21	109-99-9	
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/12/16 02:21	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/12/16 02:21	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/12/16 02:21	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/12/16 02:21	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 02:21	79-00-5	
Trichloroethene	**<0.051**	ug/L	0.40	0.051	1		07/12/16 02:21	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 02:21	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/12/16 02:21	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/12/16 02:21	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/12/16 02:21	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 02:21	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/12/16 02:21	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/12/16 02:21	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	106	%.	75-125		1		07/12/16 02:21	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/12/16 02:21	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	75-125		1		07/12/16 02:21	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: MW-9/06302016 **Lab ID: 10354639003** Collected: 06/30/16 13:02 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**0.96J**	ug/L	20.0	0.64	1		07/12/16 02:37	67-64-1	B
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/12/16 02:37	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 02:37	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/12/16 02:37	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/12/16 02:37	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/12/16 02:37	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/12/16 02:37	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/12/16 02:37	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/12/16 02:37	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/12/16 02:37	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/12/16 02:37	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/12/16 02:37	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/12/16 02:37	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/12/16 02:37	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/12/16 02:37	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/12/16 02:37	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/12/16 02:37	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/12/16 02:37	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/12/16 02:37	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/12/16 02:37	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/12/16 02:37	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/12/16 02:37	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/12/16 02:37	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/12/16 02:37	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/12/16 02:37	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/12/16 02:37	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/12/16 02:37	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 02:37	75-34-3	
1,2-Dichloroethane	**0.13J**	ug/L	1.0	0.072	1		07/12/16 02:37	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/12/16 02:37	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/12/16 02:37	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/12/16 02:37	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/12/16 02:37	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/12/16 02:37	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/12/16 02:37	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/12/16 02:37	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/12/16 02:37	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/12/16 02:37	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/12/16 02:37	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/12/16 02:37	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/12/16 02:37	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/12/16 02:37	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/12/16 02:37	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/12/16 02:37	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/12/16 02:37	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/12/16 02:37	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: MW-9/06302016 **Lab ID: 10354639003** Collected: 06/30/16 13:02 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/12/16 02:37	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/12/16 02:37	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/12/16 02:37	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/12/16 02:37	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 02:37	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 02:37	79-34-5	
Tetrachloroethene	**0.97J**	ug/L	1.0	0.13	1		07/12/16 02:37	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/12/16 02:37	109-99-9	
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/12/16 02:37	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/12/16 02:37	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/12/16 02:37	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/12/16 02:37	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 02:37	79-00-5	
Trichloroethene	**0.33J**	ug/L	0.40	0.051	1		07/12/16 02:37	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 02:37	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/12/16 02:37	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/12/16 02:37	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/12/16 02:37	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 02:37	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/12/16 02:37	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/12/16 02:37	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	101	%.	75-125		1		07/12/16 02:37	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		07/12/16 02:37	2037-26-5	
4-Bromofluorobenzene (S)	101	%.	75-125		1		07/12/16 02:37	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: MW-4/06302016 **Lab ID: 10354639004** Collected: 06/30/16 15:00 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/12/16 02:53	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/12/16 02:53	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 02:53	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/12/16 02:53	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/12/16 02:53	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/12/16 02:53	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/12/16 02:53	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/12/16 02:53	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/12/16 02:53	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/12/16 02:53	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/12/16 02:53	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/12/16 02:53	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/12/16 02:53	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/12/16 02:53	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/12/16 02:53	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/12/16 02:53	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/12/16 02:53	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/12/16 02:53	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/12/16 02:53	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/12/16 02:53	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/12/16 02:53	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/12/16 02:53	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/12/16 02:53	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/12/16 02:53	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/12/16 02:53	541-73-1	
1,4-Dichlorobenzene	**0.34J**	ug/L	1.0	0.081	1		07/12/16 02:53	106-46-7	B
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/12/16 02:53	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 02:53	75-34-3	
1,2-Dichloroethane	**0.12J**	ug/L	1.0	0.072	1		07/12/16 02:53	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/12/16 02:53	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/12/16 02:53	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/12/16 02:53	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/12/16 02:53	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/12/16 02:53	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/12/16 02:53	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/12/16 02:53	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/12/16 02:53	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/12/16 02:53	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/12/16 02:53	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/12/16 02:53	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/12/16 02:53	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/12/16 02:53	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/12/16 02:53	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/12/16 02:53	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/12/16 02:53	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/12/16 02:53	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: MW-4/06302016 **Lab ID: 10354639004** Collected: 06/30/16 15:00 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/12/16 02:53	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/12/16 02:53	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/12/16 02:53	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/12/16 02:53	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 02:53	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 02:53	79-34-5	
Tetrachloroethene	**1.3**	ug/L	1.0	0.13	1		07/12/16 02:53	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/12/16 02:53	109-99-9	
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/12/16 02:53	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/12/16 02:53	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/12/16 02:53	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/12/16 02:53	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 02:53	79-00-5	
Trichloroethene	**0.54**	ug/L	0.40	0.051	1		07/12/16 02:53	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 02:53	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/12/16 02:53	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/12/16 02:53	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/12/16 02:53	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 02:53	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/12/16 02:53	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/12/16 02:53	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	102	%.	75-125		1		07/12/16 02:53	17060-07-0	
Toluene-d8 (S)	97	%.	75-125		1		07/12/16 02:53	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	75-125		1		07/12/16 02:53	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: EB/01/06302016 **Lab ID: 10354639005** Collected: 06/30/16 15:05 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**1.6J**	ug/L	20.0	0.64	1		07/12/16 01:15	67-64-1	B
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/12/16 01:15	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 01:15	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/12/16 01:15	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/12/16 01:15	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/12/16 01:15	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/12/16 01:15	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/12/16 01:15	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/12/16 01:15	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/12/16 01:15	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/12/16 01:15	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/12/16 01:15	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/12/16 01:15	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/12/16 01:15	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/12/16 01:15	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/12/16 01:15	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/12/16 01:15	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/12/16 01:15	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/12/16 01:15	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/12/16 01:15	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/12/16 01:15	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/12/16 01:15	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/12/16 01:15	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/12/16 01:15	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/12/16 01:15	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/12/16 01:15	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/12/16 01:15	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 01:15	75-34-3	
1,2-Dichloroethane	**0.16J**	ug/L	1.0	0.072	1		07/12/16 01:15	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/12/16 01:15	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/12/16 01:15	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/12/16 01:15	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/12/16 01:15	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/12/16 01:15	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/12/16 01:15	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/12/16 01:15	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/12/16 01:15	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/12/16 01:15	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/12/16 01:15	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/12/16 01:15	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/12/16 01:15	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/12/16 01:15	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/12/16 01:15	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/12/16 01:15	99-87-6	
Methylene Chloride	**0.45J**	ug/L	4.0	0.097	1		07/12/16 01:15	75-09-2	B
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/12/16 01:15	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: EB/01/06302016 **Lab ID: 10354639005** Collected: 06/30/16 15:05 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/12/16 01:15	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/12/16 01:15	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/12/16 01:15	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/12/16 01:15	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 01:15	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 01:15	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/12/16 01:15	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/12/16 01:15	109-99-9	
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/12/16 01:15	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/12/16 01:15	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/12/16 01:15	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/12/16 01:15	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 01:15	79-00-5	
Trichloroethene	**<0.051**	ug/L	0.40	0.051	1		07/12/16 01:15	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 01:15	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/12/16 01:15	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/12/16 01:15	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/12/16 01:15	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 01:15	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/12/16 01:15	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/12/16 01:15	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	102	%.	75-125		1		07/12/16 01:15	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		07/12/16 01:15	2037-26-5	
4-Bromofluorobenzene (S)	101	%.	75-125		1		07/12/16 01:15	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: MW-DUP/06302016 **Lab ID: 10354639006** Collected: 06/30/16 14:14 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/12/16 03:58	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/12/16 03:58	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 03:58	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/12/16 03:58	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/12/16 03:58	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/12/16 03:58	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/12/16 03:58	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/12/16 03:58	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/12/16 03:58	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/12/16 03:58	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/12/16 03:58	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/12/16 03:58	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/12/16 03:58	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/12/16 03:58	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/12/16 03:58	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/12/16 03:58	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/12/16 03:58	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/12/16 03:58	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/12/16 03:58	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/12/16 03:58	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/12/16 03:58	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/12/16 03:58	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/12/16 03:58	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/12/16 03:58	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/12/16 03:58	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/12/16 03:58	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/12/16 03:58	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 03:58	75-34-3	
1,2-Dichloroethane	**0.16J**	ug/L	1.0	0.072	1		07/12/16 03:58	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/12/16 03:58	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/12/16 03:58	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/12/16 03:58	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/12/16 03:58	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/12/16 03:58	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/12/16 03:58	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/12/16 03:58	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/12/16 03:58	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/12/16 03:58	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/12/16 03:58	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/12/16 03:58	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/12/16 03:58	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/12/16 03:58	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/12/16 03:58	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/12/16 03:58	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/12/16 03:58	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/12/16 03:58	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: MW-DUP/06302016 **Lab ID: 10354639006** Collected: 06/30/16 14:14 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/12/16 03:58	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/12/16 03:58	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/12/16 03:58	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/12/16 03:58	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 03:58	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 03:58	79-34-5	
Tetrachloroethene	**5.5**	ug/L	1.0	0.13	1		07/12/16 03:58	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/12/16 03:58	109-99-9	
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/12/16 03:58	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/12/16 03:58	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/12/16 03:58	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/12/16 03:58	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 03:58	79-00-5	
Trichloroethene	**0.33J**	ug/L	0.40	0.051	1		07/12/16 03:58	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 03:58	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/12/16 03:58	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/12/16 03:58	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/12/16 03:58	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 03:58	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/12/16 03:58	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/12/16 03:58	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	101	%.	75-125		1		07/12/16 03:58	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/12/16 03:58	2037-26-5	
4-Bromofluorobenzene (S)	101	%.	75-125		1		07/12/16 03:58	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: MW-3/06302016 **Lab ID: 10354639007** Collected: 06/30/16 15:55 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/12/16 04:15	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/12/16 04:15	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 04:15	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/12/16 04:15	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/12/16 04:15	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/12/16 04:15	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/12/16 04:15	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/12/16 04:15	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/12/16 04:15	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/12/16 04:15	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/12/16 04:15	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/12/16 04:15	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/12/16 04:15	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/12/16 04:15	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/12/16 04:15	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/12/16 04:15	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/12/16 04:15	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/12/16 04:15	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/12/16 04:15	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/12/16 04:15	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/12/16 04:15	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/12/16 04:15	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/12/16 04:15	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/12/16 04:15	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/12/16 04:15	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/12/16 04:15	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/12/16 04:15	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 04:15	75-34-3	
1,2-Dichloroethane	**0.15J**	ug/L	1.0	0.072	1		07/12/16 04:15	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/12/16 04:15	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/12/16 04:15	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/12/16 04:15	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/12/16 04:15	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/12/16 04:15	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/12/16 04:15	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/12/16 04:15	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/12/16 04:15	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/12/16 04:15	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/12/16 04:15	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/12/16 04:15	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/12/16 04:15	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/12/16 04:15	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/12/16 04:15	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/12/16 04:15	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/12/16 04:15	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/12/16 04:15	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: MW-3/06302016 **Lab ID: 10354639007** Collected: 06/30/16 15:55 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/12/16 04:15	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/12/16 04:15	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/12/16 04:15	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/12/16 04:15	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 04:15	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 04:15	79-34-5	
Tetrachloroethene	**5.2**	ug/L	1.0	0.13	1		07/12/16 04:15	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/12/16 04:15	109-99-9	
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/12/16 04:15	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/12/16 04:15	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/12/16 04:15	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/12/16 04:15	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 04:15	79-00-5	
Trichloroethene	**0.30J**	ug/L	0.40	0.051	1		07/12/16 04:15	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 04:15	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/12/16 04:15	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/12/16 04:15	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/12/16 04:15	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 04:15	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/12/16 04:15	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/12/16 04:15	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	104	%.	75-125		1		07/12/16 04:15	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/12/16 04:15	2037-26-5	
4-Bromofluorobenzene (S)	100	%.	75-125		1		07/12/16 04:15	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: MW-22/06302016 **Lab ID: 10354639008** Collected: 06/30/16 16:35 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/12/16 03:10	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/12/16 03:10	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 03:10	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/12/16 03:10	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/12/16 03:10	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/12/16 03:10	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/12/16 03:10	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/12/16 03:10	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/12/16 03:10	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/12/16 03:10	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/12/16 03:10	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/12/16 03:10	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/12/16 03:10	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/12/16 03:10	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/12/16 03:10	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/12/16 03:10	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/12/16 03:10	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/12/16 03:10	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/12/16 03:10	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/12/16 03:10	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/12/16 03:10	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/12/16 03:10	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/12/16 03:10	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/12/16 03:10	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/12/16 03:10	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/12/16 03:10	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/12/16 03:10	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 03:10	75-34-3	
1,2-Dichloroethane	**0.16J**	ug/L	1.0	0.072	1		07/12/16 03:10	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/12/16 03:10	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/12/16 03:10	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/12/16 03:10	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/12/16 03:10	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/12/16 03:10	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/12/16 03:10	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/12/16 03:10	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/12/16 03:10	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/12/16 03:10	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/12/16 03:10	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/12/16 03:10	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/12/16 03:10	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/12/16 03:10	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/12/16 03:10	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/12/16 03:10	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/12/16 03:10	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/12/16 03:10	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: MW-22/06302016 **Lab ID: 10354639008** Collected: 06/30/16 16:35 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/12/16 03:10	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/12/16 03:10	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/12/16 03:10	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/12/16 03:10	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 03:10	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 03:10	79-34-5	
Tetrachloroethene	**0.41J**	ug/L	1.0	0.13	1		07/12/16 03:10	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/12/16 03:10	109-99-9	
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/12/16 03:10	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/12/16 03:10	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/12/16 03:10	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/12/16 03:10	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 03:10	79-00-5	
Trichloroethene	**0.11J**	ug/L	0.40	0.051	1		07/12/16 03:10	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 03:10	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/12/16 03:10	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/12/16 03:10	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/12/16 03:10	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 03:10	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/12/16 03:10	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/12/16 03:10	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	102	%.	75-125		1		07/12/16 03:10	17060-07-0	
Toluene-d8 (S)	97	%.	75-125		1		07/12/16 03:10	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	75-125		1		07/12/16 03:10	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: Trip Blank **Lab ID: 10354639009** Collected: 06/30/16 00:00 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**1.5J**	ug/L	20.0	0.64	1		07/12/16 00:27	67-64-1	B
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/12/16 00:27	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 00:27	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/12/16 00:27	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/12/16 00:27	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/12/16 00:27	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/12/16 00:27	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/12/16 00:27	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/12/16 00:27	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/12/16 00:27	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/12/16 00:27	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/12/16 00:27	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/12/16 00:27	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/12/16 00:27	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/12/16 00:27	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/12/16 00:27	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/12/16 00:27	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/12/16 00:27	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/12/16 00:27	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/12/16 00:27	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/12/16 00:27	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/12/16 00:27	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/12/16 00:27	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/12/16 00:27	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/12/16 00:27	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/12/16 00:27	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/12/16 00:27	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 00:27	75-34-3	
1,2-Dichloroethane	**0.17J**	ug/L	1.0	0.072	1		07/12/16 00:27	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/12/16 00:27	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/12/16 00:27	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/12/16 00:27	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/12/16 00:27	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/12/16 00:27	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/12/16 00:27	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/12/16 00:27	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/12/16 00:27	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/12/16 00:27	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/12/16 00:27	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/12/16 00:27	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/12/16 00:27	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/12/16 00:27	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/12/16 00:27	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/12/16 00:27	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/12/16 00:27	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/12/16 00:27	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Sample: Trip Blank **Lab ID: 10354639009** Collected: 06/30/16 00:00 Received: 07/06/16 09:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/12/16 00:27	1634-04-4	
Naphthalene	**0.094J**	ug/L	4.0	0.064	1		07/12/16 00:27	91-20-3	B
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/12/16 00:27	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/12/16 00:27	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 00:27	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 00:27	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/12/16 00:27	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/12/16 00:27	109-99-9	
Toluene	**0.087J**	ug/L	1.0	0.059	1		07/12/16 00:27	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/12/16 00:27	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/12/16 00:27	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/12/16 00:27	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/12/16 00:27	79-00-5	
Trichloroethene	**<0.051**	ug/L	0.40	0.051	1		07/12/16 00:27	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/12/16 00:27	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/12/16 00:27	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/12/16 00:27	76-13-1	
1,2,4-Trimethylbenzene	**0.12J**	ug/L	1.0	0.068	1		07/12/16 00:27	95-63-6	B
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/12/16 00:27	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/12/16 00:27	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/12/16 00:27	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	103	%.	75-125		1		07/12/16 00:27	17060-07-0	
Toluene-d8 (S)	97	%.	75-125		1		07/12/16 00:27	2037-26-5	
4-Bromofluorobenzene (S)	101	%.	75-125		1		07/12/16 00:27	460-00-4	

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QUALITY CONTROL DATA

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

QC Batch: 424665 | Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B | Analysis Description: 8260B MSV 465 W
Associated Lab Samples: 10354639001, 10354639002, 10354639003, 10354639004, 10354639005, 10354639006, 10354639007, 10354639008, 10354639009

METHOD BLANK: 2313627 | Matrix: Water
Associated Lab Samples: 10354639001, 10354639002, 10354639003, 10354639004, 10354639005, 10354639006, 10354639007, 10354639008, 10354639009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.064	1.0	0.064	07/11/16 23:54	
1,1,1-Trichloroethane	ug/L	<0.057	1.0	0.057	07/11/16 23:54	
1,1,2,2-Tetrachloroethane	ug/L	<0.055	1.0	0.055	07/11/16 23:54	
1,1,2-Trichloroethane	ug/L	<0.064	1.0	0.064	07/11/16 23:54	
1,1,2-Trichlorotrifluoroethane	ug/L	<0.13	1.0	0.13	07/11/16 23:54	
1,1-Dichloroethane	ug/L	<0.055	1.0	0.055	07/11/16 23:54	
1,1-Dichloroethene	ug/L	<0.069	1.0	0.069	07/11/16 23:54	
1,1-Dichloropropene	ug/L	<0.082	1.0	0.082	07/11/16 23:54	
1,2,3-Trichlorobenzene	ug/L	<0.17	1.0	0.17	07/11/16 23:54	
1,2,3-Trichloropropane	ug/L	<0.19	4.0	0.19	07/11/16 23:54	
1,2,4-Trichlorobenzene	ug/L	<0.14	1.0	0.14	07/11/16 23:54	
1,2,4-Trimethylbenzene	ug/L	0.13J	1.0	0.068	07/11/16 23:54	
1,2-Dibromo-3-chloropropane	ug/L	<0.60	4.0	0.60	07/11/16 23:54	
1,2-Dibromoethane (EDB)	ug/L	<0.092	1.0	0.092	07/11/16 23:54	
1,2-Dichlorobenzene	ug/L	<0.078	1.0	0.078	07/11/16 23:54	
1,2-Dichloroethane	ug/L	0.13J	1.0	0.072	07/11/16 23:54	
1,2-Dichloropropane	ug/L	<0.066	4.0	0.066	07/11/16 23:54	
1,3,5-Trimethylbenzene	ug/L	<0.042	1.0	0.042	07/11/16 23:54	
1,3-Dichlorobenzene	ug/L	<0.085	1.0	0.085	07/11/16 23:54	
1,3-Dichloropropane	ug/L	<0.059	1.0	0.059	07/11/16 23:54	
1,4-Dichlorobenzene	ug/L	0.084J	1.0	0.081	07/11/16 23:54	
2,2-Dichloropropane	ug/L	<0.096	4.0	0.096	07/11/16 23:54	
2-Butanone (MEK)	ug/L	<1.1	5.0	1.1	07/11/16 23:54	
2-Chlorotoluene	ug/L	<0.084	1.0	0.084	07/11/16 23:54	
4-Chlorotoluene	ug/L	<0.048	1.0	0.048	07/11/16 23:54	
4-Methyl-2-pentanone (MIBK)	ug/L	<0.80	5.0	0.80	07/11/16 23:54	
Acetone	ug/L	0.68J	20.0	0.64	07/11/16 23:54	
Allyl chloride	ug/L	<0.25	4.0	0.25	07/11/16 23:54	
Benzene	ug/L	<0.042	1.0	0.042	07/11/16 23:54	
Bromobenzene	ug/L	<0.087	1.0	0.087	07/11/16 23:54	
Bromochloromethane	ug/L	<0.082	1.0	0.082	07/11/16 23:54	
Bromodichloromethane	ug/L	<0.068	1.0	0.068	07/11/16 23:54	
Bromoform	ug/L	<0.11	4.0	0.11	07/11/16 23:54	
Bromomethane	ug/L	<0.20	10.0	0.20	07/11/16 23:54	
Carbon tetrachloride	ug/L	<0.079	1.0	0.079	07/11/16 23:54	
Chlorobenzene	ug/L	<0.066	1.0	0.066	07/11/16 23:54	
Chloroethane	ug/L	<0.12	1.0	0.12	07/11/16 23:54	
Chloroform	ug/L	<0.21	1.0	0.21	07/11/16 23:54	
Chloromethane	ug/L	<0.080	4.0	0.080	07/11/16 23:54	
cis-1,2-Dichloroethene	ug/L	<0.12	1.0	0.12	07/11/16 23:54	

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QUALITY CONTROL DATA

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

METHOD BLANK: 2313627 Matrix: Water

Associated Lab Samples: 10354639001, 10354639002, 10354639003, 10354639004, 10354639005, 10354639006, 10354639007, 10354639008, 10354639009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,3-Dichloropropene	ug/L	<0.069	4.0	0.069	07/11/16 23:54	
Dibromochloromethane	ug/L	<0.048	1.0	0.048	07/11/16 23:54	
Dibromomethane	ug/L	<0.14	4.0	0.14	07/11/16 23:54	
Dichlorodifluoromethane	ug/L	<0.075	1.0	0.075	07/11/16 23:54	
Dichlorofluoromethane	ug/L	<0.054	1.0	0.054	07/11/16 23:54	
Diethyl ether (Ethyl ether)	ug/L	<0.090	4.0	0.090	07/11/16 23:54	
Ethylbenzene	ug/L	<0.075	1.0	0.075	07/11/16 23:54	
Hexachloro-1,3-butadiene	ug/L	<0.13	4.0	0.13	07/11/16 23:54	
Isopropylbenzene (Cumene)	ug/L	<0.064	1.0	0.064	07/11/16 23:54	
Methyl-tert-butyl ether	ug/L	<0.047	1.0	0.047	07/11/16 23:54	
Methylene Chloride	ug/L	0.37J	4.0	0.097	07/11/16 23:54	
n-Butylbenzene	ug/L	<0.16	1.0	0.16	07/11/16 23:54	
n-Propylbenzene	ug/L	<0.049	1.0	0.049	07/11/16 23:54	
Naphthalene	ug/L	0.15J	4.0	0.064	07/11/16 23:54	
p-Isopropyltoluene	ug/L	<0.064	1.0	0.064	07/11/16 23:54	
sec-Butylbenzene	ug/L	<0.094	1.0	0.094	07/11/16 23:54	
Styrene	ug/L	<0.056	1.0	0.056	07/11/16 23:54	
tert-Butylbenzene	ug/L	<0.051	1.0	0.051	07/11/16 23:54	
Tetrachloroethene	ug/L	<0.13	1.0	0.13	07/11/16 23:54	
Tetrahydrofuran	ug/L	<1.5	10.0	1.5	07/11/16 23:54	
Toluene	ug/L	<0.059	1.0	0.059	07/11/16 23:54	
trans-1,2-Dichloroethene	ug/L	<0.15	1.0	0.15	07/11/16 23:54	
trans-1,3-Dichloropropene	ug/L	<0.044	4.0	0.044	07/11/16 23:54	
Trichloroethene	ug/L	<0.051	0.40	0.051	07/11/16 23:54	
Trichlorofluoromethane	ug/L	<0.055	1.0	0.055	07/11/16 23:54	
Vinyl chloride	ug/L	<0.084	0.40	0.084	07/11/16 23:54	
Xylene (Total)	ug/L	<0.15	3.0	0.15	07/11/16 23:54	
1,2-Dichloroethane-d4 (S)	%.	103	75-125		07/11/16 23:54	
4-Bromofluorobenzene (S)	%.	100	75-125		07/11/16 23:54	
Toluene-d8 (S)	%.	99	75-125		07/11/16 23:54	

LABORATORY CONTROL SAMPLE: 2313628

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	23.0	115	75-125	
1,1,1-Trichloroethane	ug/L	20	21.5	107	73-125	
1,1,2,2-Tetrachloroethane	ug/L	20	20.9	105	75-128	
1,1,2-Trichloroethane	ug/L	20	22.9	115	75-129	
1,1,2-Trichlorotrifluoroethane	ug/L	20	16.6	83	69-125	
1,1-Dichloroethane	ug/L	20	21.9	110	75-131	
1,1-Dichloroethene	ug/L	20	19.5	98	72-125	
1,1-Dichloropropene	ug/L	20	21.8	109	74-125	
1,2,3-Trichlorobenzene	ug/L	20	19.5	97	68-127	

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QUALITY CONTROL DATA

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

LABORATORY CONTROL SAMPLE: 2313628

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,3-Trichloropropane	ug/L	20	20.8	104	75-125	
1,2,4-Trichlorobenzene	ug/L	20	19.6	98	70-125	
1,2,4-Trimethylbenzene	ug/L	20	20.9	105	75-130	
1,2-Dibromo-3-chloropropane	ug/L	50	47.5	95	74-125	
1,2-Dibromoethane (EDB)	ug/L	20	21.7	109	75-125	
1,2-Dichlorobenzene	ug/L	20	21.7	109	75-125	
1,2-Dichloroethane	ug/L	20	20.2	101	72-129	
1,2-Dichloropropane	ug/L	20	22.5	113	71-129	
1,3,5-Trimethylbenzene	ug/L	20	21.1	105	75-127	
1,3-Dichlorobenzene	ug/L	20	21.5	108	75-125	
1,3-Dichloropropane	ug/L	20	22.6	113	75-125	
1,4-Dichlorobenzene	ug/L	20	20.4	102	75-125	
2,2-Dichloropropane	ug/L	20	21.2	106	71-125	
2-Butanone (MEK)	ug/L	100	98.9	99	58-150	
2-Chlorotoluene	ug/L	20	21.3	106	75-125	
4-Chlorotoluene	ug/L	20	21.0	105	75-130	
4-Methyl-2-pentanone (MIBK)	ug/L	100	98.2	98	72-140	
Acetone	ug/L	100	108	108	69-137	
Allyl chloride	ug/L	20	20.6	103	68-132	
Benzene	ug/L	20	20.8	104	75-125	
Bromobenzene	ug/L	20	21.3	106	75-125	
Bromochloromethane	ug/L	20	24.6	123	75-125	
Bromodichloromethane	ug/L	20	23.7	118	69-128	
Bromoform	ug/L	20	20.5	103	75-125	
Bromomethane	ug/L	20	12.9	64	30-150	
Carbon tetrachloride	ug/L	20	20.6	103	74-125	
Chlorobenzene	ug/L	20	21.8	109	75-125	
Chloroethane	ug/L	20	20.5	102	60-150	
Chloroform	ug/L	20	22.9	115	75-126	
Chloromethane	ug/L	20	14.7	74	46-150	
cis-1,2-Dichloroethene	ug/L	20	21.2	106	75-126	
cis-1,3-Dichloropropene	ug/L	20	23.2	116	75-125	
Dibromochloromethane	ug/L	20	22.1	111	75-125	
Dibromomethane	ug/L	20	21.8	109	72-127	
Dichlorodifluoromethane	ug/L	20	20.2	101	58-135	
Dichlorofluoromethane	ug/L	20	21.5	107	68-149	
Diethyl ether (Ethyl ether)	ug/L	20	20.3	102	66-144	
Ethylbenzene	ug/L	20	20.5	103	75-125	
Hexachloro-1,3-butadiene	ug/L	20	15.1	75	73-125	
Isopropylbenzene (Cumene)	ug/L	20	20.5	102	69-140	
Methyl-tert-butyl ether	ug/L	20	23.5	117	75-126	
Methylene Chloride	ug/L	20	21.2	106	71-130	
n-Butylbenzene	ug/L	20	19.3	97	71-129	
n-Propylbenzene	ug/L	20	20.5	103	71-133	
Naphthalene	ug/L	20	20.4	102	59-137	
p-Isopropyltoluene	ug/L	20	20.6	103	74-127	
sec-Butylbenzene	ug/L	20	19.2	96	66-140	

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QUALITY CONTROL DATA

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

LABORATORY CONTROL SAMPLE: 2313628

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Styrene	ug/L	20	22.9	115	75-125	
tert-Butylbenzene	ug/L	20	19.5	98	73-129	
Tetrachloroethene	ug/L	20	20.8	104	75-125	
Tetrahydrofuran	ug/L	200	242	121	71-129	
Toluene	ug/L	20	20.7	103	75-125	
trans-1,2-Dichloroethene	ug/L	20	20.7	103	75-125	
trans-1,3-Dichloropropene	ug/L	20	22.9	114	75-125	
Trichloroethene	ug/L	20	21.5	108	75-125	
Trichlorofluoromethane	ug/L	20	18.5	92	74-128	
Vinyl chloride	ug/L	20	18.2	91	71-131	
Xylene (Total)	ug/L	60	65.0	108	75-125	
1,2-Dichloroethane-d4 (S)	%.			106	75-125	
4-Bromofluorobenzene (S)	%.			99	75-125	
Toluene-d8 (S)	%.			99	75-125	

MATRIX SPIKE SAMPLE: 2313637

Parameter	Units	10354636001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	20	22.4	112	75-125	
1,1,1-Trichloroethane	ug/L	1.3	20	26.3	125	71-144	
1,1,2,2-Tetrachloroethane	ug/L	ND	20	19.7	98	75-131	
1,1,2-Trichloroethane	ug/L	ND	20	22.7	114	75-125	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	20	23.8	119	75-150	
1,1-Dichloroethane	ug/L	ND	20	24.2	119	64-150	
1,1-Dichloroethene	ug/L	ND	20	25.6	128	68-150	
1,1-Dichloropropene	ug/L	ND	20	26.7	134	68-145	
1,2,3-Trichlorobenzene	ug/L	ND	20	17.4	87	57-142	
1,2,3-Trichloropropane	ug/L	ND	20	19.4	97	75-125	
1,2,4-Trichlorobenzene	ug/L	ND	20	18.4	92	60-135	
1,2,4-Trimethylbenzene	ug/L	ND	20	20.4	102	67-148	
1,2-Dibromo-3-chloropropane	ug/L	ND	50	42.2	84	32-137	
1,2-Dibromoethane (EDB)	ug/L	ND	20	21.7	108	75-125	
1,2-Dichlorobenzene	ug/L	ND	20	20.9	105	75-125	
1,2-Dichloroethane	ug/L	ND	20	19.5	97	62-138	
1,2-Dichloropropane	ug/L	ND	20	22.7	113	62-144	
1,3,5-Trimethylbenzene	ug/L	ND	20	21.1	106	67-148	
1,3-Dichlorobenzene	ug/L	ND	20	21.7	109	74-131	
1,3-Dichloropropane	ug/L	ND	20	22.3	111	75-127	
1,4-Dichlorobenzene	ug/L	ND	20	20.1	100	74-126	
2,2-Dichloropropane	ug/L	ND	20	21.0	105	56-146	
2-Butanone (MEK)	ug/L	ND	100	86.7	87	47-150	
2-Chlorotoluene	ug/L	ND	20	21.4	107	74-137	
4-Chlorotoluene	ug/L	ND	20	21.3	107	72-138	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	89.2	89	60-147	
Acetone	ug/L	ND	100	100	100	61-150	

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QUALITY CONTROL DATA

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

MATRIX SPIKE SAMPLE: 2313637

Parameter	Units	10354636001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Allyl chloride	ug/L	ND	20	22.2	111	53-150	
Benzene	ug/L	ND	20	20.4	102	52-147	
Bromobenzene	ug/L	ND	20	21.5	107	75-129	
Bromochloromethane	ug/L	ND	20	22.6	113	72-128	
Bromodichloromethane	ug/L	ND	20	20.9	104	65-137	
Bromoform	ug/L	ND	20	19.7	98	59-133	
Bromomethane	ug/L	ND	20	17.0	85	30-150	
Carbon tetrachloride	ug/L	ND	20	25.8	127	73-144	
Chlorobenzene	ug/L	ND	20	22.3	111	75-126	
Chloroethane	ug/L	ND	20	17.6	88	55-150	
Chloroform	ug/L	ND	20	22.4	112	66-143	
Chloromethane	ug/L	ND	20	17.3	87	42-150	
cis-1,2-Dichloroethene	ug/L	6.6	20	30.0	117	65-143	
cis-1,3-Dichloropropene	ug/L	ND	20	22.3	112	75-125	
Dibromochloromethane	ug/L	ND	20	21.2	106	75-125	
Dibromomethane	ug/L	ND	20	21.2	106	66-133	
Dichlorodifluoromethane	ug/L	ND	20	27.9	139	74-150	
Dichlorofluoromethane	ug/L	ND	20	21.1	106	68-150	
Diethyl ether (Ethyl ether)	ug/L	ND	20	19.7	99	57-148	
Ethylbenzene	ug/L	ND	20	21.6	108	67-149	
Hexachloro-1,3-butadiene	ug/L	ND	20	16.9	85	65-143	
Isopropylbenzene (Cumene)	ug/L	ND	20	22.5	113	64-150	
Methyl-tert-butyl ether	ug/L	ND	20	21.9	109	71-130	
Methylene Chloride	ug/L	ND	20	20.6	103	67-137	
n-Butylbenzene	ug/L	ND	20	20.5	102	70-138	
n-Propylbenzene	ug/L	ND	20	22.6	113	70-148	
Naphthalene	ug/L	ND	20	17.4	87	39-150	
p-Isopropyltoluene	ug/L	ND	20	20.8	104	74-138	
sec-Butylbenzene	ug/L	ND	20	21.8	109	64-150	
Styrene	ug/L	ND	20	22.6	113	75-132	
tert-Butylbenzene	ug/L	ND	20	22.1	111	75-138	
Tetrachloroethene	ug/L	5.7	20	30.8	125	73-136	
Tetrahydrofuran	ug/L	ND	200	226	113	68-142	
Toluene	ug/L	ND	20	21.5	107	69-139	
trans-1,2-Dichloroethene	ug/L	ND	20	22.9	114	75-135	
trans-1,3-Dichloropropene	ug/L	ND	20	22.3	112	66-136	
Trichloroethene	ug/L	11.6	20	36.5	125	74-135	
Trichlorofluoromethane	ug/L	ND	20	23.2	116	75-150	
Vinyl chloride	ug/L	ND	20	21.4	107	69-150	
Xylene (Total)	ug/L	ND	60	68.3	114	70-147	
1,2-Dichloroethane-d4 (S)	%.				107	75-125	
4-Bromofluorobenzene (S)	%.				103	75-125	
Toluene-d8 (S)	%.				100	75-125	

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

SAMPLE DUPLICATE: 2313638

Parameter	Units	10354636002 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	<0.064		30	
1,1,1-Trichloroethane	ug/L	ND	<0.057		30	
1,1,2,2-Tetrachloroethane	ug/L	ND	<0.055		30	
1,1,2-Trichloroethane	ug/L	ND	<0.064		30	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	<0.13		30	
1,1-Dichloroethane	ug/L	1.1	1.1	2	30	
1,1-Dichloroethene	ug/L	ND	0.16J		30	
1,1-Dichloropropene	ug/L	ND	<0.082		30	
1,2,3-Trichlorobenzene	ug/L	ND	<0.17		30	
1,2,3-Trichloropropane	ug/L	ND	<0.19		30	
1,2,4-Trichlorobenzene	ug/L	ND	<0.14		30	
1,2,4-Trimethylbenzene	ug/L	ND	<0.068		30	
1,2-Dibromo-3-chloropropane	ug/L	ND	<0.60		30	
1,2-Dibromoethane (EDB)	ug/L	ND	<0.092		30	
1,2-Dichlorobenzene	ug/L	ND	<0.078		30	
1,2-Dichloroethane	ug/L	ND	0.20J		30	
1,2-Dichloropropane	ug/L	ND	<0.066		30	
1,3,5-Trimethylbenzene	ug/L	ND	<0.042		30	
1,3-Dichlorobenzene	ug/L	ND	<0.085		30	
1,3-Dichloropropane	ug/L	ND	<0.059		30	
1,4-Dichlorobenzene	ug/L	ND	<0.081		30	
2,2-Dichloropropane	ug/L	ND	<0.096		30	
2-Butanone (MEK)	ug/L	ND	<1.1		30	
2-Chlorotoluene	ug/L	ND	<0.084		30	
4-Chlorotoluene	ug/L	ND	<0.048		30	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	<0.80		30	
Acetone	ug/L	ND	<0.64		30	
Allyl chloride	ug/L	ND	<0.25		30	
Benzene	ug/L	ND	0.50J		30	
Bromobenzene	ug/L	ND	<0.087		30	
Bromochloromethane	ug/L	ND	<0.082		30	
Bromodichloromethane	ug/L	ND	<0.068		30	
Bromoform	ug/L	ND	<0.11		30	
Bromomethane	ug/L	ND	<0.20		30	
Carbon tetrachloride	ug/L	ND	<0.079		30	
Chlorobenzene	ug/L	ND	<0.066		30	
Chloroethane	ug/L	ND	<0.12		30	
Chloroform	ug/L	ND	<0.21		30	
Chloromethane	ug/L	ND	<0.080		30	
cis-1,2-Dichloroethene	ug/L	24.5	24.5	0	30	
cis-1,3-Dichloropropene	ug/L	ND	<0.069		30	
Dibromochloromethane	ug/L	ND	<0.048		30	
Dibromomethane	ug/L	ND	<0.14		30	
Dichlorodifluoromethane	ug/L	ND	<0.075		30	
Dichlorofluoromethane	ug/L	ND	<0.054		30	
Diethyl ether (Ethyl ether)	ug/L	ND	<0.090		30	
Ethylbenzene	ug/L	ND	<0.075		30	

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(612)607-1700

QUALITY CONTROL DATA

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

SAMPLE DUPLICATE: 2313638

Parameter	Units	10354636002 Result	Dup Result	RPD	Max RPD	Qualifiers
Hexachloro-1,3-butadiene	ug/L	ND	<0.13		30	
Isopropylbenzene (Cumene)	ug/L	ND	<0.064		30	
Methyl-tert-butyl ether	ug/L	ND	<0.047		30	
Methylene Chloride	ug/L	ND	<0.097		30	
n-Butylbenzene	ug/L	ND	<0.16		30	
n-Propylbenzene	ug/L	ND	<0.049		30	
Naphthalene	ug/L	ND	<0.064		30	
p-Isopropyltoluene	ug/L	ND	<0.064		30	
sec-Butylbenzene	ug/L	ND	<0.094		30	
Styrene	ug/L	ND	<0.056		30	
tert-Butylbenzene	ug/L	ND	<0.051		30	
Tetrachloroethene	ug/L	ND	<0.13		30	
Tetrahydrofuran	ug/L	ND	<1.5		30	
Toluene	ug/L	ND	<0.059		30	
trans-1,2-Dichloroethene	ug/L	ND	0.84J		30	
trans-1,3-Dichloropropene	ug/L	ND	<0.044		30	
Trichloroethene	ug/L	ND	0.12J		30	
Trichlorofluoromethane	ug/L	ND	<0.055		30	
Vinyl chloride	ug/L	3.5	3.6	4	30	
Xylene (Total)	ug/L	ND	<0.15		30	
1,2-Dichloroethane-d4 (S)	%.	103	99	5		
4-Bromofluorobenzene (S)	%.	103	102	1		
Toluene-d8 (S)	%.	98	98	1		

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QUALIFIERS

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

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 decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

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.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60508912-300 BNSF-Mission Wye
Pace Project No.: 10354639

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10354639001	**FB-01/06302016**	EPA 8260B	424665		
10354639002	**MW-01/06302016**	EPA 8260B	424665		
10354639003	**MW-9/06302016**	EPA 8260B	424665		
10354639004	**MW-4/06302016**	EPA 8260B	424665		
10354639005	**EB/01/06302016**	EPA 8260B	424665		
10354639006	**MW-DUP/06302016**	EPA 8260B	424665		
10354639007	**MW-3/06302016**	EPA 8260B	424665		
10354639008	**MW-22/06302016**	EPA 8260B	424665		
10354639009	**Trip Blank**	EPA 8260B	424665		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10354639

Page: of

1924234

Section A Required Client Information:

Company: AECOM
Address: 207 N. Broadway, Ste. 715, Billings, MT 59101
Email To: shelly.young@aecom.com
Phone: 406-896-4582 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: Shelly.young@aecom.com
Copy To: Cole.grover@aecom.com
Purchase Order No.:
Project Name: BNSF-Mission Wye
Project Number: 60436177-300

Section C Invoice Information:

Attention:
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☒ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: MT

Section D Required Client Information

Matrix Codes MATRIX / CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N): Y

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test: VOC-8260B	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	FB-01/06302016	WT	G	6-30-2016	—	6-30-2016	1115		3	—			X	—				X		001
2	MW-01/06302016			—	—		1125		3				X					X		002
3	MW-[illegible]/06302016			—	—		1302		3				X					X		003
4	MW-4/06302016			—	—		1500		3				X					X		004
5	EB/01/06302016			—	—		1505		3				X					X		005
6	MW-Dup/06302016			—	—		1414		3				X					X		006
7	MW-3/06302016			—	—		1555		3				X					X		007
8	MW-22/06302016			—	—		1635		3				X					X		008
9	Trip Blank		—	—	—		—		2				X					X		009
10																				
11																				
12																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Cole R. Grover / AECOM	7-5-2016	1630	[illegible] PACE	7-6-16	950	4.6	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Cole R. Grover
SIGNATURE of SAMPLER: Cole R. Grover
DATE Signed (MM/DD/YY): 07/05/2016

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 04Apr2016 Page 1 of 1
	Document No.: **F-MN-L-213-rev.16**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: AECOM

Project #: **WO# : 10354639**

10354639

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 6752 4206 8860

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

Thermometer Used: ☐ 151401163 ☑ B88A912167504 ☐ 151401164 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 4.6 **Cooler Temp Corrected (°C):** 4.6 **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:** 7-6-16 AA

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				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. Note if sediment is visible in the dissolved container
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	
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☑ Yes	☐ No	☐ N/A	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: Carol Doug **Date:** 7/7/16

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

July 27, 2016

Shelly Young
AECOM, Inc.
207 North Broadway, Suite 315
Billings, MT 59101

RE: Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Dear Shelly Young:
Enclosed are the analytical results for sample(s) received by the laboratory on July 08, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
Project Manager

Enclosures

cc: Mr. Yueh Chuang, BNSF Railway
Mark Engdahl, BNSF Railway Company
Cole Grover, AECOM

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CERTIFICATIONS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
525 N 8th Street, Salina, KS 67401
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: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10354908001	**MW-1**	Water	07/06/16 10:30	07/08/16 09:30
10354908002	**MW-19**	Water	07/06/16 12:40	07/08/16 09:30
10354908003	**MW-18**	Water	07/06/16 15:10	07/08/16 09:30
10354908004	**MW-14**	Water	07/06/16 15:58	07/08/16 09:30
10354908005	**MW-12**	Water	07/06/16 16:42	07/08/16 09:30
10354908006	**Gravel Pit Well**	Water	07/06/16 17:15	07/08/16 09:30
10354908007	**Gravel Pit Pond**	Water	07/07/16 13:45	07/08/16 09:30
10354908008	**MW-9**	Water	07/07/16 08:00	07/08/16 09:30
10354908009	**MW-32**	Water	07/07/16 08:20	07/08/16 09:30
10354908010	**MW-4**	Water	07/07/16 09:00	07/08/16 09:30
10354908011	**MW-33**	Water	07/07/16 09:20	07/08/16 09:30
10354908012	**MW-30**	Water	07/07/16 10:30	07/08/16 09:30
10354908013	**MW-5**	Water	07/07/16 10:35	07/08/16 09:30
10354908014	**MW-3**	Water	07/07/16 11:28	07/08/16 09:30
10354908015	**MW-22**	Water	07/07/16 12:02	07/08/16 09:30
10354908016	**MW-21**	Water	07/07/16 12:44	07/08/16 09:30
10354908017	**Trip Blank**	Water	07/06/16 00:00	07/08/16 09:30
10354908018	**Trip Blank**	Water	07/06/16 00:00	07/08/16 09:30

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SAMPLE ANALYTE COUNT

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10354908001	**MW-1**	EPA 8260B	PRD	70	PASI-M
10354908002	**MW-19**	EPA 8260B	PRD	70	PASI-M
10354908003	**MW-18**	EPA 8260B	PRD	70	PASI-M
10354908004	**MW-14**	EPA 8260B	PRD	70	PASI-M
10354908005	**MW-12**	EPA 8260B	EMC	70	PASI-M
10354908006	**Gravel Pit Well**	EPA 524.2	DJB	75	PASI-M
10354908007	**Gravel Pit Pond**	EPA 8260B	EMC	70	PASI-M
10354908008	**MW-9**	EPA 8260B	EMC	70	PASI-M
10354908009	**MW-32**	EPA 8260B	EMC	70	PASI-M
10354908010	**MW-4**	EPA 8260B	EMC	70	PASI-M
10354908011	**MW-33**	EPA 8260B	EMC	70	PASI-M
10354908012	**MW-30**	EPA 8260B	EMC	70	PASI-M
10354908013	**MW-5**	EPA 8260B	EMC	70	PASI-M
10354908014	**MW-3**	EPA 8260B	EMC	70	PASI-M
10354908015	**MW-22**	EPA 8260B	EMC	70	PASI-M
10354908016	**MW-21**	EPA 8260B	EMC	70	PASI-M
10354908017	**Trip Blank**	EPA 8260B	EMC	70	PASI-M
10354908018	**Trip Blank**	EPA 524.2	DJB	75	PASI-M

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SUMMARY OF DETECTION

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
10354908001	**MW-1**					
EPA 8260B	n-Butylbenzene	0.46J	ug/L	1.0	07/16/16 04:57	
EPA 8260B	sec-Butylbenzene	0.37J	ug/L	1.0	07/16/16 04:57	
EPA 8260B	1,2-Dichloroethane	0.11J	ug/L	1.0	07/16/16 04:57	B
EPA 8260B	Isopropylbenzene (Cumene)	0.29J	ug/L	1.0	07/16/16 04:57	
EPA 8260B	Naphthalene	2.0J	ug/L	4.0	07/16/16 04:57	B
EPA 8260B	n-Propylbenzene	0.69J	ug/L	1.0	07/16/16 04:57	
EPA 8260B	Trichloroethene	0.15J	ug/L	0.40	07/16/16 04:57	B
10354908002	**MW-19**					
EPA 8260B	Acetone	1.8J	ug/L	20.0	07/16/16 05:12	B
EPA 8260B	1,2-Dichloroethane	0.073J	ug/L	1.0	07/16/16 05:12	B
EPA 8260B	Naphthalene	0.84J	ug/L	4.0	07/16/16 05:12	B
EPA 8260B	Trichloroethene	0.62	ug/L	0.40	07/16/16 05:12	B
10354908003	**MW-18**					
EPA 8260B	Acetone	1.3J	ug/L	20.0	07/16/16 05:28	B
EPA 8260B	1,2-Dichloroethane	0.12J	ug/L	1.0	07/16/16 05:28	B
EPA 8260B	Naphthalene	0.69J	ug/L	4.0	07/16/16 05:28	B
EPA 8260B	Tetrachloroethene	0.40J	ug/L	1.0	07/16/16 05:28	
EPA 8260B	Trichloroethene	0.50	ug/L	0.40	07/16/16 05:28	B
10354908004	**MW-14**					
EPA 8260B	1,2-Dichloroethane	0.11J	ug/L	1.0	07/16/16 05:43	B
EPA 8260B	Naphthalene	0.64J	ug/L	4.0	07/16/16 05:43	B
EPA 8260B	Tetrachloroethene	1.0	ug/L	1.0	07/16/16 05:43	
EPA 8260B	Trichloroethene	0.40	ug/L	0.40	07/16/16 05:43	B
10354908005	**MW-12**					
EPA 8260B	1,2-Dichloroethane	0.096J	ug/L	1.0	07/16/16 02:16	B
10354908007	**Gravel Pit Pond**					
EPA 8260B	Acetone	2.3J	ug/L	20.0	07/16/16 02:32	
EPA 8260B	Chloroform	0.25J	ug/L	1.0	07/16/16 02:32	
EPA 8260B	1,2-Dichloroethane	0.16J	ug/L	1.0	07/16/16 02:32	B
10354908008	**MW-9**					
EPA 8260B	1,2-Dichloroethane	0.14J	ug/L	1.0	07/16/16 03:04	B
EPA 8260B	Tetrachloroethene	0.90J	ug/L	1.0	07/16/16 03:04	
EPA 8260B	Trichloroethene	0.26J	ug/L	0.40	07/16/16 03:04	
10354908009	**MW-32**					
EPA 8260B	Acetone	3.9J	ug/L	20.0	07/16/16 03:20	
EPA 8260B	Chloroform	0.42J	ug/L	1.0	07/16/16 03:20	
EPA 8260B	1,2-Dichloroethane	0.084J	ug/L	1.0	07/16/16 03:20	B
EPA 8260B	Methylene Chloride	0.36J	ug/L	4.0	07/16/16 03:20	
EPA 8260B	Toluene	0.89J	ug/L	1.0	07/16/16 03:20	
10354908010	**MW-4**					
EPA 8260B	1,2-Dichloroethane	0.094J	ug/L	1.0	07/16/16 03:37	B
EPA 8260B	Trichloroethene	0.64	ug/L	0.40	07/16/16 03:37	

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SUMMARY OF DETECTION

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
10354908011	**MW-33**					
EPA 8260B	1,2-Dichloroethane	0.12J	ug/L	1.0	07/16/16 03:53	B
EPA 8260B	Trichloroethene	0.75	ug/L	0.40	07/16/16 03:53	
10354908012	**MW-30**					
EPA 8260B	Acetone	3.1J	ug/L	20.0	07/16/16 04:09	
EPA 8260B	Chloroform	0.47J	ug/L	1.0	07/16/16 04:09	
EPA 8260B	1,2-Dichloroethane	0.16J	ug/L	1.0	07/16/16 04:09	B
EPA 8260B	Methylene Chloride	0.33J	ug/L	4.0	07/16/16 04:09	
EPA 8260B	Toluene	1.1	ug/L	1.0	07/16/16 04:09	
10354908013	**MW-5**					
EPA 8260B	1,2-Dichloroethane	0.12J	ug/L	1.0	07/16/16 04:25	B
EPA 8260B	Trichloroethene	0.49	ug/L	0.40	07/16/16 04:25	
10354908014	**MW-3**					
EPA 8260B	Acetone	2.2J	ug/L	20.0	07/16/16 06:34	
EPA 8260B	1,2-Dichloroethane	0.15J	ug/L	1.0	07/16/16 06:34	B
EPA 8260B	Tetrachloroethene	6.4	ug/L	1.0	07/16/16 06:34	
EPA 8260B	Trichloroethene	0.43	ug/L	0.40	07/16/16 06:34	
10354908015	**MW-22**					
EPA 8260B	1,2-Dichloroethane	0.15J	ug/L	1.0	07/16/16 04:41	B
EPA 8260B	Tetrachloroethene	0.56J	ug/L	1.0	07/16/16 04:41	
10354908016	**MW-21**					
EPA 8260B	1,2-Dichloroethane	0.13J	ug/L	1.0	07/16/16 04:57	B
10354908017	**Trip Blank**					
EPA 8260B	Acetone	3.3J	ug/L	20.0	07/16/16 01:27	
EPA 8260B	1,2-Dichloroethane	0.11J	ug/L	1.0	07/16/16 01:27	B
EPA 8260B	Naphthalene	0.13J	ug/L	4.0	07/16/16 01:27	B

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PROJECT NARRATIVE

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Date: July 27, 2016

The VOCs were rerun due to hits above the MDL present in the blanks associated with these samples. After rerunning to confirm, the majority of the hits above the MDL but below the RL did not confirm (they were found to be absent in the rerun samples). The reruns were all conducted outside of hold times. The new lab blank, which was prepared separately and run with the rerun batch, was clean.

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PROJECT NARRATIVE

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Method: **EPA 524.2**
Description: 524.2 MSV
Client: AECOM
Date: July 27, 2016

General Information:
2 samples were analyzed for EPA 524.2. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

L2: Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results may be biased low.
- Gravel Pit Well (Lab ID: 10354908006)
- Trip Blank (Lab ID: 10354908018)

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.

QC Batch: 425629

CL: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.
- BLANK (Lab ID: 2317904)
  - Bromomethane
- DUP (Lab ID: 2317908)
  - Bromomethane
- Gravel Pit Well (Lab ID: 10354908006)
  - Bromomethane
- LCS (Lab ID: 2317905)
  - Bromomethane
- LCSD (Lab ID: 2317906)
  - Bromomethane
- MS (Lab ID: 2317907)
  - Bromomethane
- Trip Blank (Lab ID: 10354908018)
  - Bromomethane

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates 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.

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PROJECT NARRATIVE

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Method: **EPA 524.2**
Description: 524.2 MSV
Client: AECOM
Date: July 27, 2016

QC Batch: 425629

L0: Analyte recovery in the laboratory control sample (LCS) was outside QC limits.

- LCS (Lab ID: 2317905)
  - Bromomethane

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 425629

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10355253001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2317907)
  - Chloroethane
  - Chloroform
  - Dichlorodifluoromethane
  - Trichlorofluoromethane

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: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: July 27, 2016

General Information:
16 samples were analyzed for EPA 8260B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

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.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates 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: 425670

B: Analyte was detected in the associated method blank.
- BLANK for HBN 425670 [MSV/3632 (Lab ID: 2318144)
  - 1,2-Dichloroethane
  - Acetone
  - Naphthalene
  - Trichloroethene

QC Batch: 425672

B: Analyte was detected in the associated method blank.
- BLANK for HBN 425672 [MSV/3632 (Lab ID: 2318154)
  - 1,2-Dichloroethane
  - Naphthalene

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

QC Batch: 425672

L0: Analyte recovery in the laboratory control sample (LCS) was outside QC limits.
- LCS (Lab ID: 2318155)
  - Tetrahydrofuran

R1: RPD value was outside control limits.
- LCSD (Lab ID: 2318190)

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PROJECT NARRATIVE

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: July 27, 2016

QC Batch: 425672

R1: RPD value was outside control limits.

- Chloromethane

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:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-1 **Lab ID: 10354908001** Collected: 07/06/16 10:30 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/16/16 04:57	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 04:57	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 04:57	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 04:57	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 04:57	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 04:57	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 04:57	75-25-2	
Bromomethane	**<0.20**	ug/L	4.0	0.20	1		07/16/16 04:57	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 04:57	78-93-3	
n-Butylbenzene	**0.46J**	ug/L	1.0	0.16	1		07/16/16 04:57	104-51-8	
sec-Butylbenzene	**0.37J**	ug/L	1.0	0.094	1		07/16/16 04:57	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 04:57	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	4.0	0.079	1		07/16/16 04:57	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 04:57	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 04:57	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/16/16 04:57	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 04:57	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 04:57	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 04:57	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	10.0	0.60	1		07/16/16 04:57	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	4.0	0.048	1		07/16/16 04:57	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 04:57	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 04:57	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 04:57	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 04:57	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 04:57	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 04:57	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:57	75-34-3	
1,2-Dichloroethane	**0.11J**	ug/L	1.0	0.072	1		07/16/16 04:57	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 04:57	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 04:57	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 04:57	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 04:57	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 04:57	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 04:57	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 04:57	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 04:57	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 04:57	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 04:57	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 04:57	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 04:57	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 04:57	87-68-3	
Isopropylbenzene (Cumene)	**0.29J**	ug/L	1.0	0.064	1		07/16/16 04:57	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:57	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/16/16 04:57	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 04:57	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-1 **Lab ID: 10354908001** Collected: 07/06/16 10:30 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 04:57	1634-04-4	
Naphthalene	**2.0J**	ug/L	4.0	0.064	1		07/16/16 04:57	91-20-3	B
n-Propylbenzene	**0.69J**	ug/L	1.0	0.049	1		07/16/16 04:57	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 04:57	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	4.0	0.064	1		07/16/16 04:57	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:57	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/16/16 04:57	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 04:57	109-99-9	
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/16/16 04:57	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 04:57	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 04:57	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 04:57	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:57	79-00-5	
Trichloroethene	**0.15J**	ug/L	0.40	0.051	1		07/16/16 04:57	79-01-6	B
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:57	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 04:57	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 04:57	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 04:57	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 04:57	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 04:57	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 04:57	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	98	%.	75-125		1		07/16/16 04:57	17060-07-0	
Toluene-d8 (S)	97	%.	75-125		1		07/16/16 04:57	2037-26-5	
4-Bromofluorobenzene (S)	100	%.	75-125		1		07/16/16 04:57	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-19 **Lab ID: 10354908002** Collected: 07/06/16 12:40 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**1.8J**	ug/L	20.0	0.64	1		07/16/16 05:12	67-64-1	B
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 05:12	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 05:12	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 05:12	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 05:12	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 05:12	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 05:12	75-25-2	
Bromomethane	**<0.20**	ug/L	4.0	0.20	1		07/16/16 05:12	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 05:12	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 05:12	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 05:12	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 05:12	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	4.0	0.079	1		07/16/16 05:12	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 05:12	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 05:12	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/16/16 05:12	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 05:12	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 05:12	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 05:12	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	10.0	0.60	1		07/16/16 05:12	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	4.0	0.048	1		07/16/16 05:12	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 05:12	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 05:12	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 05:12	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 05:12	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 05:12	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 05:12	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 05:12	75-34-3	
1,2-Dichloroethane	**0.073J**	ug/L	1.0	0.072	1		07/16/16 05:12	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 05:12	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 05:12	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 05:12	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 05:12	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 05:12	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 05:12	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 05:12	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 05:12	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 05:12	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 05:12	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 05:12	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 05:12	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 05:12	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 05:12	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 05:12	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/16/16 05:12	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 05:12	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-19 **Lab ID: 10354908002** Collected: 07/06/16 12:40 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 05:12	1634-04-4	
Naphthalene	**0.84J**	ug/L	4.0	0.064	1		07/16/16 05:12	91-20-3	B
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 05:12	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 05:12	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	4.0	0.064	1		07/16/16 05:12	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 05:12	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/16/16 05:12	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 05:12	109-99-9	
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/16/16 05:12	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 05:12	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 05:12	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 05:12	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 05:12	79-00-5	
Trichloroethene	**0.62**	ug/L	0.40	0.051	1		07/16/16 05:12	79-01-6	B
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 05:12	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 05:12	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 05:12	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 05:12	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 05:12	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 05:12	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 05:12	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	100	%.	75-125		1		07/16/16 05:12	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		07/16/16 05:12	2037-26-5	
4-Bromofluorobenzene (S)	101	%.	75-125		1		07/16/16 05:12	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-18 **Lab ID: 10354908003** Collected: 07/06/16 15:10 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**1.3J**	ug/L	20.0	0.64	1		07/16/16 05:28	67-64-1	B
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 05:28	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 05:28	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 05:28	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 05:28	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 05:28	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 05:28	75-25-2	
Bromomethane	**<0.20**	ug/L	4.0	0.20	1		07/16/16 05:28	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 05:28	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 05:28	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 05:28	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 05:28	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	4.0	0.079	1		07/16/16 05:28	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 05:28	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 05:28	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/16/16 05:28	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 05:28	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 05:28	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 05:28	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	10.0	0.60	1		07/16/16 05:28	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	4.0	0.048	1		07/16/16 05:28	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 05:28	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 05:28	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 05:28	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 05:28	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 05:28	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 05:28	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 05:28	75-34-3	
1,2-Dichloroethane	**0.12J**	ug/L	1.0	0.072	1		07/16/16 05:28	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 05:28	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 05:28	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 05:28	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 05:28	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 05:28	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 05:28	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 05:28	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 05:28	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 05:28	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 05:28	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 05:28	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 05:28	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 05:28	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 05:28	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 05:28	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/16/16 05:28	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 05:28	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-18 **Lab ID: 10354908003** Collected: 07/06/16 15:10 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 05:28	1634-04-4	
Naphthalene	**0.69J**	ug/L	4.0	0.064	1		07/16/16 05:28	91-20-3	B
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 05:28	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 05:28	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	4.0	0.064	1		07/16/16 05:28	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 05:28	79-34-5	
Tetrachloroethene	**0.40J**	ug/L	1.0	0.13	1		07/16/16 05:28	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 05:28	109-99-9	
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/16/16 05:28	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 05:28	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 05:28	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 05:28	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 05:28	79-00-5	
Trichloroethene	**0.50**	ug/L	0.40	0.051	1		07/16/16 05:28	79-01-6	B
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 05:28	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 05:28	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 05:28	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 05:28	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 05:28	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 05:28	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 05:28	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	101	%.	75-125		1		07/16/16 05:28	17060-07-0	
Toluene-d8 (S)	96	%.	75-125		1		07/16/16 05:28	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	75-125		1		07/16/16 05:28	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-14 **Lab ID: 10354908004** Collected: 07/06/16 15:58 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/16/16 05:43	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 05:43	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 05:43	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 05:43	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 05:43	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 05:43	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 05:43	75-25-2	
Bromomethane	**<0.20**	ug/L	4.0	0.20	1		07/16/16 05:43	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 05:43	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 05:43	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 05:43	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 05:43	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	4.0	0.079	1		07/16/16 05:43	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 05:43	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 05:43	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/16/16 05:43	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 05:43	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 05:43	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 05:43	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	10.0	0.60	1		07/16/16 05:43	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	4.0	0.048	1		07/16/16 05:43	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 05:43	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 05:43	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 05:43	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 05:43	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 05:43	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 05:43	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 05:43	75-34-3	
1,2-Dichloroethane	**0.11J**	ug/L	1.0	0.072	1		07/16/16 05:43	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 05:43	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 05:43	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 05:43	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 05:43	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 05:43	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 05:43	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 05:43	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 05:43	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 05:43	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 05:43	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 05:43	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 05:43	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 05:43	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 05:43	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 05:43	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/16/16 05:43	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 05:43	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-14 **Lab ID: 10354908004** Collected: 07/06/16 15:58 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 05:43	1634-04-4	
Naphthalene	**0.64J**	ug/L	4.0	0.064	1		07/16/16 05:43	91-20-3	B
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 05:43	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 05:43	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	4.0	0.064	1		07/16/16 05:43	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 05:43	79-34-5	
Tetrachloroethene	**1.0**	ug/L	1.0	0.13	1		07/16/16 05:43	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 05:43	109-99-9	
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/16/16 05:43	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 05:43	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 05:43	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 05:43	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 05:43	79-00-5	
Trichloroethene	**0.40**	ug/L	0.40	0.051	1		07/16/16 05:43	79-01-6	B
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 05:43	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 05:43	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 05:43	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 05:43	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 05:43	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 05:43	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 05:43	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	102	%.	75-125		1		07/16/16 05:43	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/16/16 05:43	2037-26-5	
4-Bromofluorobenzene (S)	101	%.	75-125		1		07/16/16 05:43	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-12 **Lab ID: 10354908005** Collected: 07/06/16 16:42 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/16/16 02:16	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 02:16	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 02:16	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 02:16	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 02:16	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 02:16	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 02:16	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/16/16 02:16	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 02:16	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 02:16	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 02:16	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 02:16	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/16/16 02:16	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 02:16	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 02:16	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/16/16 02:16	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 02:16	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 02:16	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 02:16	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/16/16 02:16	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/16/16 02:16	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 02:16	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 02:16	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 02:16	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 02:16	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 02:16	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 02:16	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 02:16	75-34-3	
1,2-Dichloroethane	**0.096J**	ug/L	1.0	0.072	1		07/16/16 02:16	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 02:16	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 02:16	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 02:16	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 02:16	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 02:16	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 02:16	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 02:16	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 02:16	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 02:16	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 02:16	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 02:16	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 02:16	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 02:16	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 02:16	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 02:16	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/16/16 02:16	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 02:16	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-12 **Lab ID: 10354908005** Collected: 07/06/16 16:42 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 02:16	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/16/16 02:16	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 02:16	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 02:16	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 02:16	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 02:16	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/16/16 02:16	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 02:16	109-99-9	L3
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/16/16 02:16	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 02:16	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 02:16	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 02:16	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 02:16	79-00-5	
Trichloroethene	**<0.051**	ug/L	0.40	0.051	1		07/16/16 02:16	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 02:16	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 02:16	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 02:16	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 02:16	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 02:16	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 02:16	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 02:16	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	100	%.	75-125		1		07/16/16 02:16	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/16/16 02:16	2037-26-5	
4-Bromofluorobenzene (S)	101	%.	75-125		1		07/16/16 02:16	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: Gravel Pit Well **Lab ID: 10354908006** Collected: 07/06/16 17:15 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
524.2 MSV	Analytical Method: EPA 524.2								
Acetone	**<2.8**	ug/L	20.0	2.8	1		07/18/16 16:26	67-64-1	
Acrylonitrile	**<3.5**	ug/L	10.0	3.5	1		07/18/16 16:26	107-13-1	
Benzene	**<0.21**	ug/L	0.50	0.21	1		07/18/16 16:26	71-43-2	
Bromobenzene	**<0.25**	ug/L	1.0	0.25	1		07/18/16 16:26	108-86-1	
Bromochloromethane	**<0.32**	ug/L	1.0	0.32	1		07/18/16 16:26	74-97-5	
Bromodichloromethane	**<0.14**	ug/L	1.0	0.14	1		07/18/16 16:26	75-27-4	
Bromoform	**<0.41**	ug/L	4.0	0.41	1		07/18/16 16:26	75-25-2	
Bromomethane	**<0.32**	ug/L	4.0	0.32	1		07/18/16 16:26	74-83-9	CL,L2
2-Butanone (MEK)	**<2.5**	ug/L	5.0	2.5	1		07/18/16 16:26	78-93-3	
n-Butylbenzene	**<0.083**	ug/L	0.50	0.083	1		07/18/16 16:26	104-51-8	
sec-Butylbenzene	**<0.16**	ug/L	0.50	0.16	1		07/18/16 16:26	135-98-8	
tert-Butylbenzene	**<0.18**	ug/L	0.50	0.18	1		07/18/16 16:26	98-06-6	
Carbon disulfide	**<0.22**	ug/L	1.0	0.22	1		07/18/16 16:26	75-15-0	
Carbon tetrachloride	**<0.35**	ug/L	1.0	0.35	1		07/18/16 16:26	56-23-5	
Chlorobenzene	**<0.23**	ug/L	0.50	0.23	1		07/18/16 16:26	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/18/16 16:26	75-00-3	
Chloroform	**<0.27**	ug/L	1.0	0.27	1		07/18/16 16:26	67-66-3	
Chloromethane	**<0.64**	ug/L	4.0	0.64	1		07/18/16 16:26	74-87-3	
2-Chlorotoluene	**<0.22**	ug/L	0.50	0.22	1		07/18/16 16:26	95-49-8	
4-Chlorotoluene	**<0.24**	ug/L	0.50	0.24	1		07/18/16 16:26	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.70**	ug/L	4.0	0.70	1		07/18/16 16:26	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	0.50	0.16	1		07/18/16 16:26	124-48-1	
1,2-Dibromoethane (EDB)	**<0.21**	ug/L	1.0	0.21	1		07/18/16 16:26	106-93-4	
Dibromomethane	**<0.31**	ug/L	1.0	0.31	1		07/18/16 16:26	74-95-3	
1,2-Dichlorobenzene	**<0.22**	ug/L	0.50	0.22	1		07/18/16 16:26	95-50-1	
1,3-Dichlorobenzene	**<0.21**	ug/L	0.50	0.21	1		07/18/16 16:26	541-73-1	
1,4-Dichlorobenzene	**<0.16**	ug/L	0.50	0.16	1		07/18/16 16:26	106-46-7	
trans-1,4-Dichloro-2-butene	**<0.48**	ug/L	10.0	0.48	1		07/18/16 16:26	110-57-6	
Dichlorodifluoromethane	**<0.49**	ug/L	1.0	0.49	1		07/18/16 16:26	75-71-8	
1,1-Dichloroethane	**<0.19**	ug/L	0.50	0.19	1		07/18/16 16:26	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	0.50	0.17	1		07/18/16 16:26	107-06-2	
1,1-Dichloroethene	**<0.17**	ug/L	0.50	0.17	1		07/18/16 16:26	75-35-4	
cis-1,2-Dichloroethene	**<0.17**	ug/L	0.50	0.17	1		07/18/16 16:26	156-59-2	
trans-1,2-Dichloroethene	**<0.18**	ug/L	0.50	0.18	1		07/18/16 16:26	156-60-5	
1,2-Dichloropropane	**<0.42**	ug/L	4.0	0.42	1		07/18/16 16:26	78-87-5	
1,3-Dichloropropane	**<0.24**	ug/L	0.50	0.24	1		07/18/16 16:26	142-28-9	
2,2-Dichloropropane	**<0.36**	ug/L	1.0	0.36	1		07/18/16 16:26	594-20-7	
1,1-Dichloropropene	**<0.16**	ug/L	0.50	0.16	1		07/18/16 16:26	563-58-6	
cis-1,3-Dichloropropene	**<0.21**	ug/L	0.50	0.21	1		07/18/16 16:26	10061-01-5	
trans-1,3-Dichloropropene	**<0.22**	ug/L	1.0	0.22	1		07/18/16 16:26	10061-02-6	
Ethylbenzene	**<0.23**	ug/L	0.50	0.23	1		07/18/16 16:26	100-41-4	
Ethyl methacrylate	**<0.56**	ug/L	5.0	0.56	1		07/18/16 16:26	97-63-2	
Hexachloro-1,3-butadiene	**<0.14**	ug/L	1.0	0.14	1		07/18/16 16:26	87-68-3	
2-Hexanone	**<2.3**	ug/L	5.0	2.3	1		07/18/16 16:26	591-78-6	
Isopropylbenzene (Cumene)	**<0.090**	ug/L	0.50	0.090	1		07/18/16 16:26	98-82-8	
p-Isopropyltoluene	**<0.097**	ug/L	0.50	0.097	1		07/18/16 16:26	99-87-6	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: Gravel Pit Well **Lab ID: 10354908006** Collected: 07/06/16 17:15 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
524.2 MSV	Analytical Method: EPA 524.2								
Methylene Chloride	**<0.56**	ug/L	4.0	0.56	1		07/18/16 16:26	75-09-2	
Methyl methacrylate	**<0.50**	ug/L	5.0	0.50	1		07/18/16 16:26	80-62-6	
4-Methyl-2-pentanone (MIBK)	**<2.4**	ug/L	5.0	2.4	1		07/18/16 16:26	108-10-1	
Methyl-tert-butyl ether	**<0.16**	ug/L	0.50	0.16	1		07/18/16 16:26	1634-04-4	
Naphthalene	**<0.14**	ug/L	1.0	0.14	1		07/18/16 16:26	91-20-3	
2-Nitropropane	**<2.0**	ug/L	10.0	2.0	1		07/18/16 16:26	79-46-9	
n-Propylbenzene	**<0.21**	ug/L	0.50	0.21	1		07/18/16 16:26	103-65-1	
Styrene	**<0.11**	ug/L	0.50	0.11	1		07/18/16 16:26	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.20**	ug/L	0.50	0.20	1		07/18/16 16:26	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.19**	ug/L	0.50	0.19	1		07/18/16 16:26	79-34-5	
Tetrachloroethene	**<0.15**	ug/L	1.0	0.15	1		07/18/16 16:26	127-18-4	
Toluene	**<0.12**	ug/L	0.50	0.12	1		07/18/16 16:26	108-88-3	
Total Trihalomethanes (Calc.)	**<2.0**	ug/L	4.0	2.0	1		07/18/16 16:26		
1,2,3-Trichlorobenzene	**<0.23**	ug/L	0.50	0.23	1		07/18/16 16:26	87-61-6	
1,2,4-Trichlorobenzene	**<0.22**	ug/L	0.50	0.22	1		07/18/16 16:26	120-82-1	
1,1,1-Trichloroethane	**<0.20**	ug/L	0.50	0.20	1		07/18/16 16:26	71-55-6	
1,1,2-Trichloroethane	**<0.24**	ug/L	0.50	0.24	1		07/18/16 16:26	79-00-5	
Trichloroethene	**<0.14**	ug/L	0.40	0.14	1		07/18/16 16:26	79-01-6	
Trichlorofluoromethane	**<0.18**	ug/L	0.50	0.18	1		07/18/16 16:26	75-69-4	
1,2,3-Trichloropropane	**<0.34**	ug/L	4.0	0.34	1		07/18/16 16:26	96-18-4	
1,2,4-Trimethylbenzene	**<0.16**	ug/L	0.50	0.16	1		07/18/16 16:26	95-63-6	
1,3,5-Trimethylbenzene	**<0.20**	ug/L	0.50	0.20	1		07/18/16 16:26	108-67-8	
Vinyl chloride	**<0.081**	ug/L	0.20	0.081	1		07/18/16 16:26	75-01-4	
Xylene (Total)	**<0.41**	ug/L	1.5	0.41	1		07/18/16 16:26	1330-20-7	
m&p-Xylene	**<0.41**	ug/L	1.0	0.41	1		07/18/16 16:26	179601-23-1	
o-Xylene	**<0.14**	ug/L	0.50	0.14	1		07/18/16 16:26	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	100	%.	75-125		1		07/18/16 16:26	460-00-4	
Toluene-d8 (S)	93	%.	75-125		1		07/18/16 16:26	2037-26-5	
1,2-Dichloroethane-d4 (S)	113	%.	75-125		1		07/18/16 16:26	17060-07-0	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: Gravel Pit Pond **Lab ID: 10354908007** Collected: 07/07/16 13:45 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**2.3J**	ug/L	20.0	0.64	1		07/16/16 02:32	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 02:32	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 02:32	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 02:32	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 02:32	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 02:32	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 02:32	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/16/16 02:32	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 02:32	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 02:32	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 02:32	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 02:32	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/16/16 02:32	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 02:32	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 02:32	75-00-3	
Chloroform	**0.25J**	ug/L	1.0	0.21	1		07/16/16 02:32	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 02:32	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 02:32	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 02:32	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/16/16 02:32	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/16/16 02:32	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 02:32	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 02:32	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 02:32	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 02:32	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 02:32	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 02:32	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 02:32	75-34-3	
1,2-Dichloroethane	**0.16J**	ug/L	1.0	0.072	1		07/16/16 02:32	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 02:32	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 02:32	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 02:32	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 02:32	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 02:32	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 02:32	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 02:32	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 02:32	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 02:32	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 02:32	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 02:32	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 02:32	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 02:32	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 02:32	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 02:32	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/16/16 02:32	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 02:32	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: Gravel Pit Pond **Lab ID: 10354908007** Collected: 07/07/16 13:45 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 02:32	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/16/16 02:32	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 02:32	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 02:32	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 02:32	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 02:32	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/16/16 02:32	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 02:32	109-99-9	L3
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/16/16 02:32	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 02:32	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 02:32	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 02:32	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 02:32	79-00-5	
Trichloroethene	**<0.051**	ug/L	0.40	0.051	1		07/16/16 02:32	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 02:32	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 02:32	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 02:32	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 02:32	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 02:32	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 02:32	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 02:32	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	98	%.	75-125		1		07/16/16 02:32	17060-07-0	
Toluene-d8 (S)	100	%.	75-125		1		07/16/16 02:32	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	75-125		1		07/16/16 02:32	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-9 **Lab ID: 10354908008** Collected: 07/07/16 08:00 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/16/16 03:04	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 03:04	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 03:04	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 03:04	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 03:04	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 03:04	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 03:04	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/16/16 03:04	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 03:04	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 03:04	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 03:04	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 03:04	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/16/16 03:04	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 03:04	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 03:04	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/16/16 03:04	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 03:04	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 03:04	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 03:04	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/16/16 03:04	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/16/16 03:04	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 03:04	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 03:04	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 03:04	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 03:04	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 03:04	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 03:04	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 03:04	75-34-3	
1,2-Dichloroethane	**0.14J**	ug/L	1.0	0.072	1		07/16/16 03:04	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 03:04	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 03:04	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 03:04	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 03:04	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 03:04	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 03:04	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 03:04	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 03:04	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 03:04	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 03:04	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 03:04	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 03:04	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 03:04	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:04	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:04	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/16/16 03:04	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 03:04	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-9 **Lab ID: 10354908008** Collected: 07/07/16 08:00 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 03:04	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/16/16 03:04	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 03:04	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 03:04	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:04	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 03:04	79-34-5	
Tetrachloroethene	**0.90J**	ug/L	1.0	0.13	1		07/16/16 03:04	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 03:04	109-99-9	L3
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/16/16 03:04	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 03:04	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 03:04	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 03:04	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:04	79-00-5	
Trichloroethene	**0.26J**	ug/L	0.40	0.051	1		07/16/16 03:04	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 03:04	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 03:04	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 03:04	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 03:04	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 03:04	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 03:04	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 03:04	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	102	%.	75-125		1		07/16/16 03:04	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/16/16 03:04	2037-26-5	
4-Bromofluorobenzene (S)	100	%.	75-125		1		07/16/16 03:04	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-32 **Lab ID: 10354908009** Collected: 07/07/16 08:20 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**3.9J**	ug/L	20.0	0.64	1		07/16/16 03:20	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 03:20	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 03:20	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 03:20	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 03:20	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 03:20	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 03:20	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/16/16 03:20	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 03:20	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 03:20	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 03:20	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 03:20	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/16/16 03:20	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 03:20	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 03:20	75-00-3	
Chloroform	**0.42J**	ug/L	1.0	0.21	1		07/16/16 03:20	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 03:20	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 03:20	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 03:20	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/16/16 03:20	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/16/16 03:20	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 03:20	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 03:20	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 03:20	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 03:20	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 03:20	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 03:20	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 03:20	75-34-3	
1,2-Dichloroethane	**0.084J**	ug/L	1.0	0.072	1		07/16/16 03:20	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 03:20	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 03:20	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 03:20	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 03:20	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 03:20	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 03:20	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 03:20	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 03:20	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 03:20	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 03:20	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 03:20	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 03:20	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 03:20	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:20	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:20	99-87-6	
Methylene Chloride	**0.36J**	ug/L	4.0	0.097	1		07/16/16 03:20	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 03:20	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-32 **Lab ID: 10354908009** Collected: 07/07/16 08:20 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 03:20	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/16/16 03:20	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 03:20	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 03:20	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:20	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 03:20	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/16/16 03:20	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 03:20	109-99-9	L3
Toluene	**0.89J**	ug/L	1.0	0.059	1		07/16/16 03:20	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 03:20	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 03:20	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 03:20	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:20	79-00-5	
Trichloroethene	**<0.051**	ug/L	0.40	0.051	1		07/16/16 03:20	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 03:20	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 03:20	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 03:20	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 03:20	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 03:20	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 03:20	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 03:20	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	99	%.	75-125		1		07/16/16 03:20	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/16/16 03:20	2037-26-5	
4-Bromofluorobenzene (S)	101	%.	75-125		1		07/16/16 03:20	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-4 **Lab ID: 10354908010** Collected: 07/07/16 09:00 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/16/16 03:37	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 03:37	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 03:37	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 03:37	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 03:37	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 03:37	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 03:37	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/16/16 03:37	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 03:37	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 03:37	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 03:37	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 03:37	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/16/16 03:37	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 03:37	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 03:37	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/16/16 03:37	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 03:37	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 03:37	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 03:37	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/16/16 03:37	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/16/16 03:37	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 03:37	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 03:37	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 03:37	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 03:37	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 03:37	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 03:37	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 03:37	75-34-3	
1,2-Dichloroethane	**0.094J**	ug/L	1.0	0.072	1		07/16/16 03:37	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 03:37	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 03:37	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 03:37	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 03:37	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 03:37	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 03:37	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 03:37	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 03:37	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 03:37	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 03:37	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 03:37	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 03:37	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 03:37	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:37	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:37	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/16/16 03:37	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 03:37	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-4 **Lab ID: 10354908010** Collected: 07/07/16 09:00 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 03:37	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/16/16 03:37	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 03:37	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 03:37	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:37	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 03:37	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/16/16 03:37	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 03:37	109-99-9	L3
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/16/16 03:37	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 03:37	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 03:37	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 03:37	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:37	79-00-5	
Trichloroethene	**0.64**	ug/L	0.40	0.051	1		07/16/16 03:37	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 03:37	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 03:37	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 03:37	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 03:37	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 03:37	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 03:37	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 03:37	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	99	%.	75-125		1		07/16/16 03:37	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/16/16 03:37	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	75-125		1		07/16/16 03:37	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-33 **Lab ID: 10354908011** Collected: 07/07/16 09:20 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/16/16 03:53	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 03:53	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 03:53	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 03:53	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 03:53	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 03:53	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 03:53	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/16/16 03:53	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 03:53	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 03:53	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 03:53	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 03:53	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/16/16 03:53	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 03:53	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 03:53	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/16/16 03:53	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 03:53	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 03:53	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 03:53	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/16/16 03:53	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/16/16 03:53	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 03:53	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 03:53	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 03:53	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 03:53	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 03:53	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 03:53	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 03:53	75-34-3	
1,2-Dichloroethane	**0.12J**	ug/L	1.0	0.072	1		07/16/16 03:53	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 03:53	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 03:53	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 03:53	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 03:53	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 03:53	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 03:53	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 03:53	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 03:53	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 03:53	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 03:53	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 03:53	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 03:53	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 03:53	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:53	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:53	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/16/16 03:53	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 03:53	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-33 **Lab ID: 10354908011** Collected: 07/07/16 09:20 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 03:53	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/16/16 03:53	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 03:53	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 03:53	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:53	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 03:53	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/16/16 03:53	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 03:53	109-99-9	L3
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/16/16 03:53	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 03:53	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 03:53	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 03:53	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 03:53	79-00-5	
Trichloroethene	**0.75**	ug/L	0.40	0.051	1		07/16/16 03:53	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 03:53	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 03:53	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 03:53	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 03:53	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 03:53	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 03:53	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 03:53	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	100	%.	75-125		1		07/16/16 03:53	17060-07-0	
Toluene-d8 (S)	100	%.	75-125		1		07/16/16 03:53	2037-26-5	
4-Bromofluorobenzene (S)	101	%.	75-125		1		07/16/16 03:53	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-30 **Lab ID: 10354908012** Collected: 07/07/16 10:30 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**3.1J**	ug/L	20.0	0.64	1		07/16/16 04:09	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 04:09	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 04:09	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 04:09	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 04:09	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 04:09	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 04:09	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/16/16 04:09	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 04:09	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 04:09	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 04:09	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 04:09	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/16/16 04:09	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 04:09	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 04:09	75-00-3	
Chloroform	**0.47J**	ug/L	1.0	0.21	1		07/16/16 04:09	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 04:09	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 04:09	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 04:09	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/16/16 04:09	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/16/16 04:09	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 04:09	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 04:09	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 04:09	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 04:09	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 04:09	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 04:09	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:09	75-34-3	
1,2-Dichloroethane	**0.16J**	ug/L	1.0	0.072	1		07/16/16 04:09	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 04:09	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 04:09	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 04:09	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 04:09	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 04:09	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 04:09	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 04:09	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 04:09	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 04:09	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 04:09	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 04:09	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 04:09	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 04:09	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:09	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:09	99-87-6	
Methylene Chloride	**0.33J**	ug/L	4.0	0.097	1		07/16/16 04:09	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 04:09	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-30 **Lab ID: 10354908012** Collected: 07/07/16 10:30 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 04:09	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/16/16 04:09	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 04:09	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 04:09	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:09	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:09	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/16/16 04:09	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 04:09	109-99-9	L3
Toluene	**1.1**	ug/L	1.0	0.059	1		07/16/16 04:09	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 04:09	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 04:09	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 04:09	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:09	79-00-5	
Trichloroethene	**<0.051**	ug/L	0.40	0.051	1		07/16/16 04:09	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:09	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 04:09	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 04:09	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 04:09	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 04:09	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 04:09	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 04:09	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	100	%.	75-125		1		07/16/16 04:09	17060-07-0	
Toluene-d8 (S)	100	%.	75-125		1		07/16/16 04:09	2037-26-5	
4-Bromofluorobenzene (S)	100	%.	75-125		1		07/16/16 04:09	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-5 **Lab ID: 10354908013** Collected: 07/07/16 10:35 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/16/16 04:25	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 04:25	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 04:25	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 04:25	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 04:25	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 04:25	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 04:25	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/16/16 04:25	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 04:25	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 04:25	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 04:25	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 04:25	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/16/16 04:25	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 04:25	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 04:25	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/16/16 04:25	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 04:25	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 04:25	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 04:25	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/16/16 04:25	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/16/16 04:25	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 04:25	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 04:25	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 04:25	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 04:25	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 04:25	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 04:25	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:25	75-34-3	
1,2-Dichloroethane	**0.12J**	ug/L	1.0	0.072	1		07/16/16 04:25	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 04:25	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 04:25	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 04:25	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 04:25	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 04:25	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 04:25	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 04:25	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 04:25	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 04:25	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 04:25	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 04:25	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 04:25	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 04:25	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:25	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:25	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/16/16 04:25	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 04:25	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-5 **Lab ID: 10354908013** Collected: 07/07/16 10:35 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 04:25	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/16/16 04:25	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 04:25	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 04:25	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:25	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:25	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/16/16 04:25	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 04:25	109-99-9	L3
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/16/16 04:25	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 04:25	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 04:25	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 04:25	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:25	79-00-5	
Trichloroethene	**0.49**	ug/L	0.40	0.051	1		07/16/16 04:25	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:25	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 04:25	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 04:25	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 04:25	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 04:25	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 04:25	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 04:25	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	100	%.	75-125		1		07/16/16 04:25	17060-07-0	
Toluene-d8 (S)	99	%.	75-125		1		07/16/16 04:25	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	75-125		1		07/16/16 04:25	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-3 **Lab ID: 10354908014** Collected: 07/07/16 11:28 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**2.2J**	ug/L	20.0	0.64	1		07/16/16 06:34	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 06:34	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 06:34	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 06:34	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 06:34	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 06:34	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 06:34	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/16/16 06:34	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 06:34	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 06:34	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 06:34	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 06:34	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/16/16 06:34	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 06:34	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 06:34	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/16/16 06:34	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 06:34	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 06:34	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 06:34	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/16/16 06:34	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/16/16 06:34	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 06:34	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 06:34	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 06:34	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 06:34	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 06:34	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 06:34	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 06:34	75-34-3	
1,2-Dichloroethane	**0.15J**	ug/L	1.0	0.072	1		07/16/16 06:34	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 06:34	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 06:34	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 06:34	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 06:34	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 06:34	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 06:34	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 06:34	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 06:34	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 06:34	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 06:34	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 06:34	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 06:34	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 06:34	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 06:34	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 06:34	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/16/16 06:34	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 06:34	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-3 **Lab ID: 10354908014** Collected: 07/07/16 11:28 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 06:34	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/16/16 06:34	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 06:34	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 06:34	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 06:34	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 06:34	79-34-5	
Tetrachloroethene	**6.4**	ug/L	1.0	0.13	1		07/16/16 06:34	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 06:34	109-99-9	L3
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/16/16 06:34	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 06:34	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 06:34	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 06:34	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 06:34	79-00-5	
Trichloroethene	**0.43**	ug/L	0.40	0.051	1		07/16/16 06:34	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 06:34	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 06:34	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 06:34	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 06:34	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 06:34	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 06:34	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 06:34	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	97	%.	75-125		1		07/16/16 06:34	17060-07-0	
Toluene-d8 (S)	100	%.	75-125		1		07/16/16 06:34	2037-26-5	
4-Bromofluorobenzene (S)	101	%.	75-125		1		07/16/16 06:34	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-22 **Lab ID: 10354908015** Collected: 07/07/16 12:02 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/16/16 04:41	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 04:41	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 04:41	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 04:41	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 04:41	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 04:41	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 04:41	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/16/16 04:41	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 04:41	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 04:41	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 04:41	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 04:41	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/16/16 04:41	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 04:41	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 04:41	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/16/16 04:41	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 04:41	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 04:41	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 04:41	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/16/16 04:41	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/16/16 04:41	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 04:41	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 04:41	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 04:41	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 04:41	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 04:41	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 04:41	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:41	75-34-3	
1,2-Dichloroethane	**0.15J**	ug/L	1.0	0.072	1		07/16/16 04:41	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 04:41	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 04:41	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 04:41	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 04:41	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 04:41	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 04:41	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 04:41	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 04:41	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 04:41	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 04:41	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 04:41	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 04:41	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 04:41	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:41	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:41	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/16/16 04:41	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 04:41	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-22 **Lab ID: 10354908015** Collected: 07/07/16 12:02 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 04:41	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/16/16 04:41	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 04:41	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 04:41	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:41	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:41	79-34-5	
Tetrachloroethene	**0.56J**	ug/L	1.0	0.13	1		07/16/16 04:41	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 04:41	109-99-9	L3
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/16/16 04:41	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 04:41	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 04:41	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 04:41	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:41	79-00-5	
Trichloroethene	**<0.051**	ug/L	0.40	0.051	1		07/16/16 04:41	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:41	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 04:41	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 04:41	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 04:41	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 04:41	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 04:41	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 04:41	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	97	%.	75-125		1		07/16/16 04:41	17060-07-0	
Toluene-d8 (S)	100	%.	75-125		1		07/16/16 04:41	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	75-125		1		07/16/16 04:41	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-21 **Lab ID: 10354908016** Collected: 07/07/16 12:44 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<0.64**	ug/L	20.0	0.64	1		07/16/16 04:57	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 04:57	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 04:57	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 04:57	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 04:57	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 04:57	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 04:57	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/16/16 04:57	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 04:57	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 04:57	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 04:57	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 04:57	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/16/16 04:57	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 04:57	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 04:57	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/16/16 04:57	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 04:57	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 04:57	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 04:57	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/16/16 04:57	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/16/16 04:57	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 04:57	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 04:57	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 04:57	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 04:57	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 04:57	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 04:57	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:57	75-34-3	
1,2-Dichloroethane	**0.13J**	ug/L	1.0	0.072	1		07/16/16 04:57	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 04:57	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 04:57	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 04:57	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 04:57	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 04:57	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 04:57	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 04:57	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 04:57	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 04:57	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 04:57	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 04:57	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 04:57	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 04:57	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:57	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:57	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/16/16 04:57	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 04:57	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: MW-21 **Lab ID: 10354908016** Collected: 07/07/16 12:44 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 04:57	1634-04-4	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/16/16 04:57	91-20-3	
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 04:57	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 04:57	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:57	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:57	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/16/16 04:57	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 04:57	109-99-9	L3
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/16/16 04:57	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 04:57	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 04:57	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 04:57	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 04:57	79-00-5	
Trichloroethene	**<0.051**	ug/L	0.40	0.051	1		07/16/16 04:57	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 04:57	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 04:57	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 04:57	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 04:57	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 04:57	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 04:57	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 04:57	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	99	%.	75-125		1		07/16/16 04:57	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		07/16/16 04:57	2037-26-5	
4-Bromofluorobenzene (S)	101	%.	75-125		1		07/16/16 04:57	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: Trip Blank **Lab ID: 10354908017** Collected: 07/06/16 00:00 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**3.3J**	ug/L	20.0	0.64	1		07/16/16 01:27	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/16/16 01:27	107-05-1	
Benzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 01:27	71-43-2	
Bromobenzene	**<0.087**	ug/L	1.0	0.087	1		07/16/16 01:27	108-86-1	
Bromochloromethane	**<0.082**	ug/L	1.0	0.082	1		07/16/16 01:27	74-97-5	
Bromodichloromethane	**<0.068**	ug/L	1.0	0.068	1		07/16/16 01:27	75-27-4	
Bromoform	**<0.11**	ug/L	4.0	0.11	1		07/16/16 01:27	75-25-2	
Bromomethane	**<0.20**	ug/L	10.0	0.20	1		07/16/16 01:27	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/16/16 01:27	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/16/16 01:27	104-51-8	
sec-Butylbenzene	**<0.094**	ug/L	1.0	0.094	1		07/16/16 01:27	135-98-8	
tert-Butylbenzene	**<0.051**	ug/L	1.0	0.051	1		07/16/16 01:27	98-06-6	
Carbon tetrachloride	**<0.079**	ug/L	1.0	0.079	1		07/16/16 01:27	56-23-5	
Chlorobenzene	**<0.066**	ug/L	1.0	0.066	1		07/16/16 01:27	108-90-7	
Chloroethane	**<0.12**	ug/L	1.0	0.12	1		07/16/16 01:27	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/16/16 01:27	67-66-3	
Chloromethane	**<0.080**	ug/L	4.0	0.080	1		07/16/16 01:27	74-87-3	
2-Chlorotoluene	**<0.084**	ug/L	1.0	0.084	1		07/16/16 01:27	95-49-8	
4-Chlorotoluene	**<0.048**	ug/L	1.0	0.048	1		07/16/16 01:27	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/16/16 01:27	96-12-8	
Dibromochloromethane	**<0.048**	ug/L	1.0	0.048	1		07/16/16 01:27	124-48-1	
1,2-Dibromoethane (EDB)	**<0.092**	ug/L	1.0	0.092	1		07/16/16 01:27	106-93-4	
Dibromomethane	**<0.14**	ug/L	4.0	0.14	1		07/16/16 01:27	74-95-3	
1,2-Dichlorobenzene	**<0.078**	ug/L	1.0	0.078	1		07/16/16 01:27	95-50-1	
1,3-Dichlorobenzene	**<0.085**	ug/L	1.0	0.085	1		07/16/16 01:27	541-73-1	
1,4-Dichlorobenzene	**<0.081**	ug/L	1.0	0.081	1		07/16/16 01:27	106-46-7	
Dichlorodifluoromethane	**<0.075**	ug/L	1.0	0.075	1		07/16/16 01:27	75-71-8	
1,1-Dichloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 01:27	75-34-3	
1,2-Dichloroethane	**0.11J**	ug/L	1.0	0.072	1		07/16/16 01:27	107-06-2	B
1,1-Dichloroethene	**<0.069**	ug/L	1.0	0.069	1		07/16/16 01:27	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/16/16 01:27	156-59-2	
trans-1,2-Dichloroethene	**<0.15**	ug/L	1.0	0.15	1		07/16/16 01:27	156-60-5	
Dichlorofluoromethane	**<0.054**	ug/L	1.0	0.054	1		07/16/16 01:27	75-43-4	
1,2-Dichloropropane	**<0.066**	ug/L	4.0	0.066	1		07/16/16 01:27	78-87-5	
1,3-Dichloropropane	**<0.059**	ug/L	1.0	0.059	1		07/16/16 01:27	142-28-9	
2,2-Dichloropropane	**<0.096**	ug/L	4.0	0.096	1		07/16/16 01:27	594-20-7	
1,1-Dichloropropene	**<0.082**	ug/L	1.0	0.082	1		07/16/16 01:27	563-58-6	
cis-1,3-Dichloropropene	**<0.069**	ug/L	4.0	0.069	1		07/16/16 01:27	10061-01-5	
trans-1,3-Dichloropropene	**<0.044**	ug/L	4.0	0.044	1		07/16/16 01:27	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.090**	ug/L	4.0	0.090	1		07/16/16 01:27	60-29-7	
Ethylbenzene	**<0.075**	ug/L	1.0	0.075	1		07/16/16 01:27	100-41-4	
Hexachloro-1,3-butadiene	**<0.13**	ug/L	4.0	0.13	1		07/16/16 01:27	87-68-3	
Isopropylbenzene (Cumene)	**<0.064**	ug/L	1.0	0.064	1		07/16/16 01:27	98-82-8	
p-Isopropyltoluene	**<0.064**	ug/L	1.0	0.064	1		07/16/16 01:27	99-87-6	
Methylene Chloride	**<0.097**	ug/L	4.0	0.097	1		07/16/16 01:27	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.80**	ug/L	5.0	0.80	1		07/16/16 01:27	108-10-1	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: Trip Blank **Lab ID: 10354908017** Collected: 07/06/16 00:00 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.047**	ug/L	1.0	0.047	1		07/16/16 01:27	1634-04-4	
Naphthalene	**0.13J**	ug/L	4.0	0.064	1		07/16/16 01:27	91-20-3	B
n-Propylbenzene	**<0.049**	ug/L	1.0	0.049	1		07/16/16 01:27	103-65-1	
Styrene	**<0.056**	ug/L	1.0	0.056	1		07/16/16 01:27	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 01:27	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 01:27	79-34-5	
Tetrachloroethene	**<0.13**	ug/L	1.0	0.13	1		07/16/16 01:27	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/16/16 01:27	109-99-9	L3
Toluene	**<0.059**	ug/L	1.0	0.059	1		07/16/16 01:27	108-88-3	
1,2,3-Trichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/16/16 01:27	87-61-6	
1,2,4-Trichlorobenzene	**<0.14**	ug/L	1.0	0.14	1		07/16/16 01:27	120-82-1	
1,1,1-Trichloroethane	**<0.057**	ug/L	1.0	0.057	1		07/16/16 01:27	71-55-6	
1,1,2-Trichloroethane	**<0.064**	ug/L	1.0	0.064	1		07/16/16 01:27	79-00-5	
Trichloroethene	**<0.051**	ug/L	0.40	0.051	1		07/16/16 01:27	79-01-6	
Trichlorofluoromethane	**<0.055**	ug/L	1.0	0.055	1		07/16/16 01:27	75-69-4	
1,2,3-Trichloropropane	**<0.19**	ug/L	4.0	0.19	1		07/16/16 01:27	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.13**	ug/L	1.0	0.13	1		07/16/16 01:27	76-13-1	
1,2,4-Trimethylbenzene	**<0.068**	ug/L	1.0	0.068	1		07/16/16 01:27	95-63-6	
1,3,5-Trimethylbenzene	**<0.042**	ug/L	1.0	0.042	1		07/16/16 01:27	108-67-8	
Vinyl chloride	**<0.084**	ug/L	0.40	0.084	1		07/16/16 01:27	75-01-4	
Xylene (Total)	**<0.15**	ug/L	3.0	0.15	1		07/16/16 01:27	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	99	%.	75-125		1		07/16/16 01:27	17060-07-0	
Toluene-d8 (S)	98	%.	75-125		1		07/16/16 01:27	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	75-125		1		07/16/16 01:27	460-00-4	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: Trip Blank **Lab ID: 10354908018** Collected: 07/06/16 00:00 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
524.2 MSV	Analytical Method: EPA 524.2								
Acetone	**<2.8**	ug/L	20.0	2.8	1		07/18/16 12:44	67-64-1	
Acrylonitrile	**<3.5**	ug/L	10.0	3.5	1		07/18/16 12:44	107-13-1	
Benzene	**<0.21**	ug/L	0.50	0.21	1		07/18/16 12:44	71-43-2	
Bromobenzene	**<0.25**	ug/L	1.0	0.25	1		07/18/16 12:44	108-86-1	
Bromochloromethane	**<0.32**	ug/L	1.0	0.32	1		07/18/16 12:44	74-97-5	
Bromodichloromethane	**<0.14**	ug/L	1.0	0.14	1		07/18/16 12:44	75-27-4	
Bromoform	**<0.41**	ug/L	4.0	0.41	1		07/18/16 12:44	75-25-2	
Bromomethane	**<0.32**	ug/L	4.0	0.32	1		07/18/16 12:44	74-83-9	CL,L2
2-Butanone (MEK)	**<2.5**	ug/L	5.0	2.5	1		07/18/16 12:44	78-93-3	
n-Butylbenzene	**<0.083**	ug/L	0.50	0.083	1		07/18/16 12:44	104-51-8	
sec-Butylbenzene	**<0.16**	ug/L	0.50	0.16	1		07/18/16 12:44	135-98-8	
tert-Butylbenzene	**<0.18**	ug/L	0.50	0.18	1		07/18/16 12:44	98-06-6	
Carbon disulfide	**<0.22**	ug/L	1.0	0.22	1		07/18/16 12:44	75-15-0	
Carbon tetrachloride	**<0.35**	ug/L	1.0	0.35	1		07/18/16 12:44	56-23-5	
Chlorobenzene	**<0.23**	ug/L	0.50	0.23	1		07/18/16 12:44	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/18/16 12:44	75-00-3	
Chloroform	**<0.27**	ug/L	1.0	0.27	1		07/18/16 12:44	67-66-3	
Chloromethane	**<0.64**	ug/L	4.0	0.64	1		07/18/16 12:44	74-87-3	
2-Chlorotoluene	**<0.22**	ug/L	0.50	0.22	1		07/18/16 12:44	95-49-8	
4-Chlorotoluene	**<0.24**	ug/L	0.50	0.24	1		07/18/16 12:44	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.70**	ug/L	4.0	0.70	1		07/18/16 12:44	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	0.50	0.16	1		07/18/16 12:44	124-48-1	
1,2-Dibromoethane (EDB)	**<0.21**	ug/L	1.0	0.21	1		07/18/16 12:44	106-93-4	
Dibromomethane	**<0.31**	ug/L	1.0	0.31	1		07/18/16 12:44	74-95-3	
1,2-Dichlorobenzene	**<0.22**	ug/L	0.50	0.22	1		07/18/16 12:44	95-50-1	
1,3-Dichlorobenzene	**<0.21**	ug/L	0.50	0.21	1		07/18/16 12:44	541-73-1	
1,4-Dichlorobenzene	**<0.16**	ug/L	0.50	0.16	1		07/18/16 12:44	106-46-7	
trans-1,4-Dichloro-2-butene	**<0.48**	ug/L	10.0	0.48	1		07/18/16 12:44	110-57-6	
Dichlorodifluoromethane	**<0.49**	ug/L	1.0	0.49	1		07/18/16 12:44	75-71-8	
1,1-Dichloroethane	**<0.19**	ug/L	0.50	0.19	1		07/18/16 12:44	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	0.50	0.17	1		07/18/16 12:44	107-06-2	
1,1-Dichloroethene	**<0.17**	ug/L	0.50	0.17	1		07/18/16 12:44	75-35-4	
cis-1,2-Dichloroethene	**<0.17**	ug/L	0.50	0.17	1		07/18/16 12:44	156-59-2	
trans-1,2-Dichloroethene	**<0.18**	ug/L	0.50	0.18	1		07/18/16 12:44	156-60-5	
1,2-Dichloropropane	**<0.42**	ug/L	4.0	0.42	1		07/18/16 12:44	78-87-5	
1,3-Dichloropropane	**<0.24**	ug/L	0.50	0.24	1		07/18/16 12:44	142-28-9	
2,2-Dichloropropane	**<0.36**	ug/L	1.0	0.36	1		07/18/16 12:44	594-20-7	
1,1-Dichloropropene	**<0.16**	ug/L	0.50	0.16	1		07/18/16 12:44	563-58-6	
cis-1,3-Dichloropropene	**<0.21**	ug/L	0.50	0.21	1		07/18/16 12:44	10061-01-5	
trans-1,3-Dichloropropene	**<0.22**	ug/L	1.0	0.22	1		07/18/16 12:44	10061-02-6	
Ethylbenzene	**<0.23**	ug/L	0.50	0.23	1		07/18/16 12:44	100-41-4	
Ethyl methacrylate	**<0.56**	ug/L	5.0	0.56	1		07/18/16 12:44	97-63-2	
Hexachloro-1,3-butadiene	**<0.14**	ug/L	1.0	0.14	1		07/18/16 12:44	87-68-3	
2-Hexanone	**<2.3**	ug/L	5.0	2.3	1		07/18/16 12:44	591-78-6	
Isopropylbenzene (Cumene)	**<0.090**	ug/L	0.50	0.090	1		07/18/16 12:44	98-82-8	
p-Isopropyltoluene	**<0.097**	ug/L	0.50	0.097	1		07/18/16 12:44	99-87-6	

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ANALYTICAL RESULTS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Sample: Trip Blank **Lab ID: 10354908018** Collected: 07/06/16 00:00 Received: 07/08/16 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
524.2 MSV	Analytical Method: EPA 524.2								
Methylene Chloride	**<0.56**	ug/L	4.0	0.56	1		07/18/16 12:44	75-09-2	
Methyl methacrylate	**<0.50**	ug/L	5.0	0.50	1		07/18/16 12:44	80-62-6	
4-Methyl-2-pentanone (MIBK)	**<2.4**	ug/L	5.0	2.4	1		07/18/16 12:44	108-10-1	
Methyl-tert-butyl ether	**<0.16**	ug/L	0.50	0.16	1		07/18/16 12:44	1634-04-4	
Naphthalene	**<0.14**	ug/L	1.0	0.14	1		07/18/16 12:44	91-20-3	
2-Nitropropane	**<2.0**	ug/L	10.0	2.0	1		07/18/16 12:44	79-46-9	
n-Propylbenzene	**<0.21**	ug/L	0.50	0.21	1		07/18/16 12:44	103-65-1	
Styrene	**<0.11**	ug/L	0.50	0.11	1		07/18/16 12:44	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.20**	ug/L	0.50	0.20	1		07/18/16 12:44	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.19**	ug/L	0.50	0.19	1		07/18/16 12:44	79-34-5	
Tetrachloroethene	**<0.15**	ug/L	1.0	0.15	1		07/18/16 12:44	127-18-4	
Toluene	**<0.12**	ug/L	0.50	0.12	1		07/18/16 12:44	108-88-3	
Total Trihalomethanes (Calc.)	**<2.0**	ug/L	4.0	2.0	1		07/18/16 12:44		
1,2,3-Trichlorobenzene	**<0.23**	ug/L	0.50	0.23	1		07/18/16 12:44	87-61-6	
1,2,4-Trichlorobenzene	**<0.22**	ug/L	0.50	0.22	1		07/18/16 12:44	120-82-1	
1,1,1-Trichloroethane	**<0.20**	ug/L	0.50	0.20	1		07/18/16 12:44	71-55-6	
1,1,2-Trichloroethane	**<0.24**	ug/L	0.50	0.24	1		07/18/16 12:44	79-00-5	
Trichloroethene	**<0.14**	ug/L	0.40	0.14	1		07/18/16 12:44	79-01-6	
Trichlorofluoromethane	**<0.18**	ug/L	0.50	0.18	1		07/18/16 12:44	75-69-4	
1,2,3-Trichloropropane	**<0.34**	ug/L	4.0	0.34	1		07/18/16 12:44	96-18-4	
1,2,4-Trimethylbenzene	**<0.16**	ug/L	0.50	0.16	1		07/18/16 12:44	95-63-6	
1,3,5-Trimethylbenzene	**<0.20**	ug/L	0.50	0.20	1		07/18/16 12:44	108-67-8	
Vinyl chloride	**<0.081**	ug/L	0.20	0.081	1		07/18/16 12:44	75-01-4	
Xylene (Total)	**<0.41**	ug/L	1.5	0.41	1		07/18/16 12:44	1330-20-7	
m&p-Xylene	**<0.41**	ug/L	1.0	0.41	1		07/18/16 12:44	179601-23-1	
o-Xylene	**<0.14**	ug/L	0.50	0.14	1		07/18/16 12:44	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	103	%.	75-125		1		07/18/16 12:44	460-00-4	
Toluene-d8 (S)	97	%.	75-125		1		07/18/16 12:44	2037-26-5	
1,2-Dichloroethane-d4 (S)	110	%.	75-125		1		07/18/16 12:44	17060-07-0	

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

QC Batch: 425629 | Analysis Method: EPA 524.2
QC Batch Method: EPA 524.2 | Analysis Description: 524.2 MSV
Associated Lab Samples: 10354908006, 10354908018

METHOD BLANK: 2317904 | Matrix: Water
Associated Lab Samples: 10354908006, 10354908018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.20	0.50	0.20	07/18/16 11:38	
1,1,1-Trichloroethane	ug/L	<0.20	0.50	0.20	07/18/16 11:38	
1,1,2,2-Tetrachloroethane	ug/L	<0.19	0.50	0.19	07/18/16 11:38	
1,1,2-Trichloroethane	ug/L	<0.24	0.50	0.24	07/18/16 11:38	
1,1-Dichloroethane	ug/L	<0.19	0.50	0.19	07/18/16 11:38	
1,1-Dichloroethene	ug/L	<0.17	0.50	0.17	07/18/16 11:38	
1,1-Dichloropropene	ug/L	<0.16	0.50	0.16	07/18/16 11:38	
1,2,3-Trichlorobenzene	ug/L	<0.23	0.50	0.23	07/18/16 11:38	
1,2,3-Trichloropropane	ug/L	<0.34	4.0	0.34	07/18/16 11:38	
1,2,4-Trichlorobenzene	ug/L	<0.22	0.50	0.22	07/18/16 11:38	
1,2,4-Trimethylbenzene	ug/L	<0.16	0.50	0.16	07/18/16 11:38	
1,2-Dibromo-3-chloropropane	ug/L	<0.70	4.0	0.70	07/18/16 11:38	
1,2-Dibromoethane (EDB)	ug/L	<0.21	1.0	0.21	07/18/16 11:38	
1,2-Dichlorobenzene	ug/L	<0.22	0.50	0.22	07/18/16 11:38	
1,2-Dichloroethane	ug/L	<0.17	0.50	0.17	07/18/16 11:38	
1,2-Dichloropropane	ug/L	<0.42	4.0	0.42	07/18/16 11:38	
1,3,5-Trimethylbenzene	ug/L	<0.20	0.50	0.20	07/18/16 11:38	
1,3-Dichlorobenzene	ug/L	<0.21	0.50	0.21	07/18/16 11:38	
1,3-Dichloropropane	ug/L	<0.24	0.50	0.24	07/18/16 11:38	
1,4-Dichlorobenzene	ug/L	<0.16	0.50	0.16	07/18/16 11:38	
2,2-Dichloropropane	ug/L	<0.36	1.0	0.36	07/18/16 11:38	
2-Butanone (MEK)	ug/L	<2.5	5.0	2.5	07/18/16 11:38	
2-Chlorotoluene	ug/L	<0.22	0.50	0.22	07/18/16 11:38	
2-Hexanone	ug/L	<2.3	5.0	2.3	07/18/16 11:38	
2-Nitropropane	ug/L	<2.0	10.0	2.0	07/18/16 11:38	
4-Chlorotoluene	ug/L	<0.24	0.50	0.24	07/18/16 11:38	
4-Methyl-2-pentanone (MIBK)	ug/L	<2.4	5.0	2.4	07/18/16 11:38	
Acetone	ug/L	<2.8	20.0	2.8	07/18/16 11:38	
Acrylonitrile	ug/L	<3.5	10.0	3.5	07/18/16 11:38	
Benzene	ug/L	<0.21	0.50	0.21	07/18/16 11:38	
Bromobenzene	ug/L	<0.25	1.0	0.25	07/18/16 11:38	
Bromochloromethane	ug/L	<0.32	1.0	0.32	07/18/16 11:38	
Bromodichloromethane	ug/L	<0.14	1.0	0.14	07/18/16 11:38	
Bromoform	ug/L	<0.41	4.0	0.41	07/18/16 11:38	
Bromomethane	ug/L	<0.32	4.0	0.32	07/18/16 11:38	CL
Carbon disulfide	ug/L	<0.22	1.0	0.22	07/18/16 11:38	
Carbon tetrachloride	ug/L	<0.35	1.0	0.35	07/18/16 11:38	
Chlorobenzene	ug/L	<0.23	0.50	0.23	07/18/16 11:38	
Chloroethane	ug/L	<0.34	1.0	0.34	07/18/16 11:38	
Chloroform	ug/L	<0.27	1.0	0.27	07/18/16 11:38	
Chloromethane	ug/L	<0.64	4.0	0.64	07/18/16 11:38	

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

METHOD BLANK: 2317904 Matrix: Water
Associated Lab Samples: 10354908006, 10354908018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,2-Dichloroethene	ug/L	<0.17	0.50	0.17	07/18/16 11:38	
cis-1,3-Dichloropropene	ug/L	<0.21	0.50	0.21	07/18/16 11:38	
Dibromochloromethane	ug/L	<0.16	0.50	0.16	07/18/16 11:38	
Dibromomethane	ug/L	<0.31	1.0	0.31	07/18/16 11:38	
Dichlorodifluoromethane	ug/L	<0.49	1.0	0.49	07/18/16 11:38	
Ethyl methacrylate	ug/L	<0.56	5.0	0.56	07/18/16 11:38	
Ethylbenzene	ug/L	<0.23	0.50	0.23	07/18/16 11:38	
Hexachloro-1,3-butadiene	ug/L	<0.14	1.0	0.14	07/18/16 11:38	
Isopropylbenzene (Cumene)	ug/L	<0.090	0.50	0.090	07/18/16 11:38	
m&p-Xylene	ug/L	<0.41	1.0	0.41	07/18/16 11:38	
Methyl methacrylate	ug/L	<0.50	5.0	0.50	07/18/16 11:38	
Methyl-tert-butyl ether	ug/L	<0.16	0.50	0.16	07/18/16 11:38	
Methylene Chloride	ug/L	<0.56	4.0	0.56	07/18/16 11:38	
n-Butylbenzene	ug/L	<0.083	0.50	0.083	07/18/16 11:38	
n-Propylbenzene	ug/L	<0.21	0.50	0.21	07/18/16 11:38	
Naphthalene	ug/L	<0.14	1.0	0.14	07/18/16 11:38	
o-Xylene	ug/L	<0.14	0.50	0.14	07/18/16 11:38	
p-Isopropyltoluene	ug/L	<0.097	0.50	0.097	07/18/16 11:38	
sec-Butylbenzene	ug/L	<0.16	0.50	0.16	07/18/16 11:38	
Styrene	ug/L	<0.11	0.50	0.11	07/18/16 11:38	
tert-Butylbenzene	ug/L	<0.18	0.50	0.18	07/18/16 11:38	
Tetrachloroethene	ug/L	<0.15	1.0	0.15	07/18/16 11:38	
Toluene	ug/L	<0.12	0.50	0.12	07/18/16 11:38	
Total Trihalomethanes (Calc.)	ug/L	<2.0	4.0	2.0	07/18/16 11:38	
trans-1,2-Dichloroethene	ug/L	<0.18	0.50	0.18	07/18/16 11:38	
trans-1,3-Dichloropropene	ug/L	<0.22	1.0	0.22	07/18/16 11:38	
trans-1,4-Dichloro-2-butene	ug/L	<0.48	10.0	0.48	07/18/16 11:38	
Trichloroethene	ug/L	<0.14	0.40	0.14	07/18/16 11:38	
Trichlorofluoromethane	ug/L	<0.18	0.50	0.18	07/18/16 11:38	
Vinyl chloride	ug/L	<0.081	0.20	0.081	07/18/16 11:38	
Xylene (Total)	ug/L	<0.41	1.5	0.41	07/18/16 11:38	
1,2-Dichloroethane-d4 (S)	%.	112	75-125		07/18/16 11:38	
4-Bromofluorobenzene (S)	%.	100	75-125		07/18/16 11:38	
Toluene-d8 (S)	%.	98	75-125		07/18/16 11:38	

LABORATORY CONTROL SAMPLE & LCSD: 2317905 2317906

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	20.2	20.1	101	101	70-130	0	20	
1,1,1-Trichloroethane	ug/L	20	19.4	20.5	97	102	70-130	5	20	
1,1,2,2-Tetrachloroethane	ug/L	20	19.5	18.9	98	95	70-130	3	20	
1,1,2-Trichloroethane	ug/L	20	19.8	19.5	99	98	70-130	2	20	
1,1-Dichloroethane	ug/L	20	20.5	21.7	102	109	70-130	6	20	
1,1-Dichloroethene	ug/L	20	18.4	19.9	92	99	70-130	8	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

LABORATORY CONTROL SAMPLE & LCSD: 2317905 2317906

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,1-Dichloropropene	ug/L	20	19.0	20.0	95	100	70-130	5	20	
1,2,3-Trichlorobenzene	ug/L	20	18.2	18.3	91	92	70-130	1	20	
1,2,3-Trichloropropane	ug/L	20	18.4	18.7	92	94	70-130	2	20	
1,2,4-Trichlorobenzene	ug/L	20	19.9	19.0	99	95	70-130	5	20	
1,2,4-Trimethylbenzene	ug/L	20	19.9	18.9	100	94	70-130	6	20	
1,2-Dibromo-3-chloropropane	ug/L	50	43.7	44.3	87	89	70-130	1	20	
1,2-Dibromoethane (EDB)	ug/L	20	18.9	18.9	95	94	70-130	0	20	
1,2-Dichlorobenzene	ug/L	20	20.3	18.8	101	94	70-130	8	20	
1,2-Dichloroethane	ug/L	20	20.3	21.7	102	108	70-130	6	20	
1,2-Dichloropropane	ug/L	20	20.0	20.1	100	101	70-130	0	20	
1,3,5-Trimethylbenzene	ug/L	20	19.6	18.7	98	94	70-130	5	20	
1,3-Dichlorobenzene	ug/L	20	19.3	18.8	96	94	70-130	3	20	
1,3-Dichloropropane	ug/L	20	19.8	19.5	99	98	70-130	1	20	
1,4-Dichlorobenzene	ug/L	20	19.8	18.6	99	93	70-130	6	20	
2,2-Dichloropropane	ug/L	20	20.0	21.1	100	106	70-130	6	20	
2-Butanone (MEK)	ug/L	100	96.9	110	97	110	70-130	13	20	
2-Chlorotoluene	ug/L	20	19.7	18.4	99	92	70-130	7	20	
2-Hexanone	ug/L	100	101	107	101	107	70-130	6	20	
2-Nitropropane	ug/L	100	95.9	99.9	96	100	70-130	4	20	
4-Chlorotoluene	ug/L	20	19.5	18.7	97	93	70-130	4	20	
4-Methyl-2-pentanone (MIBK)	ug/L	100	104	108	104	108	70-130	4	20	
Acetone	ug/L	100	94.5	88.7	95	89	70-130	6	20	
Acrylonitrile	ug/L	200	200	226	100	113	70-130	12	20	
Benzene	ug/L	20	18.0	18.6	90	93	70-130	4	20	
Bromobenzene	ug/L	20	18.9	18.0	94	90	70-130	5	20	
Bromochloromethane	ug/L	20	18.8	20.8	94	104	70-130	11	20	
Bromodichloromethane	ug/L	20	20.3	20.1	102	100	70-130	1	20	
Bromoform	ug/L	20	18.2	18.0	91	90	70-130	1	20	
Bromomethane	ug/L	20	13.5	16.2	68	81	70-130	18	20	CL,L0
Carbon disulfide	ug/L	20	18.0	18.9	90	95	70-130	5	20	
Carbon tetrachloride	ug/L	20	20.0	20.9	100	104	70-130	4	20	
Chlorobenzene	ug/L	20	19.7	19.1	98	95	70-130	3	20	
Chloroethane	ug/L	20	23.0	23.9	115	120	70-130	4	20	
Chloroform	ug/L	20	19.4	20.7	97	103	70-130	6	20	
Chloromethane	ug/L	20	17.0	17.6	85	88	70-130	3	20	
cis-1,2-Dichloroethene	ug/L	20	18.3	19.4	92	97	70-130	5	20	
cis-1,3-Dichloropropene	ug/L	20	20.0	20.1	100	101	70-130	0	20	
Dibromochloromethane	ug/L	20	18.5	18.4	93	92	70-130	1	20	
Dibromomethane	ug/L	20	19.0	18.7	95	94	70-130	2	20	
Dichlorodifluoromethane	ug/L	20	19.4	20.8	97	104	70-130	7	20	
Ethyl methacrylate	ug/L	20	19.7	19.3	98	97	70-130	2	20	
Ethylbenzene	ug/L	20	19.9	19.0	100	95	70-130	5	20	
Hexachloro-1,3-butadiene	ug/L	20	18.1	18.0	90	90	70-130	0	20	
Isopropylbenzene (Cumene)	ug/L	20	19.6	19.2	98	96	70-130	2	20	
m&p-Xylene	ug/L	40	38.9	37.7	97	94	70-130	3	20	
Methyl methacrylate	ug/L	20	19.1	19.7	96	99	70-130	3	20	
Methyl-tert-butyl ether	ug/L	20	19.4	20.9	97	105	70-130	8	20	

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

LABORATORY CONTROL SAMPLE & LCSD: 2317905 2317906

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Methylene Chloride	ug/L	20	18.4	19.4	92	97	70-130	5	20	
n-Butylbenzene	ug/L	20	20.3	19.6	101	98	70-130	3	20	
n-Propylbenzene	ug/L	20	19.7	19.1	98	95	70-130	3	20	
Naphthalene	ug/L	20	18.1	18.0	90	90	70-130	0	20	
o-Xylene	ug/L	20	19.6	19.1	98	95	70-130	2	20	
p-Isopropyltoluene	ug/L	20	19.4	18.8	97	94	70-130	3	20	
sec-Butylbenzene	ug/L	20	19.8	18.8	99	94	70-130	5	20	
Styrene	ug/L	20	19.3	18.8	96	94	70-130	3	20	
tert-Butylbenzene	ug/L	20	19.5	18.4	97	92	70-130	6	20	
Tetrachloroethene	ug/L	20	18.4	17.5	92	88	70-130	5	20	
Toluene	ug/L	20	18.7	18.1	94	91	70-130	3	20	
Total Trihalomethanes (Calc.)	ug/L	80	76.5	77.1	96	96	70-130	1	20	
trans-1,2-Dichloroethene	ug/L	20	18.8	20.3	94	101	70-130	8	20	
trans-1,3-Dichloropropene	ug/L	20	19.7	19.1	99	96	70-130	3	20	
trans-1,4-Dichloro-2-butene	ug/L	50	49.2	48.7	98	97	70-130	1	20	
Trichloroethene	ug/L	20	20.3	20.1	101	100	70-130	1	20	
Trichlorofluoromethane	ug/L	20	22.1	23.1	111	115	70-130	4	20	
Vinyl chloride	ug/L	20	19.8	20.7	99	104	70-130	4	20	
Xylene (Total)	ug/L	60	58.5	56.8	97	95	70-130	3	20	
1,2-Dichloroethane-d4 (S)	%.				104	108	75-125			
4-Bromofluorobenzene (S)	%.				102	99	75-125			
Toluene-d8 (S)	%.				98	98	75-125			

MATRIX SPIKE SAMPLE: 2317907

Parameter	Units	10355253001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	20	21.0	105	70-130	
1,1,1-Trichloroethane	ug/L	ND	20	22.4	112	70-130	
1,1,2,2-Tetrachloroethane	ug/L	ND	20	19.1	95	70-130	
1,1,2-Trichloroethane	ug/L	ND	20	20.1	101	70-130	
1,1-Dichloroethane	ug/L	ND	20	22.2	111	70-130	
1,1-Dichloroethene	ug/L	ND	20	21.8	109	70-130	
1,1-Dichloropropene	ug/L	ND	20	22.8	114	70-130	
1,2,3-Trichlorobenzene	ug/L	ND	20	19.0	95	70-130	
1,2,3-Trichloropropane	ug/L	ND	20	18.7	93	70-130	
1,2,4-Trichlorobenzene	ug/L	ND	20	20.5	102	70-130	
1,2,4-Trimethylbenzene	ug/L	ND	20	20.8	104	70-130	
1,2-Dibromo-3-chloropropane	ug/L	ND	50	45.4	91	70-130	
1,2-Dibromoethane (EDB)	ug/L	ND	20	18.9	94	70-130	
1,2-Dichlorobenzene	ug/L	ND	20	20.2	101	70-130	
1,2-Dichloroethane	ug/L	ND	20	22.9	114	70-130	
1,2-Dichloropropane	ug/L	ND	20	20.2	101	70-130	
1,3,5-Trimethylbenzene	ug/L	ND	20	20.6	103	70-130	
1,3-Dichlorobenzene	ug/L	ND	20	19.2	96	70-130	
1,3-Dichloropropane	ug/L	ND	20	20.2	101	70-130	

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

MATRIX SPIKE SAMPLE: 2317907

Parameter	Units	10355253001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,4-Dichlorobenzene	ug/L	ND	20	19.5	98	70-130	
2,2-Dichloropropane	ug/L	ND	20	23.3	116	70-130	
2-Butanone (MEK)	ug/L	ND	100	107	107	70-130	
2-Chlorotoluene	ug/L	ND	20	20.1	100	70-130	
2-Hexanone	ug/L	ND	100	105	105	70-130	
2-Nitropropane	ug/L	ND	100	98.7	99	70-130	
4-Chlorotoluene	ug/L	ND	20	19.9	100	70-130	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	107	107	70-130	
Acetone	ug/L	ND	100	92.7	93	70-130	
Acrylonitrile	ug/L	ND	200	222	111	70-130	
Benzene	ug/L	ND	20	21.3	106	70-130	
Bromobenzene	ug/L	ND	20	19.0	95	70-130	
Bromochloromethane	ug/L	ND	20	21.9	110	70-130	
Bromodichloromethane	ug/L	6.5	20	27.8	106	70-130	
Bromoform	ug/L	ND	20	17.5	88	70-130	
Bromomethane	ug/L	ND	20	20.1	101	70-130	CL
Carbon disulfide	ug/L	ND	20	24.4	122	70-130	
Carbon tetrachloride	ug/L	ND	20	25.7	129	70-130	
Chlorobenzene	ug/L	ND	20	20.9	104	70-130	
Chloroethane	ug/L	ND	20	29.4	147	70-130	M1
Chloroform	ug/L	29.7	20	56.1	132	70-130	M1
Chloromethane	ug/L	ND	20	21.4	107	70-130	
cis-1,2-Dichloroethene	ug/L	ND	20	20.7	103	70-130	
cis-1,3-Dichloropropene	ug/L	ND	20	20.3	101	70-130	
Dibromochloromethane	ug/L	ND	20	19.8	97	70-130	
Dibromomethane	ug/L	ND	20	19.3	96	70-130	
Dichlorodifluoromethane	ug/L	ND	20	29.5	148	70-130	M1
Ethyl methacrylate	ug/L	ND	20	20.0	100	70-130	
Ethylbenzene	ug/L	ND	20	20.6	103	70-130	
Hexachloro-1,3-butadiene	ug/L	ND	20	20.5	102	70-130	
Isopropylbenzene (Cumene)	ug/L	ND	20	20.6	103	70-130	
m&p-Xylene	ug/L	ND	40	40.6	102	70-130	
Methyl methacrylate	ug/L	ND	20	19.6	98	70-130	
Methyl-tert-butyl ether	ug/L	ND	20	21.7	108	70-130	
Methylene Chloride	ug/L	ND	20	21.0	105	70-130	
n-Butylbenzene	ug/L	ND	20	21.9	110	70-130	
n-Propylbenzene	ug/L	ND	20	20.0	100	70-130	
Naphthalene	ug/L	ND	20	18.8	94	70-130	
o-Xylene	ug/L	ND	20	20.0	100	70-130	
p-Isopropyltoluene	ug/L	ND	20	21.7	108	70-130	
sec-Butylbenzene	ug/L	ND	20	20.3	102	70-130	
Styrene	ug/L	ND	20	20.5	103	70-130	
tert-Butylbenzene	ug/L	ND	20	19.6	98	70-130	
Tetrachloroethene	ug/L	ND	20	19.8	99	70-130	
Toluene	ug/L	ND	20	19.9	100	70-130	
Total Trihalomethanes (Calc.)	ug/L	36.6	80	121	106	70-130	
trans-1,2-Dichloroethene	ug/L	ND	20	22.6	113	70-130	

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

MATRIX SPIKE SAMPLE: 2317907

Parameter	Units	10355253001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
trans-1,3-Dichloropropene	ug/L	ND	20	19.4	97	70-130	
trans-1,4-Dichloro-2-butene	ug/L	ND	50	51.8	104	70-130	
Trichloroethene	ug/L	ND	20	21.8	109	70-130	
Trichlorofluoromethane	ug/L	ND	20	30.7	154	70-130	M1
Vinyl chloride	ug/L	ND	20	25.2	126	70-130	
Xylene (Total)	ug/L	ND	60	60.6	101	70-130	
1,2-Dichloroethane-d4 (S)	%.				109	75-125	
4-Bromofluorobenzene (S)	%.				99	75-125	
Toluene-d8 (S)	%.				98	75-125	

SAMPLE DUPLICATE: 2317908

Parameter	Units	10355253002 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	<0.20		20	
1,1,1-Trichloroethane	ug/L	ND	<0.20		20	
1,1,2,2-Tetrachloroethane	ug/L	ND	<0.19		20	
1,1,2-Trichloroethane	ug/L	ND	<0.24		20	
1,1-Dichloroethane	ug/L	ND	<0.19		20	
1,1-Dichloroethene	ug/L	ND	<0.17		20	
1,1-Dichloropropene	ug/L	ND	<0.16		20	
1,2,3-Trichlorobenzene	ug/L	ND	<0.23		20	
1,2,3-Trichloropropane	ug/L	ND	<0.34		20	
1,2,4-Trichlorobenzene	ug/L	ND	<0.22		20	
1,2,4-Trimethylbenzene	ug/L	ND	<0.16		20	
1,2-Dibromo-3-chloropropane	ug/L	ND	<0.70		20	
1,2-Dibromoethane (EDB)	ug/L	ND	<0.21		20	
1,2-Dichlorobenzene	ug/L	ND	<0.22		20	
1,2-Dichloroethane	ug/L	ND	<0.17		20	
1,2-Dichloropropane	ug/L	ND	<0.42		20	
1,3,5-Trimethylbenzene	ug/L	ND	<0.20		20	
1,3-Dichlorobenzene	ug/L	ND	<0.21		20	
1,3-Dichloropropane	ug/L	ND	<0.24		20	
1,4-Dichlorobenzene	ug/L	ND	<0.16		20	
2,2-Dichloropropane	ug/L	ND	<0.36		20	
2-Butanone (MEK)	ug/L	ND	<2.5		20	
2-Chlorotoluene	ug/L	ND	<0.22		20	
2-Hexanone	ug/L	ND	<2.3		20	
2-Nitropropane	ug/L	ND	<2.0		20	
4-Chlorotoluene	ug/L	ND	<0.24		20	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	<2.4		20	
Acetone	ug/L	ND	<2.8		20	
Acrylonitrile	ug/L	ND	<3.5		20	
Benzene	ug/L	ND	<0.21		20	
Bromobenzene	ug/L	ND	<0.25		20	
Bromochloromethane	ug/L	ND	<0.32		20	

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

SAMPLE DUPLICATE: 2317908

Parameter	Units	10355253002 Result	Dup Result	RPD	Max RPD	Qualifiers
Bromodichloromethane	ug/L	6.5	6.4	1	20	
Bromoform	ug/L	ND	<0.41		20	
Bromomethane	ug/L	ND	<0.32		20	CL
Carbon disulfide	ug/L	ND	<0.22		20	
Carbon tetrachloride	ug/L	ND	<0.35		20	
Chlorobenzene	ug/L	ND	<0.23		20	
Chloroethane	ug/L	ND	<0.34		20	
Chloroform	ug/L	32.1	33.6	4	20	
Chloromethane	ug/L	ND	<0.64		20	
cis-1,2-Dichloroethene	ug/L	ND	<0.17		20	
cis-1,3-Dichloropropene	ug/L	ND	<0.21		20	
Dibromochloromethane	ug/L	ND	0.47J		20	
Dibromomethane	ug/L	ND	<0.31		20	
Dichlorodifluoromethane	ug/L	ND	<0.49		20	
Ethyl methacrylate	ug/L	ND	<0.56		20	
Ethylbenzene	ug/L	ND	<0.23		20	
Hexachloro-1,3-butadiene	ug/L	ND	<0.14		20	
Isopropylbenzene (Cumene)	ug/L	ND	<0.090		20	
m&p-Xylene	ug/L	ND	<0.41		20	
Methyl methacrylate	ug/L	ND	<0.50		20	
Methyl-tert-butyl ether	ug/L	ND	<0.16		20	
Methylene Chloride	ug/L	ND	<0.56		20	
n-Butylbenzene	ug/L	ND	<0.083		20	
n-Propylbenzene	ug/L	ND	<0.21		20	
Naphthalene	ug/L	ND	<0.14		20	
o-Xylene	ug/L	ND	<0.14		20	
p-Isopropyltoluene	ug/L	ND	<0.097		20	
sec-Butylbenzene	ug/L	ND	<0.16		20	
Styrene	ug/L	ND	<0.11		20	
tert-Butylbenzene	ug/L	ND	<0.18		20	
Tetrachloroethene	ug/L	ND	<0.15		20	
Toluene	ug/L	ND	<0.12		20	
Total Trihalomethanes (Calc.)	ug/L	39.1	40.5	4	20	
trans-1,2-Dichloroethene	ug/L	ND	<0.18		20	
trans-1,3-Dichloropropene	ug/L	ND	<0.22		20	
trans-1,4-Dichloro-2-butene	ug/L	ND	<0.48		20	
Trichloroethene	ug/L	ND	<0.14		20	
Trichlorofluoromethane	ug/L	ND	<0.18		20	
Vinyl chloride	ug/L	ND	<0.081		20	
Xylene (Total)	ug/L	ND	<0.41		20	
1,2-Dichloroethane-d4 (S)	%.	116	114	1		
4-Bromofluorobenzene (S)	%.	99	99	1		
Toluene-d8 (S)	%.	97	96	1		

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

QC Batch: 425670 | Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B | Analysis Description: 8260B MSV 465 W
Associated Lab Samples: 10354908001, 10354908002, 10354908003, 10354908004

METHOD BLANK: 2318144 | Matrix: Water
Associated Lab Samples: 10354908001, 10354908002, 10354908003, 10354908004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.064	4.0	0.064	07/16/16 03:10	
1,1,1-Trichloroethane	ug/L	<0.057	1.0	0.057	07/16/16 03:10	
1,1,2,2-Tetrachloroethane	ug/L	<0.055	1.0	0.055	07/16/16 03:10	
1,1,2-Trichloroethane	ug/L	<0.064	1.0	0.064	07/16/16 03:10	
1,1,2-Trichlorotrifluoroethane	ug/L	<0.13	1.0	0.13	07/16/16 03:10	
1,1-Dichloroethane	ug/L	<0.055	1.0	0.055	07/16/16 03:10	
1,1-Dichloroethene	ug/L	<0.069	1.0	0.069	07/16/16 03:10	
1,1-Dichloropropene	ug/L	<0.082	1.0	0.082	07/16/16 03:10	
1,2,3-Trichlorobenzene	ug/L	<0.17	1.0	0.17	07/16/16 03:10	
1,2,3-Trichloropropane	ug/L	<0.19	4.0	0.19	07/16/16 03:10	
1,2,4-Trichlorobenzene	ug/L	<0.14	1.0	0.14	07/16/16 03:10	
1,2,4-Trimethylbenzene	ug/L	<0.068	1.0	0.068	07/16/16 03:10	
1,2-Dibromo-3-chloropropane	ug/L	<0.60	10.0	0.60	07/16/16 03:10	
1,2-Dibromoethane (EDB)	ug/L	<0.092	1.0	0.092	07/16/16 03:10	
1,2-Dichlorobenzene	ug/L	<0.078	1.0	0.078	07/16/16 03:10	
1,2-Dichloroethane	ug/L	0.092J	1.0	0.072	07/16/16 03:10	
1,2-Dichloropropane	ug/L	<0.066	4.0	0.066	07/16/16 03:10	
1,3,5-Trimethylbenzene	ug/L	<0.042	1.0	0.042	07/16/16 03:10	
1,3-Dichlorobenzene	ug/L	<0.085	1.0	0.085	07/16/16 03:10	
1,3-Dichloropropane	ug/L	<0.059	1.0	0.059	07/16/16 03:10	
1,4-Dichlorobenzene	ug/L	<0.081	1.0	0.081	07/16/16 03:10	
2,2-Dichloropropane	ug/L	<0.096	4.0	0.096	07/16/16 03:10	
2-Butanone (MEK)	ug/L	<1.1	5.0	1.1	07/16/16 03:10	
2-Chlorotoluene	ug/L	<0.084	1.0	0.084	07/16/16 03:10	
4-Chlorotoluene	ug/L	<0.048	1.0	0.048	07/16/16 03:10	
4-Methyl-2-pentanone (MIBK)	ug/L	<0.80	5.0	0.80	07/16/16 03:10	
Acetone	ug/L	2.2J	20.0	0.64	07/16/16 03:10	
Allyl chloride	ug/L	<0.25	4.0	0.25	07/16/16 03:10	
Benzene	ug/L	<0.042	1.0	0.042	07/16/16 03:10	
Bromobenzene	ug/L	<0.087	1.0	0.087	07/16/16 03:10	
Bromochloromethane	ug/L	<0.082	1.0	0.082	07/16/16 03:10	
Bromodichloromethane	ug/L	<0.068	1.0	0.068	07/16/16 03:10	
Bromoform	ug/L	<0.11	4.0	0.11	07/16/16 03:10	
Bromomethane	ug/L	<0.20	4.0	0.20	07/16/16 03:10	
Carbon tetrachloride	ug/L	<0.079	4.0	0.079	07/16/16 03:10	
Chlorobenzene	ug/L	<0.066	1.0	0.066	07/16/16 03:10	
Chloroethane	ug/L	<0.12	1.0	0.12	07/16/16 03:10	
Chloroform	ug/L	<0.21	1.0	0.21	07/16/16 03:10	
Chloromethane	ug/L	<0.080	4.0	0.080	07/16/16 03:10	
cis-1,2-Dichloroethene	ug/L	<0.12	1.0	0.12	07/16/16 03:10	
cis-1,3-Dichloropropene	ug/L	<0.069	4.0	0.069	07/16/16 03:10	

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

METHOD BLANK: 2318144 Matrix: Water
Associated Lab Samples: 10354908001, 10354908002, 10354908003, 10354908004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Dibromochloromethane	ug/L	<0.048	4.0	0.048	07/16/16 03:10	
Dibromomethane	ug/L	<0.14	4.0	0.14	07/16/16 03:10	
Dichlorodifluoromethane	ug/L	<0.075	1.0	0.075	07/16/16 03:10	
Dichlorofluoromethane	ug/L	<0.054	1.0	0.054	07/16/16 03:10	
Diethyl ether (Ethyl ether)	ug/L	<0.090	4.0	0.090	07/16/16 03:10	
Ethylbenzene	ug/L	<0.075	1.0	0.075	07/16/16 03:10	
Hexachloro-1,3-butadiene	ug/L	<0.13	4.0	0.13	07/16/16 03:10	
Isopropylbenzene (Cumene)	ug/L	<0.064	1.0	0.064	07/16/16 03:10	
Methyl-tert-butyl ether	ug/L	<0.047	1.0	0.047	07/16/16 03:10	
Methylene Chloride	ug/L	<0.097	4.0	0.097	07/16/16 03:10	
n-Butylbenzene	ug/L	<0.16	1.0	0.16	07/16/16 03:10	
n-Propylbenzene	ug/L	<0.049	1.0	0.049	07/16/16 03:10	
Naphthalene	ug/L	0.69J	4.0	0.064	07/16/16 03:10	
p-Isopropyltoluene	ug/L	<0.064	1.0	0.064	07/16/16 03:10	
sec-Butylbenzene	ug/L	<0.094	1.0	0.094	07/16/16 03:10	
Styrene	ug/L	<0.056	1.0	0.056	07/16/16 03:10	
tert-Butylbenzene	ug/L	<0.051	1.0	0.051	07/16/16 03:10	
Tetrachloroethene	ug/L	<0.13	1.0	0.13	07/16/16 03:10	
Tetrahydrofuran	ug/L	<1.5	10.0	1.5	07/16/16 03:10	
Toluene	ug/L	<0.059	1.0	0.059	07/16/16 03:10	
trans-1,2-Dichloroethene	ug/L	<0.15	1.0	0.15	07/16/16 03:10	
trans-1,3-Dichloropropene	ug/L	<0.044	4.0	0.044	07/16/16 03:10	
Trichloroethene	ug/L	0.14J	0.40	0.051	07/16/16 03:10	
Trichlorofluoromethane	ug/L	<0.055	1.0	0.055	07/16/16 03:10	
Vinyl chloride	ug/L	<0.084	0.40	0.084	07/16/16 03:10	
Xylene (Total)	ug/L	<0.15	3.0	0.15	07/16/16 03:10	
1,2-Dichloroethane-d4 (S)	%.	101	75-125		07/16/16 03:10	
4-Bromofluorobenzene (S)	%.	102	75-125		07/16/16 03:10	
Toluene-d8 (S)	%.	100	75-125		07/16/16 03:10	

LABORATORY CONTROL SAMPLE: 2318145

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	19.8	99	75-125	
1,1,1-Trichloroethane	ug/L	20	18.6	93	73-125	
1,1,2,2-Tetrachloroethane	ug/L	20	19.2	96	75-128	
1,1,2-Trichloroethane	ug/L	20	19.4	97	75-129	
1,1,2-Trichlorotrifluoroethane	ug/L	20	19.8	99	69-125	
1,1-Dichloroethane	ug/L	20	17.7	88	75-131	
1,1-Dichloroethene	ug/L	20	17.4	87	72-125	
1,1-Dichloropropene	ug/L	20	17.7	89	74-125	
1,2,3-Trichlorobenzene	ug/L	20	18.6	93	68-127	
1,2,3-Trichloropropane	ug/L	20	19.3	97	75-125	
1,2,4-Trichlorobenzene	ug/L	20	18.6	93	70-125	

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

LABORATORY CONTROL SAMPLE: 2318145

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	21.1	105	75-130	
1,2-Dibromo-3-chloropropane	ug/L	50	48.7	97	74-125	
1,2-Dibromoethane (EDB)	ug/L	20	19.6	98	75-125	
1,2-Dichlorobenzene	ug/L	20	20.0	100	75-125	
1,2-Dichloroethane	ug/L	20	18.6	93	72-129	
1,2-Dichloropropane	ug/L	20	19.2	96	71-129	
1,3,5-Trimethylbenzene	ug/L	20	19.7	98	75-127	
1,3-Dichlorobenzene	ug/L	20	19.5	98	75-125	
1,3-Dichloropropane	ug/L	20	19.1	95	75-125	
1,4-Dichlorobenzene	ug/L	20	19.0	95	75-125	
2,2-Dichloropropane	ug/L	20	16.1	81	71-125	
2-Butanone (MEK)	ug/L	100	87.1	87	58-150	
2-Chlorotoluene	ug/L	20	19.4	97	75-125	
4-Chlorotoluene	ug/L	20	19.6	98	75-130	
4-Methyl-2-pentanone (MIBK)	ug/L	100	98.1	98	72-140	
Acetone	ug/L	100	100	100	69-137	
Allyl chloride	ug/L	20	16.5	83	68-132	
Benzene	ug/L	20	19.2	96	75-125	
Bromobenzene	ug/L	20	19.9	99	75-125	
Bromochloromethane	ug/L	20	20.0	100	75-125	
Bromodichloromethane	ug/L	20	20.3	102	69-128	
Bromoform	ug/L	20	16.1	80	75-125	
Bromomethane	ug/L	20	17.0	85	30-150	
Carbon tetrachloride	ug/L	20	18.4	92	74-125	
Chlorobenzene	ug/L	20	19.2	96	75-125	
Chloroethane	ug/L	20	23.4	117	60-150	
Chloroform	ug/L	20	19.9	99	75-126	
Chloromethane	ug/L	20	18.6	93	46-150	
cis-1,2-Dichloroethene	ug/L	20	19.0	95	75-126	
cis-1,3-Dichloropropene	ug/L	20	18.5	93	75-125	
Dibromochloromethane	ug/L	20	19.2	96	75-125	
Dibromomethane	ug/L	20	20.3	102	72-127	
Dichlorodifluoromethane	ug/L	20	21.3	106	58-135	
Dichlorofluoromethane	ug/L	20	21.9	109	68-149	
Diethyl ether (Ethyl ether)	ug/L	20	19.4	97	66-144	
Ethylbenzene	ug/L	20	19.0	95	75-125	
Hexachloro-1,3-butadiene	ug/L	20	18.5	92	73-125	
Isopropylbenzene (Cumene)	ug/L	20	19.8	99	69-140	
Methyl-tert-butyl ether	ug/L	20	19.0	95	75-126	
Methylene Chloride	ug/L	20	19.1	96	71-130	
n-Butylbenzene	ug/L	20	19.6	98	71-129	
n-Propylbenzene	ug/L	20	19.0	95	71-133	
Naphthalene	ug/L	20	18.0	90	59-137	
p-Isopropyltoluene	ug/L	20	20.7	103	74-127	
sec-Butylbenzene	ug/L	20	18.5	93	66-140	
Styrene	ug/L	20	20.4	102	75-125	
tert-Butylbenzene	ug/L	20	18.3	92	73-129	

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

LABORATORY CONTROL SAMPLE: 2318145

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	ug/L	20	19.0	95	75-125	
Tetrahydrofuran	ug/L	200	190	95	71-129	
Toluene	ug/L	20	18.8	94	75-125	
trans-1,2-Dichloroethene	ug/L	20	19.4	97	75-125	
trans-1,3-Dichloropropene	ug/L	20	19.4	97	75-125	
Trichloroethene	ug/L	20	19.1	96	75-125	
Trichlorofluoromethane	ug/L	20	21.6	108	74-128	
Vinyl chloride	ug/L	20	20.1	100	71-131	
Xylene (Total)	ug/L	60	59.3	99	75-125	
1,2-Dichloroethane-d4 (S)	%.			100	75-125	
4-Bromofluorobenzene (S)	%.			103	75-125	
Toluene-d8 (S)	%.			100	75-125	

MATRIX SPIKE SAMPLE: 2318290

Parameter	Units	10354909029 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	20	18.9	94	75-125	
1,1,1-Trichloroethane	ug/L	ND	20	20.9	105	71-144	
1,1,2,2-Tetrachloroethane	ug/L	ND	20	18.5	92	75-131	
1,1,2-Trichloroethane	ug/L	ND	20	19.0	95	75-125	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	20	22.0	110	75-150	
1,1-Dichloroethane	ug/L	ND	20	19.5	96	64-150	
1,1-Dichloroethene	ug/L	ND	20	20.5	102	68-150	
1,1-Dichloropropene	ug/L	ND	20	20.7	104	68-145	
1,2,3-Trichlorobenzene	ug/L	ND	20	19.6	98	57-142	
1,2,3-Trichloropropane	ug/L	ND	20	18.5	93	75-125	
1,2,4-Trichlorobenzene	ug/L	ND	20	19.5	97	60-135	
1,2,4-Trimethylbenzene	ug/L	ND	20	20.2	98	67-148	
1,2-Dibromo-3-chloropropane	ug/L	ND	50	45.6	91	32-137	
1,2-Dibromoethane (EDB)	ug/L	ND	20	19.2	96	75-125	
1,2-Dichlorobenzene	ug/L	ND	20	18.7	94	75-125	
1,2-Dichloroethane	ug/L	ND	20	17.7	88	62-138	
1,2-Dichloropropane	ug/L	ND	20	19.2	96	62-144	
1,3,5-Trimethylbenzene	ug/L	ND	20	19.6	97	67-148	
1,3-Dichlorobenzene	ug/L	ND	20	19.0	95	74-131	
1,3-Dichloropropane	ug/L	ND	20	18.6	93	75-127	
1,4-Dichlorobenzene	ug/L	ND	20	18.1	90	74-126	
2,2-Dichloropropane	ug/L	ND	20	17.1	85	56-146	
2-Butanone (MEK)	ug/L	ND	100	84.3	84	47-150	
2-Chlorotoluene	ug/L	ND	20	19.2	96	74-137	
4-Chlorotoluene	ug/L	ND	20	19.6	98	72-138	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	97.5	98	60-147	
Acetone	ug/L	ND	100	93.5	89	61-150	
Allyl chloride	ug/L	ND	20	18.0	89	53-150	
Benzene	ug/L	ND	20	18.9	94	52-147	

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

MATRIX SPIKE SAMPLE: 2318290

Parameter	Units	10354909029 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Bromobenzene	ug/L	ND	20	18.5	93	75-129	
Bromochloromethane	ug/L	ND	20	19.4	97	72-128	
Bromodichloromethane	ug/L	ND	20	18.8	94	65-137	
Bromoform	ug/L	ND	20	16.8	84	59-133	
Bromomethane	ug/L	ND	20	17.1	85	30-150	
Carbon tetrachloride	ug/L	ND	20	20.6	103	73-144	
Chlorobenzene	ug/L	ND	20	19.4	97	75-126	
Chloroethane	ug/L	ND	20	20.6	103	55-150	
Chloroform	ug/L	ND	20	19.2	96	66-143	
Chloromethane	ug/L	ND	20	17.2	86	42-150	
cis-1,2-Dichloroethene	ug/L	4.9	20	24.4	98	65-143	
cis-1,3-Dichloropropene	ug/L	ND	20	17.5	87	75-125	
Dibromochloromethane	ug/L	ND	20	18.4	92	75-125	
Dibromomethane	ug/L	ND	20	19.4	97	66-133	
Dichlorodifluoromethane	ug/L	ND	20	20.6	103	74-150	
Dichlorofluoromethane	ug/L	ND	20	19.0	95	68-150	
Diethyl ether (Ethyl ether)	ug/L	ND	20	18.9	95	57-148	
Ethylbenzene	ug/L	ND	20	20.1	100	67-149	
Hexachloro-1,3-butadiene	ug/L	ND	20	19.0	95	65-143	
Isopropylbenzene (Cumene)	ug/L	ND	20	21.2	106	64-150	
Methyl-tert-butyl ether	ug/L	ND	20	18.0	90	71-130	
Methylene Chloride	ug/L	ND	20	18.5	93	67-137	
n-Butylbenzene	ug/L	ND	20	20.4	102	70-138	
n-Propylbenzene	ug/L	ND	20	19.9	98	70-148	
Naphthalene	ug/L	ND	20	19.2	77	39-150	
p-Isopropyltoluene	ug/L	ND	20	20.0	100	74-138	
sec-Butylbenzene	ug/L	ND	20	19.7	98	64-150	
Styrene	ug/L	ND	20	20.2	101	75-132	
tert-Butylbenzene	ug/L	ND	20	19.4	97	75-138	
Tetrachloroethene	ug/L	ND	20	21.2	106	73-136	
Tetrahydrofuran	ug/L	ND	200	176	88	68-142	
Toluene	ug/L	ND	20	19.1	95	69-139	
trans-1,2-Dichloroethene	ug/L	ND	20	21.5	104	75-135	
trans-1,3-Dichloropropene	ug/L	ND	20	19.0	95	66-136	
Trichloroethene	ug/L	4.6	20	24.1	98	74-135	
Trichlorofluoromethane	ug/L	ND	20	21.0	105	75-150	
Vinyl chloride	ug/L	ND	20	20.0	100	69-150	
Xylene (Total)	ug/L	ND	60	62.2	104	70-147	
1,2-Dichloroethane-d4 (S)	%.				95	75-125	
4-Bromofluorobenzene (S)	%.				101	75-125	
Toluene-d8 (S)	%.				102	75-125	

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

SAMPLE DUPLICATE: 2318291

Parameter	Units	10354909030 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	<0.064		30	
1,1,1-Trichloroethane	ug/L	ND	<0.057		30	
1,1,2,2-Tetrachloroethane	ug/L	ND	<0.055		30	
1,1,2-Trichloroethane	ug/L	ND	<0.064		30	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	<0.13		30	
1,1-Dichloroethane	ug/L	ND	<0.055		30	
1,1-Dichloroethene	ug/L	ND	<0.069		30	
1,1-Dichloropropene	ug/L	ND	<0.082		30	
1,2,3-Trichlorobenzene	ug/L	ND	<0.17		30	
1,2,3-Trichloropropane	ug/L	ND	<0.19		30	
1,2,4-Trichlorobenzene	ug/L	ND	<0.14		30	
1,2,4-Trimethylbenzene	ug/L	58.8	58.1	1	30	
1,2-Dibromo-3-chloropropane	ug/L	ND	<0.60		30	
1,2-Dibromoethane (EDB)	ug/L	ND	<0.092		30	
1,2-Dichlorobenzene	ug/L	ND	<0.078		30	
1,2-Dichloroethane	ug/L	ND	0.078J		30	
1,2-Dichloropropane	ug/L	ND	<0.066		30	
1,3,5-Trimethylbenzene	ug/L	ND	0.82J		30	
1,3-Dichlorobenzene	ug/L	ND	<0.085		30	
1,3-Dichloropropane	ug/L	ND	<0.059		30	
1,4-Dichlorobenzene	ug/L	ND	<0.081		30	
2,2-Dichloropropane	ug/L	ND	<0.096		30	
2-Butanone (MEK)	ug/L	ND	<1.1		30	
2-Chlorotoluene	ug/L	ND	<0.084		30	
4-Chlorotoluene	ug/L	ND	<0.048		30	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	<0.80		30	
Acetone	ug/L	ND	1.4J		30	
Allyl chloride	ug/L	ND	<0.25		30	
Benzene	ug/L	ND	0.71J		30	
Bromobenzene	ug/L	ND	<0.087		30	
Bromochloromethane	ug/L	ND	<0.082		30	
Bromodichloromethane	ug/L	ND	<0.068		30	
Bromoform	ug/L	ND	<0.11		30	
Bromomethane	ug/L	ND	<0.20		30	
Carbon tetrachloride	ug/L	ND	<0.079		30	
Chlorobenzene	ug/L	ND	<0.066		30	
Chloroethane	ug/L	ND	<0.12		30	
Chloroform	ug/L	ND	<0.21		30	
Chloromethane	ug/L	ND	<0.080		30	
cis-1,2-Dichloroethene	ug/L	1.9	2.5	30	30	
cis-1,3-Dichloropropene	ug/L	ND	<0.069		30	
Dibromochloromethane	ug/L	ND	<0.048		30	
Dibromomethane	ug/L	ND	<0.14		30	
Dichlorodifluoromethane	ug/L	ND	<0.075		30	
Dichlorofluoromethane	ug/L	ND	<0.054		30	
Diethyl ether (Ethyl ether)	ug/L	ND	<0.090		30	
Ethylbenzene	ug/L	2.8	3.8	29	30	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

SAMPLE DUPLICATE: 2318291

Parameter	Units	10354909030 Result	Dup Result	RPD	Max RPD	Qualifiers
Hexachloro-1,3-butadiene	ug/L	ND	<0.13		30	
Isopropylbenzene (Cumene)	ug/L	10.4	10.8	4	30	
Methyl-tert-butyl ether	ug/L	ND	<0.047		30	
Methylene Chloride	ug/L	ND	<0.097		30	
n-Butylbenzene	ug/L	3.4	3.3	0	30	
n-Propylbenzene	ug/L	12.2	13.2	8	30	
Naphthalene	ug/L	63.7	62.5	2	30	
p-Isopropyltoluene	ug/L	1.2	1.3	5	30	
sec-Butylbenzene	ug/L	5.3	5.8	10	30	
Styrene	ug/L	ND	<0.056		30	
tert-Butylbenzene	ug/L	ND	0.27J		30	
Tetrachloroethene	ug/L	ND	<0.13		30	
Tetrahydrofuran	ug/L	ND	<1.5		30	
Toluene	ug/L	ND	<0.059		30	
trans-1,2-Dichloroethene	ug/L	ND	<0.15		30	
trans-1,3-Dichloropropene	ug/L	ND	<0.044		30	
Trichloroethene	ug/L	ND	0.11J		30	
Trichlorofluoromethane	ug/L	ND	<0.055		30	
Vinyl chloride	ug/L	ND	<0.084		30	
Xylene (Total)	ug/L	17.4	16.7	4	30	
1,2-Dichloroethane-d4 (S)	%.	102	99	2		
4-Bromofluorobenzene (S)	%.	99	101	2		
Toluene-d8 (S)	%.	98	99	1		

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

QC Batch: 425672 | Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B | Analysis Description: 8260B MSV 465 W
Associated Lab Samples: 10354908005, 10354908007, 10354908008, 10354908009, 10354908010, 10354908011, 10354908012, 10354908013, 10354908014, 10354908015, 10354908016, 10354908017

METHOD BLANK: 2318154 | Matrix: Water
Associated Lab Samples: 10354908005, 10354908007, 10354908008, 10354908009, 10354908010, 10354908011, 10354908012, 10354908013, 10354908014, 10354908015, 10354908016, 10354908017

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.064	1.0	0.064	07/16/16 01:11	
1,1,1-Trichloroethane	ug/L	<0.057	1.0	0.057	07/16/16 01:11	
1,1,2,2-Tetrachloroethane	ug/L	<0.055	1.0	0.055	07/16/16 01:11	
1,1,2-Trichloroethane	ug/L	<0.064	1.0	0.064	07/16/16 01:11	
1,1,2-Trichlorotrifluoroethane	ug/L	<0.13	1.0	0.13	07/16/16 01:11	
1,1-Dichloroethane	ug/L	<0.055	1.0	0.055	07/16/16 01:11	
1,1-Dichloroethene	ug/L	<0.069	1.0	0.069	07/16/16 01:11	
1,1-Dichloropropene	ug/L	<0.082	1.0	0.082	07/16/16 01:11	
1,2,3-Trichlorobenzene	ug/L	<0.17	1.0	0.17	07/16/16 01:11	
1,2,3-Trichloropropane	ug/L	<0.19	4.0	0.19	07/16/16 01:11	
1,2,4-Trichlorobenzene	ug/L	<0.14	1.0	0.14	07/16/16 01:11	
1,2,4-Trimethylbenzene	ug/L	<0.068	1.0	0.068	07/16/16 01:11	
1,2-Dibromo-3-chloropropane	ug/L	<0.60	4.0	0.60	07/16/16 01:11	
1,2-Dibromoethane (EDB)	ug/L	<0.092	1.0	0.092	07/16/16 01:11	
1,2-Dichlorobenzene	ug/L	<0.078	1.0	0.078	07/16/16 01:11	
1,2-Dichloroethane	ug/L	0.11J	1.0	0.072	07/16/16 01:11	
1,2-Dichloropropane	ug/L	<0.066	4.0	0.066	07/16/16 01:11	
1,3,5-Trimethylbenzene	ug/L	<0.042	1.0	0.042	07/16/16 01:11	
1,3-Dichlorobenzene	ug/L	<0.085	1.0	0.085	07/16/16 01:11	
1,3-Dichloropropane	ug/L	<0.059	1.0	0.059	07/16/16 01:11	
1,4-Dichlorobenzene	ug/L	0.088J	1.0	0.081	07/16/16 01:11	
2,2-Dichloropropane	ug/L	<0.096	4.0	0.096	07/16/16 01:11	
2-Butanone (MEK)	ug/L	<1.1	5.0	1.1	07/16/16 01:11	
2-Chlorotoluene	ug/L	<0.084	1.0	0.084	07/16/16 01:11	
4-Chlorotoluene	ug/L	<0.048	1.0	0.048	07/16/16 01:11	
4-Methyl-2-pentanone (MIBK)	ug/L	<0.80	5.0	0.80	07/16/16 01:11	
Acetone	ug/L	<0.64	20.0	0.64	07/16/16 01:11	
Allyl chloride	ug/L	<0.25	4.0	0.25	07/16/16 01:11	
Benzene	ug/L	<0.042	1.0	0.042	07/16/16 01:11	
Bromobenzene	ug/L	<0.087	1.0	0.087	07/16/16 01:11	
Bromochloromethane	ug/L	<0.082	1.0	0.082	07/16/16 01:11	
Bromodichloromethane	ug/L	<0.068	1.0	0.068	07/16/16 01:11	
Bromoform	ug/L	<0.11	4.0	0.11	07/16/16 01:11	
Bromomethane	ug/L	<0.20	10.0	0.20	07/16/16 01:11	
Carbon tetrachloride	ug/L	<0.079	1.0	0.079	07/16/16 01:11	
Chlorobenzene	ug/L	<0.066	1.0	0.066	07/16/16 01:11	
Chloroethane	ug/L	<0.12	1.0	0.12	07/16/16 01:11	
Chloroform	ug/L	<0.21	1.0	0.21	07/16/16 01:11	
Chloromethane	ug/L	<0.080	4.0	0.080	07/16/16 01:11	
cis-1,2-Dichloroethene	ug/L	<0.12	1.0	0.12	07/16/16 01:11	

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

METHOD BLANK: 2318154 Matrix: Water

Associated Lab Samples: 10354908005, 10354908007, 10354908008, 10354908009, 10354908010, 10354908011, 10354908012, 10354908013, 10354908014, 10354908015, 10354908016, 10354908017

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
cis-1,3-Dichloropropene	ug/L	<0.069	4.0	0.069	07/16/16 01:11	
Dibromochloromethane	ug/L	<0.048	1.0	0.048	07/16/16 01:11	
Dibromomethane	ug/L	<0.14	4.0	0.14	07/16/16 01:11	
Dichlorodifluoromethane	ug/L	<0.075	1.0	0.075	07/16/16 01:11	
Dichlorofluoromethane	ug/L	<0.054	1.0	0.054	07/16/16 01:11	
Diethyl ether (Ethyl ether)	ug/L	<0.090	4.0	0.090	07/16/16 01:11	
Ethylbenzene	ug/L	<0.075	1.0	0.075	07/16/16 01:11	
Hexachloro-1,3-butadiene	ug/L	1.4J	4.0	0.13	07/16/16 01:11	
Isopropylbenzene (Cumene)	ug/L	<0.064	1.0	0.064	07/16/16 01:11	
Methyl-tert-butyl ether	ug/L	<0.047	1.0	0.047	07/16/16 01:11	
Methylene Chloride	ug/L	<0.097	4.0	0.097	07/16/16 01:11	
n-Butylbenzene	ug/L	<0.16	1.0	0.16	07/16/16 01:11	
n-Propylbenzene	ug/L	<0.049	1.0	0.049	07/16/16 01:11	
Naphthalene	ug/L	0.16J	4.0	0.064	07/16/16 01:11	
p-Isopropyltoluene	ug/L	<0.064	1.0	0.064	07/16/16 01:11	
sec-Butylbenzene	ug/L	<0.094	1.0	0.094	07/16/16 01:11	
Styrene	ug/L	<0.056	1.0	0.056	07/16/16 01:11	
tert-Butylbenzene	ug/L	<0.051	1.0	0.051	07/16/16 01:11	
Tetrachloroethene	ug/L	<0.13	1.0	0.13	07/16/16 01:11	
Tetrahydrofuran	ug/L	<1.5	10.0	1.5	07/16/16 01:11	
Toluene	ug/L	<0.059	1.0	0.059	07/16/16 01:11	
trans-1,2-Dichloroethene	ug/L	<0.15	1.0	0.15	07/16/16 01:11	
trans-1,3-Dichloropropene	ug/L	<0.044	4.0	0.044	07/16/16 01:11	
Trichloroethene	ug/L	<0.051	0.40	0.051	07/16/16 01:11	
Trichlorofluoromethane	ug/L	<0.055	1.0	0.055	07/16/16 01:11	
Vinyl chloride	ug/L	<0.084	0.40	0.084	07/16/16 01:11	
Xylene (Total)	ug/L	<0.15	3.0	0.15	07/16/16 01:11	
1,2-Dichloroethane-d4 (S)	%.	99	75-125		07/16/16 01:11	
4-Bromofluorobenzene (S)	%.	102	75-125		07/16/16 01:11	
Toluene-d8 (S)	%.	99	75-125		07/16/16 01:11	

LABORATORY CONTROL SAMPLE & LCSD: 2318155 2318190

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	22.1	23.7	111	118	75-125	7	20	
1,1,1-Trichloroethane	ug/L	20	20.3	23.2	102	116	73-125	13	20	
1,1,2,2-Tetrachloroethane	ug/L	20	22.0	21.9	110	109	75-128	0	20	
1,1,2-Trichloroethane	ug/L	20	23.0	24.1	115	121	75-129	5	20	
1,1,2-Trichlorotrifluoroethane	ug/L	20	17.6	21.4	88	107	69-125	20	20	
1,1-Dichloroethane	ug/L	20	20.5	22.5	102	113	75-131	10	20	
1,1-Dichloroethene	ug/L	20	18.7	21.6	93	108	72-125	14	20	
1,1-Dichloropropene	ug/L	20	21.3	24.5	107	122	74-125	14	20	
1,2,3-Trichlorobenzene	ug/L	20	18.5	20.9	92	105	68-127	13	20	

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QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

LABORATORY CONTROL SAMPLE & LCSD: 2318155 2318190

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,2,3-Trichloropropane	ug/L	20	21.4	22.0	107	110	75-125	3	20	
1,2,4-Trichlorobenzene	ug/L	20	19.1	21.2	95	106	70-125	10	20	
1,2,4-Trimethylbenzene	ug/L	20	20.5	22.3	103	111	75-130	8	20	
1,2-Dibromo-3-chloropropane	ug/L	50	48.4	50.1	97	100	74-125	3	20	
1,2-Dibromoethane (EDB)	ug/L	20	22.4	22.8	112	114	75-125	2	20	
1,2-Dichlorobenzene	ug/L	20	22.2	23.6	111	118	75-125	6	20	
1,2-Dichloroethane	ug/L	20	19.5	20.4	97	102	72-129	5	20	
1,2-Dichloropropane	ug/L	20	21.8	23.9	109	120	71-129	9	20	
1,3,5-Trimethylbenzene	ug/L	20	21.1	23.0	105	115	75-127	9	20	
1,3-Dichlorobenzene	ug/L	20	21.4	23.1	107	115	75-125	8	20	
1,3-Dichloropropane	ug/L	20	22.8	23.6	114	118	75-125	3	20	
1,4-Dichlorobenzene	ug/L	20	20.6	22.2	103	111	75-125	8	20	
2,2-Dichloropropane	ug/L	20	18.6	21.7	93	108	71-125	15	20	
2-Butanone (MEK)	ug/L	100	96.6	97.3	97	97	58-150	1	20	
2-Chlorotoluene	ug/L	20	20.8	22.6	104	113	75-125	8	20	
4-Chlorotoluene	ug/L	20	20.7	22.2	104	111	75-130	7	20	
4-Methyl-2-pentanone (MIBK)	ug/L	100	99.8	105	100	105	72-140	5	20	
Acetone	ug/L	100	124	126	124	126	69-137	2	20	
Allyl chloride	ug/L	20	19.4	21.0	97	105	68-132	8	20	
Benzene	ug/L	20	19.6	21.5	98	107	75-125	9	20	
Bromobenzene	ug/L	20	22.7	24.5	113	123	75-125	8	20	
Bromochloromethane	ug/L	20	23.1	24.6	116	123	75-125	6	20	
Bromodichloromethane	ug/L	20	20.9	22.6	104	113	69-128	8	20	
Bromoform	ug/L	20	20.3	21.0	101	105	75-125	3	20	
Bromomethane	ug/L	20	17.1	18.8	86	94	30-150	9	20	
Carbon tetrachloride	ug/L	20	20.0	23.0	100	115	74-125	14	20	
Chlorobenzene	ug/L	20	21.7	23.8	108	119	75-125	10	20	
Chloroethane	ug/L	20	20.8	22.6	104	113	60-150	8	20	
Chloroform	ug/L	20	20.9	23.5	104	117	75-126	12	20	
Chloromethane	ug/L	20	17.5	13.0	87	65	46-150	29	20	R1
cis-1,2-Dichloroethene	ug/L	20	20.1	22.8	101	114	75-126	13	20	
cis-1,3-Dichloropropene	ug/L	20	21.3	23.0	107	115	75-125	8	20	
Dibromochloromethane	ug/L	20	21.3	23.4	106	117	75-125	9	20	
Dibromomethane	ug/L	20	22.3	23.3	111	116	72-127	4	20	
Dichlorodifluoromethane	ug/L	20	20.0	23.9	100	119	58-135	18	20	
Dichlorofluoromethane	ug/L	20	21.2	23.8	106	119	68-149	12	20	
Diethyl ether (Ethyl ether)	ug/L	20	19.7	20.0	99	100	66-144	1	20	
Ethylbenzene	ug/L	20	19.9	22.4	99	112	75-125	12	20	
Hexachloro-1,3-butadiene	ug/L	20	16.1	19.5	81	97	73-125	19	20	
Isopropylbenzene (Cumene)	ug/L	20	20.4	22.9	102	115	69-140	12	20	
Methyl-tert-butyl ether	ug/L	20	22.2	23.3	111	117	75-126	5	20	
Methylene Chloride	ug/L	20	20.5	21.8	102	109	71-130	6	20	
n-Butylbenzene	ug/L	20	19.7	22.1	98	110	71-129	11	20	
n-Propylbenzene	ug/L	20	20.6	22.7	103	113	71-133	9	20	
Naphthalene	ug/L	20	19.0	21.0	95	105	59-137	10	20	
p-Isopropyltoluene	ug/L	20	20.8	23.1	104	115	74-127	10	20	
sec-Butylbenzene	ug/L	20	19.8	22.2	99	111	66-140	11	20	

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Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

LABORATORY CONTROL SAMPLE & LCSD: 2318155 2318190

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Styrene	ug/L	20	22.7	24.7	114	123	75-125	8	20	
tert-Butylbenzene	ug/L	20	20.5	22.5	102	113	73-129	10	20	
Tetrachloroethene	ug/L	20	21.4	24.3	107	121	75-125	13	20	
Tetrahydrofuran	ug/L	200	260	256	130	128	71-129	2	20	L0
Toluene	ug/L	20	20.5	22.7	103	114	75-125	10	20	
trans-1,2-Dichloroethene	ug/L	20	19.6	22.1	98	111	75-125	12	20	
trans-1,3-Dichloropropene	ug/L	20	22.8	24.1	114	121	75-125	5	20	
Trichloroethene	ug/L	20	21.8	25.1	109	125	75-125	14	20	
Trichlorofluoromethane	ug/L	20	19.8	22.3	99	111	74-128	12	20	
Vinyl chloride	ug/L	20	18.7	20.5	94	102	71-131	9	20	
Xylene (Total)	ug/L	60	64.2	71.3	107	119	75-125	10	20	
1,2-Dichloroethane-d4 (S)	%.				102	103	75-125			
4-Bromofluorobenzene (S)	%.				103	102	75-125			
Toluene-d8 (S)	%.				101	102	75-125			

MATRIX SPIKE SAMPLE: 2318195

Parameter	Units	10354908005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.064	20	21.4	107	75-125	
1,1,1-Trichloroethane	ug/L	<0.057	20	23.8	119	71-144	
1,1,2,2-Tetrachloroethane	ug/L	<0.055	20	19.6	98	75-131	
1,1,2-Trichloroethane	ug/L	<0.064	20	21.1	106	75-125	
1,1,2-Trichlorotrifluoroethane	ug/L	<0.13	20	22.4	112	75-150	
1,1-Dichloroethane	ug/L	<0.055	20	22.1	111	64-150	
1,1-Dichloroethene	ug/L	<0.069	20	23.9	120	68-150	
1,1-Dichloropropene	ug/L	<0.082	20	23.5	118	68-145	
1,2,3-Trichlorobenzene	ug/L	<0.17	20	17.7	88	57-142	
1,2,3-Trichloropropane	ug/L	<0.19	20	18.7	94	75-125	
1,2,4-Trichlorobenzene	ug/L	<0.14	20	18.4	92	60-135	
1,2,4-Trimethylbenzene	ug/L	<0.068	20	20.1	100	67-148	
1,2-Dibromo-3-chloropropane	ug/L	<0.60	50	39.2	78	32-137	
1,2-Dibromoethane (EDB)	ug/L	<0.092	20	19.6	98	75-125	
1,2-Dichlorobenzene	ug/L	<0.078	20	21.2	106	75-125	
1,2-Dichloroethane	ug/L	0.096J	20	18.3	91	62-138	
1,2-Dichloropropane	ug/L	<0.066	20	22.2	111	62-144	
1,3,5-Trimethylbenzene	ug/L	<0.042	20	21.0	105	67-148	
1,3-Dichlorobenzene	ug/L	<0.085	20	21.3	106	74-131	
1,3-Dichloropropane	ug/L	<0.059	20	21.2	106	75-127	
1,4-Dichlorobenzene	ug/L	<0.081	20	20.1	101	74-126	
2,2-Dichloropropane	ug/L	<0.096	20	18.4	92	56-146	
2-Butanone (MEK)	ug/L	<1.1	100	78.9	79	47-150	
2-Chlorotoluene	ug/L	<0.084	20	21.0	105	74-137	
4-Chlorotoluene	ug/L	<0.048	20	20.8	104	72-138	
4-Methyl-2-pentanone (MIBK)	ug/L	<0.80	100	84.1	84	60-147	
Acetone	ug/L	<0.64	100	104	104	61-150	

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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: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

MATRIX SPIKE SAMPLE: 2318195

Parameter	Units	10354908005 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Allyl chloride	ug/L	<0.25	20	20.5	102	53-150	
Benzene	ug/L	<0.042	20	19.1	96	52-147	
Bromobenzene	ug/L	<0.087	20	21.3	106	75-129	
Bromochloromethane	ug/L	<0.082	20	22.5	113	72-128	
Bromodichloromethane	ug/L	<0.068	20	20.4	102	65-137	
Bromoform	ug/L	<0.11	20	18.4	92	59-133	
Bromomethane	ug/L	<0.20	20	21.5	108	30-150	
Carbon tetrachloride	ug/L	<0.079	20	22.4	112	73-144	
Chlorobenzene	ug/L	<0.066	20	21.1	105	75-126	
Chloroethane	ug/L	<0.12	20	19.0	95	55-150	
Chloroform	ug/L	<0.21	20	20.0	100	66-143	
Chloromethane	ug/L	<0.080	20	15.7	78	42-150	
cis-1,2-Dichloroethene	ug/L	<0.12	20	22.4	112	65-143	
cis-1,3-Dichloropropene	ug/L	<0.069	20	20.0	100	75-125	
Dibromochloromethane	ug/L	<0.048	20	19.9	99	75-125	
Dibromomethane	ug/L	<0.14	20	21.0	105	66-133	
Dichlorodifluoromethane	ug/L	<0.075	20	24.1	121	74-150	
Dichlorofluoromethane	ug/L	<0.054	20	21.0	105	68-150	
Diethyl ether (Ethyl ether)	ug/L	<0.090	20	18.5	93	57-148	
Ethylbenzene	ug/L	<0.075	20	20.4	102	67-149	
Hexachloro-1,3-butadiene	ug/L	<0.13	20	17.3	86	65-143	
Isopropylbenzene (Cumene)	ug/L	<0.064	20	21.5	107	64-150	
Methyl-tert-butyl ether	ug/L	<0.047	20	20.8	104	71-130	
Methylene Chloride	ug/L	<0.097	20	19.7	98	67-137	
n-Butylbenzene	ug/L	<0.16	20	20.1	100	70-138	
n-Propylbenzene	ug/L	<0.049	20	22.3	111	70-148	
Naphthalene	ug/L	<0.064	20	16.4	82	39-150	
p-Isopropyltoluene	ug/L	<0.064	20	20.5	103	74-138	
sec-Butylbenzene	ug/L	<0.094	20	21.9	110	64-150	
Styrene	ug/L	<0.056	20	20.8	104	75-132	
tert-Butylbenzene	ug/L	<0.051	20	21.7	108	75-138	
Tetrachloroethene	ug/L	<0.13	20	23.8	119	73-136	
Tetrahydrofuran	ug/L	<1.5	200	232	116	68-142	
Toluene	ug/L	<0.059	20	20.2	101	69-139	
trans-1,2-Dichloroethene	ug/L	<0.15	20	20.4	102	75-135	
trans-1,3-Dichloropropene	ug/L	<0.044	20	20.2	101	66-136	
Trichloroethene	ug/L	<0.051	20	23.4	117	74-135	
Trichlorofluoromethane	ug/L	<0.055	20	23.3	116	75-150	
Vinyl chloride	ug/L	<0.084	20	20.7	104	69-150	
Xylene (Total)	ug/L	<0.15	60	65.2	109	70-147	
1,2-Dichloroethane-d4 (S)	%.				101	75-125	
4-Bromofluorobenzene (S)	%.				101	75-125	
Toluene-d8 (S)	%.				99	75-125	

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(612)607-1700

QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

SAMPLE DUPLICATE: 2318196

Parameter	Units	10354908007 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.064	<0.064		30	
1,1,1-Trichloroethane	ug/L	<0.057	<0.057		30	
1,1,2,2-Tetrachloroethane	ug/L	<0.055	<0.055		30	
1,1,2-Trichloroethane	ug/L	<0.064	<0.064		30	
1,1,2-Trichlorotrifluoroethane	ug/L	<0.13	<0.13		30	
1,1-Dichloroethane	ug/L	<0.055	<0.055		30	
1,1-Dichloroethene	ug/L	<0.069	<0.069		30	
1,1-Dichloropropene	ug/L	<0.082	<0.082		30	
1,2,3-Trichlorobenzene	ug/L	<0.17	<0.17		30	
1,2,3-Trichloropropane	ug/L	<0.19	<0.19		30	
1,2,4-Trichlorobenzene	ug/L	<0.14	<0.14		30	
1,2,4-Trimethylbenzene	ug/L	<0.068	<0.068		30	
1,2-Dibromo-3-chloropropane	ug/L	<0.60	<0.60		30	
1,2-Dibromoethane (EDB)	ug/L	<0.092	<0.092		30	
1,2-Dichlorobenzene	ug/L	<0.078	<0.078		30	
1,2-Dichloroethane	ug/L	0.16J	0.12J		30	
1,2-Dichloropropane	ug/L	<0.066	<0.066		30	
1,3,5-Trimethylbenzene	ug/L	<0.042	<0.042		30	
1,3-Dichlorobenzene	ug/L	<0.085	<0.085		30	
1,3-Dichloropropane	ug/L	<0.059	<0.059		30	
1,4-Dichlorobenzene	ug/L	<0.081	<0.081		30	
2,2-Dichloropropane	ug/L	<0.096	<0.096		30	
2-Butanone (MEK)	ug/L	<1.1	<1.1		30	
2-Chlorotoluene	ug/L	<0.084	<0.084		30	
4-Chlorotoluene	ug/L	<0.048	<0.048		30	
4-Methyl-2-pentanone (MIBK)	ug/L	<0.80	<0.80		30	
Acetone	ug/L	2.3J	3.1J		30	
Allyl chloride	ug/L	<0.25	<0.25		30	
Benzene	ug/L	<0.042	<0.042		30	
Bromobenzene	ug/L	<0.087	<0.087		30	
Bromochloromethane	ug/L	<0.082	<0.082		30	
Bromodichloromethane	ug/L	<0.068	<0.068		30	
Bromoform	ug/L	<0.11	<0.11		30	
Bromomethane	ug/L	<0.20	<0.20		30	
Carbon tetrachloride	ug/L	<0.079	<0.079		30	
Chlorobenzene	ug/L	<0.066	<0.066		30	
Chloroethane	ug/L	<0.12	<0.12		30	
Chloroform	ug/L	0.25J	0.29J		30	
Chloromethane	ug/L	<0.080	<0.080		30	
cis-1,2-Dichloroethene	ug/L	<0.12	<0.12		30	
cis-1,3-Dichloropropene	ug/L	<0.069	<0.069		30	
Dibromochloromethane	ug/L	<0.048	<0.048		30	
Dibromomethane	ug/L	<0.14	<0.14		30	
Dichlorodifluoromethane	ug/L	<0.075	<0.075		30	
Dichlorofluoromethane	ug/L	<0.054	<0.054		30	
Diethyl ether (Ethyl ether)	ug/L	<0.090	<0.090		30	
Ethylbenzene	ug/L	<0.075	<0.075		30	

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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

SAMPLE DUPLICATE: 2318196

Parameter	Units	10354908007 Result	Dup Result	RPD	Max RPD	Qualifiers
Hexachloro-1,3-butadiene	ug/L	<0.13	<0.13		30	
Isopropylbenzene (Cumene)	ug/L	<0.064	<0.064		30	
Methyl-tert-butyl ether	ug/L	<0.047	<0.047		30	
Methylene Chloride	ug/L	<0.097	<0.097		30	
n-Butylbenzene	ug/L	<0.16	<0.16		30	
n-Propylbenzene	ug/L	<0.049	<0.049		30	
Naphthalene	ug/L	<0.064	<0.064		30	
p-Isopropyltoluene	ug/L	<0.064	<0.064		30	
sec-Butylbenzene	ug/L	<0.094	<0.094		30	
Styrene	ug/L	<0.056	<0.056		30	
tert-Butylbenzene	ug/L	<0.051	<0.051		30	
Tetrachloroethene	ug/L	<0.13	<0.13		30	
Tetrahydrofuran	ug/L	<1.5	<1.5		30	
Toluene	ug/L	<0.059	<0.059		30	
trans-1,2-Dichloroethene	ug/L	<0.15	<0.15		30	
trans-1,3-Dichloropropene	ug/L	<0.044	<0.044		30	
Trichloroethene	ug/L	<0.051	<0.051		30	
Trichlorofluoromethane	ug/L	<0.055	<0.055		30	
Vinyl chloride	ug/L	<0.084	<0.084		30	
Xylene (Total)	ug/L	<0.15	<0.15		30	
1,2-Dichloroethane-d4 (S)	%.	98	100	3		
4-Bromofluorobenzene (S)	%.	102	102	1		
Toluene-d8 (S)	%.	100	98	1		

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(612)607-1700

QUALIFIERS

Project: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

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 decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

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.
CL	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.
L0	Analyte recovery in the laboratory control sample (LCS) was outside QC limits.
L2	Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results may be biased low.
L3	Analyte recovery in the laboratory control sample (LCS) exceeded QC limits. Analyte presence below reporting limits in associated samples. Results unaffected by high bias.
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: 60484659.310 BNSF Mission Wye
Pace Project No.: 10354908

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10354908006	**Gravel Pit Well**	EPA 524.2	425629		
10354908018	**Trip Blank**	EPA 524.2	425629		
10354908001	**MW-1**	EPA 8260B	425670		
10354908002	**MW-19**	EPA 8260B	425670		
10354908003	**MW-18**	EPA 8260B	425670		
10354908004	**MW-14**	EPA 8260B	425670		
10354908005	**MW-12**	EPA 8260B	425672		
10354908007	**Gravel Pit Pond**	EPA 8260B	425672		
10354908008	**MW-9**	EPA 8260B	425672		
10354908009	**MW-32**	EPA 8260B	425672		
10354908010	**MW-4**	EPA 8260B	425672		
10354908011	**MW-33**	EPA 8260B	425672		
10354908012	**MW-30**	EPA 8260B	425672		
10354908013	**MW-5**	EPA 8260B	425672		
10354908014	**MW-3**	EPA 8260B	425672		
10354908015	**MW-22**	EPA 8260B	425672		
10354908016	**MW-21**	EPA 8260B	425672		
10354908017	**Trip Blank**	EPA 8260B	425672		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

(0354908

Page: 1 of 2

1939024

Section A Required Client Information:

Company: AECOM
Address: 207 N Broadway Ste 315
Billings, MT 59101
Email To: shelly.young@aecom.com
Phone: 406-896-4552 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: shelly.young@aecom.com
Copy To: cole.grover@aecom.com
Purchase Order No.:
Project Name: BNSF-Mission Way
Project Number: 60484659.310

Section C Invoice Information:

Attention: YUEH
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☒ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MT

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N): VOCs (8260B) Y; VOCs (524.2) Y

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	Composite Start TIME	Composite End/Grab DATE	Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-1	WT	G			07/06/16	1030	14.5	3				X						01
2	MW-19	WT	G			07/06/16	1240	14.4	3				X						02
3	MW-18	WT	G			07/06/16	1510	15.0	3				X						03
4	MW-14	WT	G			07/06/16	1558	13.0	3				X						04
5	MW-12	WT	G			07/06/16	1642	14.0	3				X						05
6	GRAVEL PIT WELL	WT	G			07/06/16	1715	–	3				X				X		06
7	GRAVEL PIT POND	WT	G			07/06/16	1345	–	3				X				*		07
8	MW-9	WT	G			07/07/16	0800	14.4	3				X						08
9	MW-32	WT	G			07/07/16	0820	–	3				X						09
10	MW-4	WT	G			07/07/16	0900	12.5	3				X						010
11	MW-33	WT	G			07/07/16	0920	12.5	3				X						011
12	MW-30	WT	G			07/07/16	1030	13.[illegible]	3				X						012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	J Evans / AECOM	07/07/16	1430	FedEx 675242069640	07/08/16	1430				
				[illegible]	7/8/16	0930	3.9	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Jennifer Evans
SIGNATURE of SAMPLER: J Evans
DATE Signed (MM/DD/YY): 07/07/16

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

1939025

Section A Required Client Information:

Company: AECOM
Address: 207 N Broadway Ste 35
Billings, MT 59101
Email To: shelly.yonge@aecom.com
Phone: 406-896-4532 Fax:
Requested Due Date/TAT: STANDARD

Section B Required Project Information:

Report To: shelly.yonge@aecom.com
Copy To: cole.grover@aecom.com
Purchase Order No.:
Project Name: BNSF - Mission Wye
Project Number: 60484659.310

Section C Invoice Information:

Attention: Yuch
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☒ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: MT

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N): VOCs (8260B) Y; VOCs (524.2) Y

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	Composite Start TIME	Composite End/Grab DATE	Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-5	WT	G			07/07/16	1035	13.1	3				X						013
2	MW-3	WT	G			07/07/16	1128	13.5	3				X						014
3	MW-22	WT	G			07/07/16	1202	14.5	3				X						015
4	MW-21	WT	G			07/07/16	1244	14.8	3				X						016
5	TRIP BLANK	WT	-			—	—	—	2				X						~~lab supplied~~ 017
6	TRIP BLANK	WT	-			—	—	—	2				X						018
7																			
8																			
9																			
10																			
11																			
12																			

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
lab supplied trip	J Evans / AECOM	07/09/16	1430	FedEx 6752420 9640	07/09/16	1430				
blanks sealed in				Vanessa Lejovic	7/8/16	0930	3.9	Y	Y	Y
bubble wrap										

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Jennifer Evans
SIGNATURE of SAMPLER: J Evans
DATE Signed (MM/DD/YY): 07/07/16

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 04Apr2016 Page 1 of 1
	Document No.: **F-MN-L-213-rev.16**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Alcom.

Project #: WO# : 10354908

10354908

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 8058 9409 7745

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

Thermometer Used: ☐ 151401163 ☐ 151401164 ☑ B88A912167504 ☐ B88A0143310098 **Type of Ice:** ☑ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 3.9 **Cooler Temp Corrected (°C):** 3.9 **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6°C **Correction Factor:** none **Date and Initials of Person Examining Contents:** VS 7/8/16

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, AZ, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				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. Note if sediment is visible in the dissolved container
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	
Exceptions: VOA, coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☑ Yes	☐ No	☐ N/A	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): 040416-38GF				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: Carol Day **Date:** 7/8/16

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, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

June 28, 2017

Shelly Young
AECOM, Inc.
207 North Broadway, Suite 315
Billings, MT 59101

RE: Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Dear Shelly Young:
Enclosed are the analytical results for sample(s) received by the laboratory on June 21, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
1(612)607-6436
Project Manager

Enclosures

cc: Mr. Yueh Chuang, BNSF Railway
Cole Grover, AECOM
Mary Sark, BNSF

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CERTIFICATIONS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Minnesota Certification IDs

1700 Elm Street SE, Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: UST-078
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014
Arkansas Certification #: 88-0680
California Certification #: MN00064
CNMI Saipan Certification #:MP0003
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida Certification #: E87605
Georgia Certification #: 959
Guam EPA Certification #: MN00064
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: 03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: MN00064
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081
New Jersey Certification #: MN002
New York Certification #: 11647
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon NwTPH Certification #: MN300001
Oregon Secondary Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia Certification #: 460163
Washington Certification #: C486
West Virginia DW Certification #: 9952 C
West Virginia WW Certification #: 382
Wisconsin Certification #: 999407970
Wyoming via EPA Region 8 Certification #: 8TMS-L

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SAMPLE SUMMARY

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10393046001	**MW-01/06192017**	Water	06/19/17 13:20	06/21/17 09:45
10393046002	**MW-04/06192017**	Water	06/19/17 14:10	06/21/17 09:45
10393046003	**MW-03/06192017**	Water	06/19/17 15:05	06/21/17 09:45
10393046004	**MW-DUP/06192017**	Water	06/19/17 14:50	06/21/17 09:45
10393046005	**MW-22/06192017**	Water	06/19/17 15:55	06/21/17 09:45
10393046006	**MW-09/06192017**	Water	06/19/17 17:00	06/21/17 09:45
10393046007	**EB-01/06192017**	Water	06/19/17 17:25	06/21/17 09:45
10393046008	**FB-01/06192017**	Water	06/19/17 16:45	06/21/17 09:45
10393046009	**TRIP BLANK**	Water	06/19/17 00:00	06/21/17 09:45

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SAMPLE ANALYTE COUNT

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10393046001	**MW-01/06192017**	EPA 8260B	PRD	70	PASI-M
10393046002	**MW-04/06192017**	EPA 8260B	PRD	70	PASI-M
10393046003	**MW-03/06192017**	EPA 8260B	PRD	70	PASI-M
10393046004	**MW-DUP/06192017**	EPA 8260B	PRD	70	PASI-M
10393046005	**MW-22/06192017**	EPA 8260B	PRD	70	PASI-M
10393046006	**MW-09/06192017**	EPA 8260B	PRD	70	PASI-M
10393046007	**EB-01/06192017**	EPA 8260B	PRD	70	PASI-M
10393046008	**FB-01/06192017**	EPA 8260B	PRD	70	PASI-M
10393046009	**TRIP BLANK**	EPA 8260B	PRD	70	PASI-M

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PROJECT NARRATIVE

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: June 28, 2017

General Information:
9 samples were analyzed for EPA 8260B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

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.

QC Batch: 481348

CH: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.

- FB-01/06192017 (Lab ID: 10393046008)
  - Acetone
- LCS (Lab ID: 2621798)
  - Acetone
  - Bromomethane
  - Chloroethane
- MS (Lab ID: 2622935)
  - Acetone
  - Bromomethane
  - Chloroethane
- MSD (Lab ID: 2622936)
  - Acetone
  - Bromomethane
  - Chloroethane
- MW-03/06192017 (Lab ID: 10393046003)
  - Acetone
- TRIP BLANK (Lab ID: 10393046009)
  - Acetone

QC Batch: 482022

CH: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.

- LCS (Lab ID: 2625437)
  - Bromomethane
  - Chloroethane
- LCSD (Lab ID: 2625438)
  - Bromomethane
  - Chloroethane

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

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PROJECT NARRATIVE

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: June 28, 2017

QC Batch: 482022

IS: The internal standard response is below criteria. Results may be biased high.

- MW-01/06192017 (Lab ID: 10393046001)
  - Acetone
  - Tetrahydrofuran
- MW-04/06192017 (Lab ID: 10393046002)
  - Acetone
  - Tetrahydrofuran

Surrogates:
All surrogates 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.

QC Batch: 481348

L1: Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high.

- LCS (Lab ID: 2621798)
  - Acetone
  - Chloroethane

QC Batch: 482022

L3: Analyte recovery in the laboratory control sample (LCS) exceeded QC limits. Analyte presence below reporting limits in associated samples.

- LCS (Lab ID: 2625437)
  - Chloroethane
  - Dichlorofluoromethane
- LCSD (Lab ID: 2625438)
  - Bromomethane
  - Chloroethane
  - Dichlorofluoromethane

R1: RPD value was outside control limits.

- LCSD (Lab ID: 2625438)
  - Bromomethane

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

QC Batch: 481348

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10392635003

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- MS (Lab ID: 2622935)

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PROJECT NARRATIVE

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: June 28, 2017

QC Batch: 481348

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10392635003

M0: Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

- Acetone
- Chloroethane

- MSD (Lab ID: 2622936)
  - Acetone

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 2622935)
  - 1,1,1-Trichloroethane
  - 1,1,2-Trichlorotrifluoroethane
  - 1,1-Dichloroethane
  - 1,1-Dichloroethene
  - 1,1-Dichloropropene
  - 1,2,4-Trimethylbenzene
  - 1,2-Dichloroethane
  - 1,2-Dichloropropane
  - 2,2-Dichloropropane
  - 2-Butanone (MEK)
  - 2-Chlorotoluene
  - Allyl chloride
  - Benzene
  - Bromoform
  - Bromomethane
  - Chloroform
  - Chloromethane
  - Dichlorodifluoromethane
  - Dichlorofluoromethane
  - Diethyl ether (Ethyl ether)
  - Ethylbenzene
  - Hexachloro-1,3-butadiene
  - Isopropylbenzene (Cumene)
  - Methyl-tert-butyl ether
  - Tetrahydrofuran
  - Trichlorofluoromethane
  - Vinyl chloride
  - cis-1,2-Dichloroethene
  - cis-1,3-Dichloropropene
  - p-Isopropyltoluene
  - trans-1,3-Dichloropropene
- MSD (Lab ID: 2622936)
  - 1,2,4-Trimethylbenzene
  - 2-Chlorotoluene
  - Allyl chloride
  - Bromomethane
  - Chloromethane

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PROJECT NARRATIVE

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: June 28, 2017

QC Batch: 481348

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10392635003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Ethylbenzene

R1: RPD value was outside control limits.

- MSD (Lab ID: 2622936)
  - Dichlorofluoromethane
  - Trichlorofluoromethane

Additional Comments:

Analyte Comments:

QC Batch: 481348

1M: Headspace in the vial was measured at 9mm.

- TRIP BLANK (Lab ID: 10393046009)
  - 1,2-Dichloroethane-d4 (S)

4M: Headspace in the vial was measured at 8mm.

- FB-01/06192017 (Lab ID: 10393046008)
  - 1,2-Dichloroethane-d4 (S)

E: Analyte concentration exceeded the calibration range. The reported result is estimated.

- MS (Lab ID: 2622935)
  - 1,2,4-Trimethylbenzene
  - 1,3,5-Trimethylbenzene
  - Ethylbenzene
- MSD (Lab ID: 2622936)
  - 1,2,4-Trimethylbenzene
  - 1,3,5-Trimethylbenzene
  - Ethylbenzene

QC Batch: 482022

2M: Headspace in the vial was measured at 6mm.

- MW-04/06192017 (Lab ID: 10393046002)
  - 1,2-Dichloroethane-d4 (S)

3M: Headspace in the vial was measured at 7 mm.

- MW-01/06192017 (Lab ID: 10393046001)
  - 1,2-Dichloroethane-d4 (S)

C0: Result confirmed by second analysis.

- MW-01/06192017 (Lab ID: 10393046001)
  - Acetone
- MW-04/06192017 (Lab ID: 10393046002)
  - Acetone

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: MW-01/06192017 **Lab ID: 10393046001** Collected: 06/19/17 13:20 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**17.7J**	ug/L	20.0	2.0	1		06/27/17 19:30	67-64-1	C0,IS
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		06/27/17 19:30	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		06/27/17 19:30	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		06/27/17 19:30	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		06/27/17 19:30	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		06/27/17 19:30	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		06/27/17 19:30	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		06/27/17 19:30	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		06/27/17 19:30	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		06/27/17 19:30	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		06/27/17 19:30	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		06/27/17 19:30	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		06/27/17 19:30	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		06/27/17 19:30	108-90-7	
Chloroethane	**<0.34**	ug/L	4.0	0.34	1		06/27/17 19:30	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		06/27/17 19:30	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		06/27/17 19:30	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		06/27/17 19:30	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		06/27/17 19:30	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		06/27/17 19:30	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		06/27/17 19:30	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		06/27/17 19:30	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		06/27/17 19:30	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		06/27/17 19:30	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		06/27/17 19:30	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/27/17 19:30	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	4.0	0.23	1		06/27/17 19:30	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/27/17 19:30	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/27/17 19:30	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		06/27/17 19:30	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		06/27/17 19:30	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		06/27/17 19:30	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		06/27/17 19:30	75-43-4	
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		06/27/17 19:30	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		06/27/17 19:30	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		06/27/17 19:30	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		06/27/17 19:30	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/27/17 19:30	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/27/17 19:30	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		06/27/17 19:30	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		06/27/17 19:30	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		06/27/17 19:30	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		06/27/17 19:30	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		06/27/17 19:30	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		06/27/17 19:30	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		06/27/17 19:30	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: MW-01/06192017 **Lab ID: 10393046001** Collected: 06/19/17 13:20 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		06/27/17 19:30	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		06/27/17 19:30	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		06/27/17 19:30	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		06/27/17 19:30	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		06/27/17 19:30	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		06/27/17 19:30	79-34-5	
Tetrachloroethene	**<0.25**	ug/L	1.0	0.25	1		06/27/17 19:30	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		06/27/17 19:30	109-99-9	IS
Toluene	**<0.14**	ug/L	1.0	0.14	1		06/27/17 19:30	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/27/17 19:30	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/27/17 19:30	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/27/17 19:30	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		06/27/17 19:30	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		06/27/17 19:30	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	4.0	0.33	1		06/27/17 19:30	75-69-4	
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		06/27/17 19:30	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		06/27/17 19:30	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		06/27/17 19:30	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		06/27/17 19:30	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		06/27/17 19:30	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		06/27/17 19:30	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	116	%.	75-137		1		06/27/17 19:30	17060-07-0	3M,HS
Toluene-d8 (S)	95	%.	75-125		1		06/27/17 19:30	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	75-125		1		06/27/17 19:30	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: MW-04/06192017 **Lab ID: 10393046002** Collected: 06/19/17 14:10 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**21.2**	ug/L	20.0	2.0	1		06/27/17 19:46	67-64-1	C0,IS
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		06/27/17 19:46	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		06/27/17 19:46	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		06/27/17 19:46	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		06/27/17 19:46	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		06/27/17 19:46	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		06/27/17 19:46	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		06/27/17 19:46	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		06/27/17 19:46	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		06/27/17 19:46	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		06/27/17 19:46	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		06/27/17 19:46	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		06/27/17 19:46	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		06/27/17 19:46	108-90-7	
Chloroethane	**<0.34**	ug/L	4.0	0.34	1		06/27/17 19:46	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		06/27/17 19:46	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		06/27/17 19:46	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		06/27/17 19:46	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		06/27/17 19:46	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		06/27/17 19:46	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		06/27/17 19:46	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		06/27/17 19:46	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		06/27/17 19:46	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		06/27/17 19:46	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		06/27/17 19:46	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/27/17 19:46	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	4.0	0.23	1		06/27/17 19:46	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/27/17 19:46	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/27/17 19:46	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		06/27/17 19:46	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		06/27/17 19:46	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		06/27/17 19:46	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		06/27/17 19:46	75-43-4	
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		06/27/17 19:46	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		06/27/17 19:46	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		06/27/17 19:46	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		06/27/17 19:46	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/27/17 19:46	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/27/17 19:46	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		06/27/17 19:46	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		06/27/17 19:46	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		06/27/17 19:46	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		06/27/17 19:46	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		06/27/17 19:46	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		06/27/17 19:46	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		06/27/17 19:46	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: MW-04/06192017 **Lab ID: 10393046002** Collected: 06/19/17 14:10 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		06/27/17 19:46	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		06/27/17 19:46	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		06/27/17 19:46	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		06/27/17 19:46	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		06/27/17 19:46	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		06/27/17 19:46	79-34-5	
Tetrachloroethene	**<0.25**	ug/L	1.0	0.25	1		06/27/17 19:46	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		06/27/17 19:46	109-99-9	IS
Toluene	**<0.14**	ug/L	1.0	0.14	1		06/27/17 19:46	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/27/17 19:46	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/27/17 19:46	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/27/17 19:46	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		06/27/17 19:46	79-00-5	
Trichloroethene	**0.48**	ug/L	0.40	0.052	1		06/27/17 19:46	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	4.0	0.33	1		06/27/17 19:46	75-69-4	
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		06/27/17 19:46	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		06/27/17 19:46	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		06/27/17 19:46	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		06/27/17 19:46	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		06/27/17 19:46	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		06/27/17 19:46	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	115	%.	75-137		1		06/27/17 19:46	17060-07-0	2M,HS
Toluene-d8 (S)	97	%.	75-125		1		06/27/17 19:46	2037-26-5	
4-Bromofluorobenzene (S)	106	%.	75-125		1		06/27/17 19:46	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: MW-03/06192017 **Lab ID: 10393046003** Collected: 06/19/17 15:05 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**7.0J**	ug/L	20.0	2.0	1		06/23/17 15:52	67-64-1	CH,L1
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		06/23/17 15:52	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 15:52	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		06/23/17 15:52	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		06/23/17 15:52	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		06/23/17 15:52	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		06/23/17 15:52	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		06/23/17 15:52	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		06/23/17 15:52	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 15:52	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		06/23/17 15:52	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		06/23/17 15:52	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		06/23/17 15:52	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		06/23/17 15:52	108-90-7	
Chloroethane	**<0.34**	ug/L	4.0	0.34	1		06/23/17 15:52	75-00-3	L3
Chloroform	**<0.21**	ug/L	1.0	0.21	1		06/23/17 15:52	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		06/23/17 15:52	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		06/23/17 15:52	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		06/23/17 15:52	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		06/23/17 15:52	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		06/23/17 15:52	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		06/23/17 15:52	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		06/23/17 15:52	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		06/23/17 15:52	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		06/23/17 15:52	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 15:52	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	4.0	0.23	1		06/23/17 15:52	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 15:52	75-34-3	
1,2-Dichloroethane	**0.21J**	ug/L	1.0	0.17	1		06/23/17 15:52	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		06/23/17 15:52	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		06/23/17 15:52	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 15:52	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		06/23/17 15:52	75-43-4	
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		06/23/17 15:52	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		06/23/17 15:52	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		06/23/17 15:52	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		06/23/17 15:52	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/23/17 15:52	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/23/17 15:52	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		06/23/17 15:52	60-29-7	
Ethylbenzene	**0.17J**	ug/L	1.0	0.15	1		06/23/17 15:52	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		06/23/17 15:52	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		06/23/17 15:52	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		06/23/17 15:52	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		06/23/17 15:52	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		06/23/17 15:52	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: MW-03/06192017 **Lab ID: 10393046003** Collected: 06/19/17 15:05 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		06/23/17 15:52	1634-04-4	
Naphthalene	**0.54J**	ug/L	4.0	0.20	1		06/23/17 15:52	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		06/23/17 15:52	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		06/23/17 15:52	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 15:52	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		06/23/17 15:52	79-34-5	
Tetrachloroethene	**0.96J**	ug/L	1.0	0.25	1		06/23/17 15:52	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		06/23/17 15:52	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		06/23/17 15:52	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 15:52	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 15:52	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 15:52	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		06/23/17 15:52	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		06/23/17 15:52	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	4.0	0.33	1		06/23/17 15:52	75-69-4	
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		06/23/17 15:52	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		06/23/17 15:52	76-13-1	
1,2,4-Trimethylbenzene	**0.41J**	ug/L	1.0	0.18	1		06/23/17 15:52	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		06/23/17 15:52	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		06/23/17 15:52	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		06/23/17 15:52	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	122	%.	75-137		1		06/23/17 15:52	17060-07-0	
Toluene-d8 (S)	101	%.	75-125		1		06/23/17 15:52	2037-26-5	
4-Bromofluorobenzene (S)	107	%.	75-125		1		06/23/17 15:52	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: MW-DUP/06192017 **Lab ID: 10393046004** Collected: 06/19/17 14:50 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		06/23/17 16:08	67-64-1	L3
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		06/23/17 16:08	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 16:08	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		06/23/17 16:08	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		06/23/17 16:08	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		06/23/17 16:08	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		06/23/17 16:08	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		06/23/17 16:08	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		06/23/17 16:08	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 16:08	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		06/23/17 16:08	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		06/23/17 16:08	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		06/23/17 16:08	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		06/23/17 16:08	108-90-7	
Chloroethane	**<0.34**	ug/L	4.0	0.34	1		06/23/17 16:08	75-00-3	L3
Chloroform	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:08	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		06/23/17 16:08	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		06/23/17 16:08	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		06/23/17 16:08	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		06/23/17 16:08	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		06/23/17 16:08	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		06/23/17 16:08	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		06/23/17 16:08	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		06/23/17 16:08	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		06/23/17 16:08	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:08	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	4.0	0.23	1		06/23/17 16:08	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 16:08	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 16:08	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		06/23/17 16:08	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		06/23/17 16:08	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 16:08	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:08	75-43-4	
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		06/23/17 16:08	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		06/23/17 16:08	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		06/23/17 16:08	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		06/23/17 16:08	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/23/17 16:08	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/23/17 16:08	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		06/23/17 16:08	60-29-7	
Ethylbenzene	**0.18J**	ug/L	1.0	0.15	1		06/23/17 16:08	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		06/23/17 16:08	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		06/23/17 16:08	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		06/23/17 16:08	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		06/23/17 16:08	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		06/23/17 16:08	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: MW-DUP/06192017 **Lab ID: 10393046004** Collected: 06/19/17 14:50 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		06/23/17 16:08	1634-04-4	
Naphthalene	**0.41J**	ug/L	4.0	0.20	1		06/23/17 16:08	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		06/23/17 16:08	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		06/23/17 16:08	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 16:08	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		06/23/17 16:08	79-34-5	
Tetrachloroethene	**1.2**	ug/L	1.0	0.25	1		06/23/17 16:08	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		06/23/17 16:08	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		06/23/17 16:08	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:08	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:08	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 16:08	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		06/23/17 16:08	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		06/23/17 16:08	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	4.0	0.33	1		06/23/17 16:08	75-69-4	
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		06/23/17 16:08	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		06/23/17 16:08	76-13-1	
1,2,4-Trimethylbenzene	**0.36J**	ug/L	1.0	0.18	1		06/23/17 16:08	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		06/23/17 16:08	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		06/23/17 16:08	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		06/23/17 16:08	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	118	%.	75-137		1		06/23/17 16:08	17060-07-0	
Toluene-d8 (S)	101	%.	75-125		1		06/23/17 16:08	2037-26-5	
4-Bromofluorobenzene (S)	107	%.	75-125		1		06/23/17 16:08	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: MW-22/06192017 **Lab ID: 10393046005** Collected: 06/19/17 15:55 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		06/23/17 16:25	67-64-1	L3
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		06/23/17 16:25	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 16:25	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		06/23/17 16:25	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		06/23/17 16:25	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		06/23/17 16:25	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		06/23/17 16:25	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		06/23/17 16:25	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		06/23/17 16:25	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 16:25	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		06/23/17 16:25	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		06/23/17 16:25	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		06/23/17 16:25	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		06/23/17 16:25	108-90-7	
Chloroethane	**<0.34**	ug/L	4.0	0.34	1		06/23/17 16:25	75-00-3	L3
Chloroform	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:25	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		06/23/17 16:25	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		06/23/17 16:25	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		06/23/17 16:25	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		06/23/17 16:25	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		06/23/17 16:25	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		06/23/17 16:25	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		06/23/17 16:25	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		06/23/17 16:25	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		06/23/17 16:25	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:25	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	4.0	0.23	1		06/23/17 16:25	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 16:25	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 16:25	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		06/23/17 16:25	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		06/23/17 16:25	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 16:25	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:25	75-43-4	
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		06/23/17 16:25	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		06/23/17 16:25	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		06/23/17 16:25	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		06/23/17 16:25	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/23/17 16:25	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/23/17 16:25	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		06/23/17 16:25	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		06/23/17 16:25	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		06/23/17 16:25	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		06/23/17 16:25	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		06/23/17 16:25	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		06/23/17 16:25	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		06/23/17 16:25	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: MW-22/06192017 **Lab ID: 10393046005** Collected: 06/19/17 15:55 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		06/23/17 16:25	1634-04-4	
Naphthalene	**0.33J**	ug/L	4.0	0.20	1		06/23/17 16:25	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		06/23/17 16:25	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		06/23/17 16:25	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 16:25	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		06/23/17 16:25	79-34-5	
Tetrachloroethene	**<0.25**	ug/L	1.0	0.25	1		06/23/17 16:25	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		06/23/17 16:25	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		06/23/17 16:25	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:25	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:25	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 16:25	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		06/23/17 16:25	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		06/23/17 16:25	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	4.0	0.33	1		06/23/17 16:25	75-69-4	
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		06/23/17 16:25	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		06/23/17 16:25	76-13-1	
1,2,4-Trimethylbenzene	**0.26J**	ug/L	1.0	0.18	1		06/23/17 16:25	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		06/23/17 16:25	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		06/23/17 16:25	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		06/23/17 16:25	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	116	%.	75-137		1		06/23/17 16:25	17060-07-0	
Toluene-d8 (S)	101	%.	75-125		1		06/23/17 16:25	2037-26-5	
4-Bromofluorobenzene (S)	105	%.	75-125		1		06/23/17 16:25	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: MW-09/06192017 **Lab ID: 10393046006** Collected: 06/19/17 17:00 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		06/23/17 16:41	67-64-1	L3
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		06/23/17 16:41	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 16:41	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		06/23/17 16:41	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		06/23/17 16:41	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		06/23/17 16:41	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		06/23/17 16:41	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		06/23/17 16:41	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		06/23/17 16:41	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 16:41	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		06/23/17 16:41	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		06/23/17 16:41	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		06/23/17 16:41	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		06/23/17 16:41	108-90-7	
Chloroethane	**<0.34**	ug/L	4.0	0.34	1		06/23/17 16:41	75-00-3	L3
Chloroform	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:41	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		06/23/17 16:41	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		06/23/17 16:41	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		06/23/17 16:41	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		06/23/17 16:41	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		06/23/17 16:41	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		06/23/17 16:41	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		06/23/17 16:41	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		06/23/17 16:41	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		06/23/17 16:41	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:41	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	4.0	0.23	1		06/23/17 16:41	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 16:41	75-34-3	
1,2-Dichloroethane	**0.23J**	ug/L	1.0	0.17	1		06/23/17 16:41	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		06/23/17 16:41	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		06/23/17 16:41	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 16:41	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:41	75-43-4	
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		06/23/17 16:41	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		06/23/17 16:41	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		06/23/17 16:41	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		06/23/17 16:41	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/23/17 16:41	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/23/17 16:41	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		06/23/17 16:41	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		06/23/17 16:41	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		06/23/17 16:41	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		06/23/17 16:41	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		06/23/17 16:41	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		06/23/17 16:41	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		06/23/17 16:41	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: MW-09/06192017 **Lab ID: 10393046006** Collected: 06/19/17 17:00 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		06/23/17 16:41	1634-04-4	
Naphthalene	**0.32J**	ug/L	4.0	0.20	1		06/23/17 16:41	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		06/23/17 16:41	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		06/23/17 16:41	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 16:41	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		06/23/17 16:41	79-34-5	
Tetrachloroethene	**<0.25**	ug/L	1.0	0.25	1		06/23/17 16:41	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		06/23/17 16:41	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		06/23/17 16:41	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:41	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 16:41	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 16:41	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		06/23/17 16:41	79-00-5	
Trichloroethene	**0.31J**	ug/L	0.40	0.052	1		06/23/17 16:41	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	4.0	0.33	1		06/23/17 16:41	75-69-4	
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		06/23/17 16:41	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		06/23/17 16:41	76-13-1	
1,2,4-Trimethylbenzene	**0.20J**	ug/L	1.0	0.18	1		06/23/17 16:41	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		06/23/17 16:41	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		06/23/17 16:41	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		06/23/17 16:41	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	120	%.	75-137		1		06/23/17 16:41	17060-07-0	
Toluene-d8 (S)	102	%.	75-125		1		06/23/17 16:41	2037-26-5	
4-Bromofluorobenzene (S)	107	%.	75-125		1		06/23/17 16:41	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: EB-01/06192017 **Lab ID: 10393046007** Collected: 06/19/17 17:25 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		06/23/17 13:26	67-64-1	L3
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		06/23/17 13:26	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 13:26	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		06/23/17 13:26	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		06/23/17 13:26	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		06/23/17 13:26	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		06/23/17 13:26	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		06/23/17 13:26	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		06/23/17 13:26	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 13:26	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		06/23/17 13:26	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		06/23/17 13:26	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		06/23/17 13:26	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		06/23/17 13:26	108-90-7	
Chloroethane	**<0.34**	ug/L	4.0	0.34	1		06/23/17 13:26	75-00-3	L3
Chloroform	**0.62J**	ug/L	1.0	0.21	1		06/23/17 13:26	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		06/23/17 13:26	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		06/23/17 13:26	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		06/23/17 13:26	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		06/23/17 13:26	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		06/23/17 13:26	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		06/23/17 13:26	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		06/23/17 13:26	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		06/23/17 13:26	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		06/23/17 13:26	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 13:26	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	4.0	0.23	1		06/23/17 13:26	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 13:26	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 13:26	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		06/23/17 13:26	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		06/23/17 13:26	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 13:26	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		06/23/17 13:26	75-43-4	
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		06/23/17 13:26	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		06/23/17 13:26	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		06/23/17 13:26	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		06/23/17 13:26	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/23/17 13:26	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/23/17 13:26	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		06/23/17 13:26	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		06/23/17 13:26	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		06/23/17 13:26	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		06/23/17 13:26	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		06/23/17 13:26	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		06/23/17 13:26	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		06/23/17 13:26	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: EB-01/06192017 **Lab ID: 10393046007** Collected: 06/19/17 17:25 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		06/23/17 13:26	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		06/23/17 13:26	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		06/23/17 13:26	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		06/23/17 13:26	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 13:26	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		06/23/17 13:26	79-34-5	
Tetrachloroethene	**<0.25**	ug/L	1.0	0.25	1		06/23/17 13:26	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		06/23/17 13:26	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		06/23/17 13:26	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 13:26	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 13:26	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 13:26	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		06/23/17 13:26	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		06/23/17 13:26	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	4.0	0.33	1		06/23/17 13:26	75-69-4	
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		06/23/17 13:26	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		06/23/17 13:26	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		06/23/17 13:26	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		06/23/17 13:26	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		06/23/17 13:26	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		06/23/17 13:26	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	118	%.	75-137		1		06/23/17 13:26	17060-07-0	
Toluene-d8 (S)	101	%.	75-125		1		06/23/17 13:26	2037-26-5	
4-Bromofluorobenzene (S)	105	%.	75-125		1		06/23/17 13:26	460-00-4	

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: FB-01/06192017 **Lab ID: 10393046008** Collected: 06/19/17 16:45 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**18.2J**	ug/L	20.0	2.0	1		06/23/17 13:10	67-64-1	CH,L1
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		06/23/17 13:10	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 13:10	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		06/23/17 13:10	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		06/23/17 13:10	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		06/23/17 13:10	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		06/23/17 13:10	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		06/23/17 13:10	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		06/23/17 13:10	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 13:10	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		06/23/17 13:10	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		06/23/17 13:10	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		06/23/17 13:10	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		06/23/17 13:10	108-90-7	
Chloroethane	**<0.34**	ug/L	4.0	0.34	1		06/23/17 13:10	75-00-3	L3
Chloroform	**0.89J**	ug/L	1.0	0.21	1		06/23/17 13:10	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		06/23/17 13:10	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		06/23/17 13:10	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		06/23/17 13:10	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		06/23/17 13:10	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		06/23/17 13:10	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		06/23/17 13:10	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		06/23/17 13:10	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		06/23/17 13:10	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		06/23/17 13:10	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 13:10	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	4.0	0.23	1		06/23/17 13:10	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 13:10	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 13:10	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		06/23/17 13:10	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		06/23/17 13:10	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 13:10	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		06/23/17 13:10	75-43-4	
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		06/23/17 13:10	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		06/23/17 13:10	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		06/23/17 13:10	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		06/23/17 13:10	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/23/17 13:10	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/23/17 13:10	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		06/23/17 13:10	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		06/23/17 13:10	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		06/23/17 13:10	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		06/23/17 13:10	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		06/23/17 13:10	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		06/23/17 13:10	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		06/23/17 13:10	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: FB-01/06192017 **Lab ID: 10393046008** Collected: 06/19/17 16:45 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		06/23/17 13:10	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		06/23/17 13:10	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		06/23/17 13:10	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		06/23/17 13:10	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 13:10	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		06/23/17 13:10	79-34-5	
Tetrachloroethene	**<0.25**	ug/L	1.0	0.25	1		06/23/17 13:10	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		06/23/17 13:10	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		06/23/17 13:10	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 13:10	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 13:10	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 13:10	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		06/23/17 13:10	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		06/23/17 13:10	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	4.0	0.33	1		06/23/17 13:10	75-69-4	
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		06/23/17 13:10	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		06/23/17 13:10	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		06/23/17 13:10	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		06/23/17 13:10	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		06/23/17 13:10	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		06/23/17 13:10	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	117	%.	75-137		1		06/23/17 13:10	17060-07-0	4M,HS
Toluene-d8 (S)	99	%.	75-125		1		06/23/17 13:10	2037-26-5	
4-Bromofluorobenzene (S)	104	%.	75-125		1		06/23/17 13:10	460-00-4	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: TRIP BLANK **Lab ID: 10393046009** Collected: 06/19/17 00:00 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**2.1J**	ug/L	20.0	2.0	1		06/23/17 12:22	67-64-1	CH,L1
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		06/23/17 12:22	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 12:22	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		06/23/17 12:22	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		06/23/17 12:22	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		06/23/17 12:22	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		06/23/17 12:22	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		06/23/17 12:22	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		06/23/17 12:22	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 12:22	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		06/23/17 12:22	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		06/23/17 12:22	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		06/23/17 12:22	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		06/23/17 12:22	108-90-7	
Chloroethane	**<0.34**	ug/L	4.0	0.34	1		06/23/17 12:22	75-00-3	L3
Chloroform	**<0.21**	ug/L	1.0	0.21	1		06/23/17 12:22	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		06/23/17 12:22	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		06/23/17 12:22	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		06/23/17 12:22	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		06/23/17 12:22	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		06/23/17 12:22	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		06/23/17 12:22	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		06/23/17 12:22	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		06/23/17 12:22	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		06/23/17 12:22	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 12:22	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	4.0	0.23	1		06/23/17 12:22	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 12:22	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 12:22	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		06/23/17 12:22	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		06/23/17 12:22	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		06/23/17 12:22	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		06/23/17 12:22	75-43-4	
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		06/23/17 12:22	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		06/23/17 12:22	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		06/23/17 12:22	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		06/23/17 12:22	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/23/17 12:22	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		06/23/17 12:22	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		06/23/17 12:22	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		06/23/17 12:22	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		06/23/17 12:22	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		06/23/17 12:22	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		06/23/17 12:22	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		06/23/17 12:22	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		06/23/17 12:22	108-10-1	

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ANALYTICAL RESULTS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Sample: TRIP BLANK **Lab ID: 10393046009** Collected: 06/19/17 00:00 Received: 06/21/17 09:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		06/23/17 12:22	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		06/23/17 12:22	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		06/23/17 12:22	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		06/23/17 12:22	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 12:22	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		06/23/17 12:22	79-34-5	
Tetrachloroethene	**<0.25**	ug/L	1.0	0.25	1		06/23/17 12:22	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		06/23/17 12:22	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		06/23/17 12:22	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 12:22	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		06/23/17 12:22	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		06/23/17 12:22	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		06/23/17 12:22	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		06/23/17 12:22	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	4.0	0.33	1		06/23/17 12:22	75-69-4	
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		06/23/17 12:22	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		06/23/17 12:22	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		06/23/17 12:22	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		06/23/17 12:22	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		06/23/17 12:22	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		06/23/17 12:22	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	121	%.	75-137		1		06/23/17 12:22	17060-07-0	1M,HS
Toluene-d8 (S)	100	%.	75-125		1		06/23/17 12:22	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	75-125		1		06/23/17 12:22	460-00-4	

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QUALITY CONTROL DATA

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

QC Batch: 481348 | Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B | Analysis Description: 8260B MSV 465 W
Associated Lab Samples: 10393046003, 10393046004, 10393046005, 10393046006, 10393046007, 10393046008, 10393046009

METHOD BLANK: 2621797 | Matrix: Water
Associated Lab Samples: 10393046003, 10393046004, 10393046005, 10393046006, 10393046007, 10393046008, 10393046009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.17	1.0	0.17	06/23/17 11:19	
1,1,1-Trichloroethane	ug/L	<0.17	1.0	0.17	06/23/17 11:19	
1,1,2,2-Tetrachloroethane	ug/L	<0.22	1.0	0.22	06/23/17 11:19	
1,1,2-Trichloroethane	ug/L	<0.15	1.0	0.15	06/23/17 11:19	
1,1,2-Trichlorotrifluoroethane	ug/L	<0.32	1.0	0.32	06/23/17 11:19	
1,1-Dichloroethane	ug/L	<0.17	1.0	0.17	06/23/17 11:19	
1,1-Dichloroethene	ug/L	<0.28	1.0	0.28	06/23/17 11:19	
1,1-Dichloropropene	ug/L	<0.23	1.0	0.23	06/23/17 11:19	
1,2,3-Trichlorobenzene	ug/L	<0.21	1.0	0.21	06/23/17 11:19	
1,2,3-Trichloropropane	ug/L	<0.28	4.0	0.28	06/23/17 11:19	
1,2,4-Trichlorobenzene	ug/L	<0.21	1.0	0.21	06/23/17 11:19	
1,2,4-Trimethylbenzene	ug/L	<0.18	1.0	0.18	06/23/17 11:19	
1,2-Dibromo-3-chloropropane	ug/L	<0.60	4.0	0.60	06/23/17 11:19	
1,2-Dibromoethane (EDB)	ug/L	<0.20	1.0	0.20	06/23/17 11:19	
1,2-Dichlorobenzene	ug/L	<0.17	1.0	0.17	06/23/17 11:19	
1,2-Dichloroethane	ug/L	<0.17	1.0	0.17	06/23/17 11:19	
1,2-Dichloropropane	ug/L	<0.22	4.0	0.22	06/23/17 11:19	
1,3,5-Trimethylbenzene	ug/L	<0.27	1.0	0.27	06/23/17 11:19	
1,3-Dichlorobenzene	ug/L	<0.12	1.0	0.12	06/23/17 11:19	
1,3-Dichloropropane	ug/L	<0.096	1.0	0.096	06/23/17 11:19	
1,4-Dichlorobenzene	ug/L	<0.21	1.0	0.21	06/23/17 11:19	
2,2-Dichloropropane	ug/L	<0.13	4.0	0.13	06/23/17 11:19	
2-Butanone (MEK)	ug/L	<1.1	5.0	1.1	06/23/17 11:19	
2-Chlorotoluene	ug/L	<0.30	1.0	0.30	06/23/17 11:19	
4-Chlorotoluene	ug/L	<0.26	1.0	0.26	06/23/17 11:19	
4-Methyl-2-pentanone (MIBK)	ug/L	<0.43	5.0	0.43	06/23/17 11:19	
Acetone	ug/L	<2.0	20.0	2.0	06/23/17 11:19	
Allyl chloride	ug/L	<0.25	4.0	0.25	06/23/17 11:19	
Benzene	ug/L	<0.16	1.0	0.16	06/23/17 11:19	
Bromobenzene	ug/L	<0.34	1.0	0.34	06/23/17 11:19	
Bromochloromethane	ug/L	<0.19	1.0	0.19	06/23/17 11:19	
Bromodichloromethane	ug/L	<0.24	1.0	0.24	06/23/17 11:19	
Bromoform	ug/L	<0.27	4.0	0.27	06/23/17 11:19	
Bromomethane	ug/L	<0.44	4.0	0.44	06/23/17 11:19	
Carbon tetrachloride	ug/L	<0.20	1.0	0.20	06/23/17 11:19	
Chlorobenzene	ug/L	<0.11	1.0	0.11	06/23/17 11:19	
Chloroethane	ug/L	<0.34	4.0	0.34	06/23/17 11:19	MN
Chloroform	ug/L	<0.21	1.0	0.21	06/23/17 11:19	
Chloromethane	ug/L	<0.25	4.0	0.25	06/23/17 11:19	
cis-1,2-Dichloroethene	ug/L	<0.12	1.0	0.12	06/23/17 11:19	
cis-1,3-Dichloropropene	ug/L	<0.15	4.0	0.15	06/23/17 11:19	

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REPORT OF LABORATORY ANALYSIS

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(612)607-1700

QUALITY CONTROL DATA

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

METHOD BLANK: 2621797 Matrix: Water
Associated Lab Samples: 10393046003, 10393046004, 10393046005, 10393046006, 10393046007, 10393046008, 10393046009

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Dibromochloromethane	ug/L	<0.16	1.0	0.16	06/23/17 11:19	
Dibromomethane	ug/L	<0.19	4.0	0.19	06/23/17 11:19	
Dichlorodifluoromethane	ug/L	<0.23	4.0	0.23	06/23/17 11:19	MN
Dichlorofluoromethane	ug/L	<0.21	1.0	0.21	06/23/17 11:19	
Diethyl ether (Ethyl ether)	ug/L	<0.19	4.0	0.19	06/23/17 11:19	
Ethylbenzene	ug/L	<0.15	1.0	0.15	06/23/17 11:19	
Hexachloro-1,3-butadiene	ug/L	<0.18	1.0	0.18	06/23/17 11:19	
Isopropylbenzene (Cumene)	ug/L	<0.25	1.0	0.25	06/23/17 11:19	
Methyl-tert-butyl ether	ug/L	<0.15	1.0	0.15	06/23/17 11:19	
Methylene Chloride	ug/L	<0.29	4.0	0.29	06/23/17 11:19	
n-Butylbenzene	ug/L	<0.16	1.0	0.16	06/23/17 11:19	
n-Propylbenzene	ug/L	<0.23	1.0	0.23	06/23/17 11:19	
Naphthalene	ug/L	<0.20	4.0	0.20	06/23/17 11:19	
p-Isopropyltoluene	ug/L	<0.19	1.0	0.19	06/23/17 11:19	
sec-Butylbenzene	ug/L	<0.19	1.0	0.19	06/23/17 11:19	
Styrene	ug/L	<0.29	1.0	0.29	06/23/17 11:19	
tert-Butylbenzene	ug/L	<0.22	1.0	0.22	06/23/17 11:19	
Tetrachloroethene	ug/L	<0.25	1.0	0.25	06/23/17 11:19	
Tetrahydrofuran	ug/L	<1.5	10.0	1.5	06/23/17 11:19	
Toluene	ug/L	<0.14	1.0	0.14	06/23/17 11:19	
trans-1,2-Dichloroethene	ug/L	<0.16	1.0	0.16	06/23/17 11:19	
trans-1,3-Dichloropropene	ug/L	<0.15	4.0	0.15	06/23/17 11:19	
Trichloroethene	ug/L	<0.052	0.40	0.052	06/23/17 11:19	
Trichlorofluoromethane	ug/L	<0.33	4.0	0.33	06/23/17 11:19	MN
Vinyl chloride	ug/L	<0.069	0.20	0.069	06/23/17 11:19	
Xylene (Total)	ug/L	<0.32	3.0	0.32	06/23/17 11:19	
1,2-Dichloroethane-d4 (S)	%.	116	75-137		06/23/17 11:19	
4-Bromofluorobenzene (S)	%.	104	75-125		06/23/17 11:19	
Toluene-d8 (S)	%.	101	75-125		06/23/17 11:19	

LABORATORY CONTROL SAMPLE: 2621798

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	21.6	108	75-125	
1,1,1-Trichloroethane	ug/L	20	21.5	108	69-125	
1,1,2,2-Tetrachloroethane	ug/L	20	21.6	108	70-125	
1,1,2-Trichloroethane	ug/L	20	20.9	104	75-125	
1,1,2-Trichlorotrifluoroethane	ug/L	20	20.9	104	70-133	
1,1-Dichloroethane	ug/L	20	22.2	111	62-130	
1,1-Dichloroethene	ug/L	20	20.1	101	64-134	
1,1-Dichloropropene	ug/L	20	23.1	115	65-129	
1,2,3-Trichlorobenzene	ug/L	20	18.3	91	75-125	
1,2,3-Trichloropropane	ug/L	20	20.9	104	70-125	
1,2,4-Trichlorobenzene	ug/L	20	19.7	98	75-125	

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QUALITY CONTROL DATA

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

LABORATORY CONTROL SAMPLE: 2621798

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	20.6	103	69-135	
1,2-Dibromo-3-chloropropane	ug/L	50	44.9	90	73-130	
1,2-Dibromoethane (EDB)	ug/L	20	20.8	104	75-125	
1,2-Dichlorobenzene	ug/L	20	18.2	91	75-125	
1,2-Dichloroethane	ug/L	20	22.9	115	64-126	
1,2-Dichloropropane	ug/L	20	21.5	108	73-125	
1,3,5-Trimethylbenzene	ug/L	20	20.9	104	71-129	
1,3-Dichlorobenzene	ug/L	20	18.2	91	75-125	
1,3-Dichloropropane	ug/L	20	22.7	113	74-125	
1,4-Dichlorobenzene	ug/L	20	18.0	90	75-125	
2,2-Dichloropropane	ug/L	20	23.2	116	59-135	
2-Butanone (MEK)	ug/L	100	133	133	57-142	
2-Chlorotoluene	ug/L	20	20.1	101	73-125	
4-Chlorotoluene	ug/L	20	19.4	97	74-128	
4-Methyl-2-pentanone (MIBK)	ug/L	100	117	117	56-142	
Acetone	ug/L	100	154	154	75-133	CH,L1
Allyl chloride	ug/L	20	24.5	122	62-139	
Benzene	ug/L	20	20.2	101	74-125	
Bromobenzene	ug/L	20	18.4	92	75-125	
Bromochloromethane	ug/L	20	20.7	104	75-125	
Bromodichloromethane	ug/L	20	21.8	109	72-125	
Bromoform	ug/L	20	20.9	105	74-125	
Bromomethane	ug/L	20	28.1	140	30-150	CH
Carbon tetrachloride	ug/L	20	20.2	101	67-130	
Chlorobenzene	ug/L	20	19.3	97	75-125	
Chloroethane	ug/L	20	28.3	141	63-137	CH,L1
Chloroform	ug/L	20	20.2	101	68-128	
Chloromethane	ug/L	20	24.7	123	46-145	
cis-1,2-Dichloroethene	ug/L	20	21.3	107	75-125	
cis-1,3-Dichloropropene	ug/L	20	23.1	116	73-125	
Dibromochloromethane	ug/L	20	20.6	103	75-125	
Dibromomethane	ug/L	20	19.0	95	73-125	
Dichlorodifluoromethane	ug/L	20	18.0	90	36-150	
Dichlorofluoromethane	ug/L	20	24.4	122	75-125	
Diethyl ether (Ethyl ether)	ug/L	20	24.2	121	62-136	
Ethylbenzene	ug/L	20	20.7	103	73-125	
Hexachloro-1,3-butadiene	ug/L	20	24.4	122	69-141	
Isopropylbenzene (Cumene)	ug/L	20	22.6	113	75-126	
Methyl-tert-butyl ether	ug/L	20	21.9	110	70-130	
Methylene Chloride	ug/L	20	19.2	96	74-125	
n-Butylbenzene	ug/L	20	23.4	117	69-133	
n-Propylbenzene	ug/L	20	21.7	108	75-125	
Naphthalene	ug/L	20	19.0	95	66-129	
p-Isopropyltoluene	ug/L	20	23.1	115	73-127	
sec-Butylbenzene	ug/L	20	22.3	112	75-131	
Styrene	ug/L	20	19.9	100	75-128	
tert-Butylbenzene	ug/L	20	21.0	105	75-127	

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QUALITY CONTROL DATA

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

LABORATORY CONTROL SAMPLE: 2621798

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	ug/L	20	19.3	97	71-127	
Tetrahydrofuran	ug/L	200	191	95	75-132	
Toluene	ug/L	20	19.9	100	75-125	
trans-1,2-Dichloroethene	ug/L	20	18.0	90	69-127	
trans-1,3-Dichloropropene	ug/L	20	22.8	114	70-128	
Trichloroethene	ug/L	20	22.0	110	70-125	
Trichlorofluoromethane	ug/L	20	18.9	95	71-125	
Vinyl chloride	ug/L	20	20.4	102	69-133	
Xylene (Total)	ug/L	60	63.1	105	75-125	
1,2-Dichloroethane-d4 (S)	%.			119	75-137	
4-Bromofluorobenzene (S)	%.			105	75-125	
Toluene-d8 (S)	%.			107	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2622935 2622936

Parameter	Units	10392635003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1,2-Tetrachloroethane	ug/L	ND	20	20	27.2	22.3	136	112	75-138	20	30	
1,1,1-Trichloroethane	ug/L	ND	20	20	30.5	24.5	152	123	75-145	22	30	M1
1,1,2,2-Tetrachloroethane	ug/L	ND	20	20	26.0	21.8	130	109	73-150	18	30	
1,1,2-Trichloroethane	ug/L	ND	20	20	26.9	22.7	135	113	75-140	17	30	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	20	20	35.1	27.1	175	135	74-150	26	30	M1
1,1-Dichloroethane	ug/L	ND	20	20	29.4	24.9	147	125	75-140	16	30	M1
1,1-Dichloroethene	ug/L	ND	20	20	31.1	25.6	155	128	73-150	19	30	M1
1,1-Dichloropropene	ug/L	ND	20	20	33.0	27.4	165	137	75-150	19	30	M1
1,2,3-Trichlorobenzene	ug/L	ND	20	20	22.3	18.0	111	90	57-147	21	30	
1,2,3-Trichloropropane	ug/L	ND	20	20	27.8	22.0	135	107	75-147	23	30	
1,2,4-Trichlorobenzene	ug/L	ND	20	20	23.6	20.1	118	101	59-142	16	30	
1,2,4-Trimethylbenzene	ug/L	466	20	20	586	583	602	584	73-141	1	30	E,M1
1,2-Dibromo-3-chloropropane	ug/L	ND	50	50	56.5	47.0	113	94	65-136	18	30	
1,2-Dibromoethane (EDB)	ug/L	ND	20	20	23.3	20.4	117	102	75-131	13	30	
1,2-Dichlorobenzene	ug/L	ND	20	20	21.6	18.2	108	91	75-141	17	30	
1,2-Dichloroethane	ug/L	ND	20	20	29.7	25.6	145	125	75-125	15	30	M1
1,2-Dichloropropane	ug/L	ND	20	20	30.3	27.8	150	137	71-147	9	30	M1
1,3,5-Trimethylbenzene	ug/L	226	20	20	250	253	122	135	75-139	1	30	E
1,3-Dichlorobenzene	ug/L	ND	20	20	22.2	18.8	111	94	75-142	17	30	
1,3-Dichloropropane	ug/L	ND	20	20	26.6	22.3	133	112	75-141	17	30	
1,4-Dichlorobenzene	ug/L	ND	20	20	21.5	18.4	107	92	75-139	15	30	
2,2-Dichloropropane	ug/L	ND	20	20	31.5	27.6	157	138	60-150	13	30	M1
2-Butanone (MEK)	ug/L	36.6	100	100	180	150	144	113	68-133	18	30	M1
2-Chlorotoluene	ug/L	ND	20	20	52.7	49.6	263	248	75-146	6	30	M1
4-Chlorotoluene	ug/L	ND	20	20	22.7	19.1	113	96	75-149	17	30	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	100	140	114	137	111	67-150	21	30	

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QUALITY CONTROL DATA

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2622935 2622936

Parameter	Units	10392635003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Acetone	ug/L	57.2	100	100	246	219	189	162	56-150	12	30	CH,L1, M0
Allyl chloride	ug/L	ND	20	20	46.0	36.4	230	182	66-134	23	30	M1
Benzene	ug/L	ND	20	20	27.5	23.4	136	115	74-134	16	30	M1
Bromobenzene	ug/L	ND	20	20	23.1	19.4	115	97	75-138	18	30	
Bromochloromethane	ug/L	ND	20	20	27.0	23.4	135	117	75-145	15	30	
Bromodichloromethane	ug/L	ND	20	20	27.3	24.4	136	122	75-143	11	30	
Bromoform	ug/L	ND	20	20	25.2	21.7	126	109	67-125	15	30	M1
Bromomethane	ug/L	ND	20	20	40.8	39.8	204	199	30-150	2	30	CH,M1
Carbon tetrachloride	ug/L	ND	20	20	28.3	23.3	141	116	75-150	19	30	
Chlorobenzene	ug/L	ND	20	20	25.8	21.7	129	108	75-133	18	30	
Chloroethane	ug/L	ND	20	20	39.6	29.6	198	148	53-150	29	30	CH,L1, M0
Chloroform	ug/L	ND	20	20	29.1	26.4	146	132	75-134	10	30	M1
Chloromethane	ug/L	ND	20	20	43.5	36.5	217	183	41-150	17	30	M1
cis-1,2-Dichloroethene	ug/L	ND	20	20	30.6	27.0	153	135	73-140	12	30	M1
cis-1,3-Dichloropropene	ug/L	ND	20	20	29.6	25.4	148	127	72-140	15	30	M1
Dibromochloromethane	ug/L	ND	20	20	24.8	20.6	124	103	74-130	19	30	
Dibromomethane	ug/L	ND	20	20	25.1	22.4	125	112	70-141	11	30	
Dichlorodifluoromethane	ug/L	ND	20	20	30.9	23.7	155	118	50-150	27	30	M1
Dichlorofluoromethane	ug/L	ND	20	20	37.6	27.2	188	136	62-150	32	30	M1,R1
Diethyl ether (Ethyl ether)	ug/L	ND	20	20	31.2	25.6	156	128	71-141	20	30	M1
Ethylbenzene	ug/L	375	20	20	433	430	293	275	75-136	1	30	E,M1
Hexachloro-1,3-butadiene	ug/L	ND	20	20	31.5	28.6	157	143	47-150	10	30	M1
Isopropylbenzene (Cumene)	ug/L	63.8	20	20	94.4	90.6	153	134	75-138	4	30	M1
Methyl-tert-butyl ether	ug/L	ND	20	20	28.4	24.1	142	120	75-128	16	30	M1
Methylene Chloride	ug/L	ND	20	20	26.0	23.1	130	116	69-150	12	30	
n-Butylbenzene	ug/L	14.6	20	20	42.7	38.5	141	120	68-150	10	30	
n-Propylbenzene	ug/L	145	20	20	171	173	132	142	74-150	1	30	
Naphthalene	ug/L	180	20	20	200	201	100	105	61-138	1	30	
p-Isopropyltoluene	ug/L	6.4	20	20	36.3	30.9	149	123	70-142	16	30	M1
sec-Butylbenzene	ug/L	11.4	20	20	37.5	34.2	130	114	74-150	9	30	
Styrene	ug/L	ND	20	20	24.8	21.0	123	104	70-140	17	30	
tert-Butylbenzene	ug/L	ND	20	20	24.5	21.3	120	104	73-140	14	30	
Tetrachloroethene	ug/L	ND	20	20	25.0	19.8	125	99	72-141	23	30	
Tetrahydrofuran	ug/L	ND	200	200	354	289	177	144	53-150	20	30	M1
Toluene	ug/L	2.2	20	20	27.5	22.9	127	103	71-138	18	30	
trans-1,2-Dichloroethene	ug/L	ND	20	20	25.8	20.8	129	104	74-149	22	30	
trans-1,3-Dichloropropene	ug/L	ND	20	20	28.2	23.8	141	119	74-138	17	30	M1
Trichloroethene	ug/L	ND	20	20	28.8	24.9	144	125	70-150	14	30	
Trichlorofluoromethane	ug/L	ND	20	20	35.2	24.9	176	124	57-150	34	30	M1,R1
Vinyl chloride	ug/L	ND	20	20	33.0	25.2	165	126	59-150	27	30	M1
Xylene (Total)	ug/L	550	60	60	843	841	488	487	75-131	0	30	ES,MS
1,2-Dichloroethane-d4 (S)	%.						125	119	75-137			
4-Bromofluorobenzene (S)	%.						101	100	75-125			
Toluene-d8 (S)	%.						103	99	75-125			

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QUALITY CONTROL DATA

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

QC Batch: 482022 | Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B | Analysis Description: 8260B MSV 465 W
Associated Lab Samples: 10393046001, 10393046002

METHOD BLANK: 2625436 | Matrix: Water
Associated Lab Samples: 10393046001, 10393046002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.17	1.0	0.17	06/27/17 19:14	
1,1,1-Trichloroethane	ug/L	<0.17	1.0	0.17	06/27/17 19:14	
1,1,2,2-Tetrachloroethane	ug/L	<0.22	1.0	0.22	06/27/17 19:14	
1,1,2-Trichloroethane	ug/L	<0.15	1.0	0.15	06/27/17 19:14	
1,1,2-Trichlorotrifluoroethane	ug/L	<0.32	1.0	0.32	06/27/17 19:14	
1,1-Dichloroethane	ug/L	<0.17	1.0	0.17	06/27/17 19:14	
1,1-Dichloroethene	ug/L	<0.28	1.0	0.28	06/27/17 19:14	
1,1-Dichloropropene	ug/L	<0.23	1.0	0.23	06/27/17 19:14	
1,2,3-Trichlorobenzene	ug/L	<0.21	1.0	0.21	06/27/17 19:14	
1,2,3-Trichloropropane	ug/L	<0.28	4.0	0.28	06/27/17 19:14	
1,2,4-Trichlorobenzene	ug/L	<0.21	1.0	0.21	06/27/17 19:14	
1,2,4-Trimethylbenzene	ug/L	<0.18	1.0	0.18	06/27/17 19:14	
1,2-Dibromo-3-chloropropane	ug/L	<0.60	4.0	0.60	06/27/17 19:14	
1,2-Dibromoethane (EDB)	ug/L	<0.20	1.0	0.20	06/27/17 19:14	
1,2-Dichlorobenzene	ug/L	<0.17	1.0	0.17	06/27/17 19:14	
1,2-Dichloroethane	ug/L	<0.17	1.0	0.17	06/27/17 19:14	
1,2-Dichloropropane	ug/L	<0.22	4.0	0.22	06/27/17 19:14	
1,3,5-Trimethylbenzene	ug/L	<0.27	1.0	0.27	06/27/17 19:14	
1,3-Dichlorobenzene	ug/L	<0.12	1.0	0.12	06/27/17 19:14	
1,3-Dichloropropane	ug/L	<0.096	1.0	0.096	06/27/17 19:14	
1,4-Dichlorobenzene	ug/L	<0.21	1.0	0.21	06/27/17 19:14	
2,2-Dichloropropane	ug/L	<0.13	4.0	0.13	06/27/17 19:14	
2-Butanone (MEK)	ug/L	<1.1	5.0	1.1	06/27/17 19:14	
2-Chlorotoluene	ug/L	<0.30	1.0	0.30	06/27/17 19:14	
4-Chlorotoluene	ug/L	<0.26	1.0	0.26	06/27/17 19:14	
4-Methyl-2-pentanone (MIBK)	ug/L	<0.43	5.0	0.43	06/27/17 19:14	
Acetone	ug/L	<2.0	20.0	2.0	06/27/17 19:14	
Allyl chloride	ug/L	<0.25	4.0	0.25	06/27/17 19:14	
Benzene	ug/L	<0.16	1.0	0.16	06/27/17 19:14	
Bromobenzene	ug/L	<0.34	1.0	0.34	06/27/17 19:14	
Bromochloromethane	ug/L	<0.19	1.0	0.19	06/27/17 19:14	
Bromodichloromethane	ug/L	<0.24	1.0	0.24	06/27/17 19:14	
Bromoform	ug/L	<0.27	4.0	0.27	06/27/17 19:14	
Bromomethane	ug/L	<0.44	4.0	0.44	06/27/17 19:14	
Carbon tetrachloride	ug/L	<0.20	1.0	0.20	06/27/17 19:14	
Chlorobenzene	ug/L	<0.11	1.0	0.11	06/27/17 19:14	
Chloroethane	ug/L	<0.34	4.0	0.34	06/27/17 19:14	MN
Chloroform	ug/L	<0.21	1.0	0.21	06/27/17 19:14	
Chloromethane	ug/L	<0.25	4.0	0.25	06/27/17 19:14	
cis-1,2-Dichloroethene	ug/L	<0.12	1.0	0.12	06/27/17 19:14	
cis-1,3-Dichloropropene	ug/L	<0.15	4.0	0.15	06/27/17 19:14	

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

METHOD BLANK: 2625436 Matrix: Water
Associated Lab Samples: 10393046001, 10393046002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Dibromochloromethane	ug/L	<0.16	1.0	0.16	06/27/17 19:14	
Dibromomethane	ug/L	<0.19	4.0	0.19	06/27/17 19:14	
Dichlorodifluoromethane	ug/L	<0.23	4.0	0.23	06/27/17 19:14	MN
Dichlorofluoromethane	ug/L	<0.21	1.0	0.21	06/27/17 19:14	
Diethyl ether (Ethyl ether)	ug/L	<0.19	4.0	0.19	06/27/17 19:14	
Ethylbenzene	ug/L	<0.15	1.0	0.15	06/27/17 19:14	
Hexachloro-1,3-butadiene	ug/L	<0.18	1.0	0.18	06/27/17 19:14	
Isopropylbenzene (Cumene)	ug/L	<0.25	1.0	0.25	06/27/17 19:14	
Methyl-tert-butyl ether	ug/L	<0.15	1.0	0.15	06/27/17 19:14	
Methylene Chloride	ug/L	0.31J	4.0	0.29	06/27/17 19:14	
n-Butylbenzene	ug/L	<0.16	1.0	0.16	06/27/17 19:14	
n-Propylbenzene	ug/L	<0.23	1.0	0.23	06/27/17 19:14	
Naphthalene	ug/L	<0.20	4.0	0.20	06/27/17 19:14	
p-Isopropyltoluene	ug/L	<0.19	1.0	0.19	06/27/17 19:14	
sec-Butylbenzene	ug/L	<0.19	1.0	0.19	06/27/17 19:14	
Styrene	ug/L	<0.29	1.0	0.29	06/27/17 19:14	
tert-Butylbenzene	ug/L	<0.22	1.0	0.22	06/27/17 19:14	
Tetrachloroethene	ug/L	<0.25	1.0	0.25	06/27/17 19:14	
Tetrahydrofuran	ug/L	<1.5	10.0	1.5	06/27/17 19:14	
Toluene	ug/L	<0.14	1.0	0.14	06/27/17 19:14	
trans-1,2-Dichloroethene	ug/L	<0.16	1.0	0.16	06/27/17 19:14	
trans-1,3-Dichloropropene	ug/L	<0.15	4.0	0.15	06/27/17 19:14	
Trichloroethene	ug/L	<0.052	0.40	0.052	06/27/17 19:14	
Trichlorofluoromethane	ug/L	<0.33	4.0	0.33	06/27/17 19:14	MN
Vinyl chloride	ug/L	<0.069	0.20	0.069	06/27/17 19:14	
Xylene (Total)	ug/L	<0.32	3.0	0.32	06/27/17 19:14	
1,2-Dichloroethane-d4 (S)	%.	116	75-137		06/27/17 19:14	
4-Bromofluorobenzene (S)	%.	104	75-125		06/27/17 19:14	
Toluene-d8 (S)	%.	98	75-125		06/27/17 19:14	

LABORATORY CONTROL SAMPLE & LCSD: 2625437 2625438

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	21.2	21.2	106	106	75-125	0	20	
1,1,1-Trichloroethane	ug/L	20	20.6	22.1	103	110	69-125	7	20	
1,1,2,2-Tetrachloroethane	ug/L	20	20.5	21.6	102	108	70-125	5	20	
1,1,2-Trichloroethane	ug/L	20	20.2	21.0	101	105	75-125	4	20	
1,1,2-Trichlorotrifluoroethane	ug/L	20	20.5	21.8	103	109	70-133	6	20	
1,1-Dichloroethane	ug/L	20	22.8	23.5	114	117	62-130	3	20	
1,1-Dichloroethene	ug/L	20	20.2	22.3	101	112	64-134	10	20	
1,1-Dichloropropene	ug/L	20	22.4	24.3	112	122	65-129	8	20	
1,2,3-Trichlorobenzene	ug/L	20	17.3	18.1	86	91	75-125	5	20	
1,2,3-Trichloropropane	ug/L	20	20.4	20.8	102	104	70-125	2	20	
1,2,4-Trichlorobenzene	ug/L	20	18.3	19.7	91	98	75-125	7	20	

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

LABORATORY CONTROL SAMPLE & LCSD: 2625437 2625438

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	19.8	20.9	99	105	69-135	6	20	
1,2-Dibromo-3-chloropropane	ug/L	50	41.7	45.6	83	91	73-130	9	20	
1,2-Dibromoethane (EDB)	ug/L	20	19.5	19.8	98	99	75-125	1	20	
1,2-Dichlorobenzene	ug/L	20	17.6	18.2	88	91	75-125	4	20	
1,2-Dichloroethane	ug/L	20	23.3	23.2	116	116	64-126	0	20	
1,2-Dichloropropane	ug/L	20	23.2	23.3	116	116	73-125	0	20	
1,3,5-Trimethylbenzene	ug/L	20	20.6	20.5	103	102	71-129	1	20	
1,3-Dichlorobenzene	ug/L	20	18.0	19.1	90	95	75-125	6	20	
1,3-Dichloropropane	ug/L	20	21.8	22.4	109	112	74-125	3	20	
1,4-Dichlorobenzene	ug/L	20	17.5	18.3	88	92	75-125	5	20	
2,2-Dichloropropane	ug/L	20	21.9	24.2	110	121	59-135	10	20	
2-Butanone (MEK)	ug/L	100	104	110	104	110	57-142	5	20	
2-Chlorotoluene	ug/L	20	19.3	20.3	97	101	73-125	5	20	
4-Chlorotoluene	ug/L	20	18.9	19.6	95	98	74-128	4	20	
4-Methyl-2-pentanone (MIBK)	ug/L	100	112	117	112	117	56-142	4	20	
Acetone	ug/L	100	107	103	107	103	75-133	3	20	
Allyl chloride	ug/L	20	24.8	25.8	124	129	62-139	4	20	
Benzene	ug/L	20	19.3	20.8	97	104	74-125	7	20	
Bromobenzene	ug/L	20	17.8	18.1	89	91	75-125	2	20	
Bromochloromethane	ug/L	20	20.5	21.3	103	107	75-125	4	20	
Bromodichloromethane	ug/L	20	21.4	23.4	107	117	72-125	9	20	
Bromoform	ug/L	20	20.6	21.7	103	108	74-125	5	20	
Bromomethane	ug/L	20	19.2	32.4	96	162	30-150	51	20	CH,L3,R1
Carbon tetrachloride	ug/L	20	20.5	20.7	102	103	67-130	1	20	
Chlorobenzene	ug/L	20	18.7	19.4	93	97	75-125	4	20	
Chloroethane	ug/L	20	31.6	30.3	158	151	63-137	4	20	CH,L3
Chloroform	ug/L	20	20.5	22.6	102	113	68-128	10	20	
Chloromethane	ug/L	20	22.2	22.6	111	113	46-145	2	20	
cis-1,2-Dichloroethene	ug/L	20	21.8	22.9	109	115	75-125	5	20	
cis-1,3-Dichloropropene	ug/L	20	22.7	24.3	113	122	73-125	7	20	
Dibromochloromethane	ug/L	20	19.9	20.5	99	103	75-125	3	20	
Dibromomethane	ug/L	20	20.2	21.7	101	108	73-125	7	20	
Dichlorodifluoromethane	ug/L	20	17.7	20.1	88	100	36-150	13	20	
Dichlorofluoromethane	ug/L	20	26.1	26.8	130	134	75-125	3	20	L3
Diethyl ether (Ethyl ether)	ug/L	20	24.8	24.4	124	122	62-136	2	20	
Ethylbenzene	ug/L	20	20.0	20.8	100	104	73-125	4	20	
Hexachloro-1,3-butadiene	ug/L	20	23.4	25.3	117	127	69-141	8	20	
Isopropylbenzene (Cumene)	ug/L	20	21.4	22.4	107	112	75-126	4	20	
Methyl-tert-butyl ether	ug/L	20	22.1	23.2	110	116	70-130	5	20	
Methylene Chloride	ug/L	20	20.4	21.2	102	106	74-125	4	20	
n-Butylbenzene	ug/L	20	21.2	23.1	106	115	69-133	9	20	
n-Propylbenzene	ug/L	20	20.9	21.4	105	107	75-125	2	20	
Naphthalene	ug/L	20	17.4	19.2	87	96	66-129	10	20	
p-Isopropyltoluene	ug/L	20	21.9	22.9	109	115	73-127	5	20	
sec-Butylbenzene	ug/L	20	21.1	22.0	105	110	75-131	5	20	
Styrene	ug/L	20	19.3	20.1	96	101	75-128	4	20	
tert-Butylbenzene	ug/L	20	19.7	20.0	99	100	75-127	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: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

LABORATORY CONTROL SAMPLE & LCSD: 2625437 2625438

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Tetrachloroethene	ug/L	20	18.9	19.8	94	99	71-127	5	20	
Tetrahydrofuran	ug/L	200	220	214	110	107	75-132	2	20	
Toluene	ug/L	20	19.2	20.2	96	101	75-125	5	20	
trans-1,2-Dichloroethene	ug/L	20	18.5	19.5	92	97	69-127	5	20	
trans-1,3-Dichloropropene	ug/L	20	23.1	23.9	116	120	70-128	3	20	
Trichloroethene	ug/L	20	21.4	23.2	107	116	70-125	8	20	
Trichlorofluoromethane	ug/L	20	20.4	19.9	102	100	71-125	2	20	
Vinyl chloride	ug/L	20	20.2	21.9	101	110	69-133	8	20	
Xylene (Total)	ug/L	60	61.3	64.6	102	108	75-125	5	20	
1,2-Dichloroethane-d4 (S)	%.				118	118	75-137			
4-Bromofluorobenzene (S)	%.				104	104	75-125			
Toluene-d8 (S)	%.				103	102	75-125			

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(612)607-1700

QUALIFIERS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

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 decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

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

1M	Headspace in the vial was measured at 9mm.
2M	Headspace in the vial was measured at 6mm.
3M	Headspace in the vial was measured at 7 mm.
4M	Headspace in the vial was measured at 8mm.
C0	Result confirmed by second analysis.
CH	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.
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.
HS	Results are from sample aliquot taken from VOA vial with headspace (air bubble greater than 6 mm diameter).
IS	The internal standard response is below criteria. Results may be biased high.
L1	Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high.
L3	Analyte recovery in the laboratory control sample (LCS) exceeded QC limits. Analyte presence below reporting limits in associated samples.
M0	Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
MN	The reporting limit has been raised in accordance with Minnesota Statutes 4740.2100 Subpart 8. C, D. Reporting Limit Evaluation Rule.

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QUALIFIERS

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

ANALYTE QUALIFIERS

MS	Analyte recovery in the matrix spike was outside QC limits for one or more of the constituent analytes used in the calculated result.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60508912 BNSF-Mission Wye
Pace Project No.: 10393046

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10393046001	**MW-01/06192017**	EPA 8260B	482022		
10393046002	**MW-04/06192017**	EPA 8260B	482022		
10393046003	**MW-03/06192017**	EPA 8260B	481348		
10393046004	**MW-DUP/06192017**	EPA 8260B	481348		
10393046005	**MW-22/06192017**	EPA 8260B	481348		
10393046006	**MW-09/06192017**	EPA 8260B	481348		
10393046007	**EB-01/06192017**	EPA 8260B	481348		
10393046008	**FB-01/06192017**	EPA 8260B	481348		
10393046009	**TRIP BLANK**	EPA 8260B	481348		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10393046

Page: of

1969394

Section A Required Client Information:

Company: AECOM
Address: 207 N Broadway STE#315
Billings, MT 59101
Email To: Shelly.young@AECOM.COM
Phone: 406 896 4582 Fax:
Requested Due Date/TAT: STANDARD

Section B Required Project Information:

Report To: Shelly.young@AECOM.COM
Copy To: Cole.Grover@AECOM.COM
Purchase Order No.:
Project Name: BNSF-Mission Wye
Project Number: 60508912

Section C Invoice Information:

Attention:
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #: 32797

REGULATORY AGENCY: ☐ NPDES ☒ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MT

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N): Y

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	COLLECTED Composite Start TIME	COLLECTED Composite End/Grab DATE	COLLECTED Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test: VOC-8260B	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-01/06192017	WT	G	—	—	6-19-17	1320		3				X					X		001
2	MW-04/06192017			—	—		1410		3				X					X		002
3	MW-03/06192017			—	—		1505		3				X					X		003
4	MW-DUP/06192017			—	—		1450		3				X					X		004
5	MW-22/06192017			—	—		1555		3				X					X		005
6	MW-09/06192017			—	—		1700		3				X					X		006
7	EB-01/06192017			—	—		1725		3				X					X		007
8	FB-01/06192017	—	—	—	—	—	1645		3				X					X		008
9	Trip Blank	WT	G	—	—	6-19-17	—		2				X					X		009
10																				
11																				
12																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	[signature] / AECOM	6-20-17	0700	[signature] / Pace	6/21/17	945	1.3	Y	Y	Y

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Brent Brumfield
SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 06/20/17

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 21Dec2016 Page 1 of 2
	Document No.: **F-MN-L-210-rev.22**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: BNSF AECOM

Project #: WO#: 10393046

10393046

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 7180 9267 3644

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

Thermometer Used: ☒ 151401163 ☐ 151401164 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.2 **Cooler Temp Corrected (°C):** 1.3 **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:** lcr 6/21/17

USDA Regulated Soil (☒ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☒ Yes	☐ No		1.
Chain of Custody Filled Out?	☒ Yes	☐ No		2.
Chain of Custody Relinquished?	☒ Yes	☐ No		3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No		5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No		6.
Rush Turn Around Time Requested?	☐ Yes	☒ No		7.
Sufficient Volume (triple volume provided for MS/MSD)?	☒ Yes	☐ No		8. No MS/MSD
Correct Containers Used?	☒ Yes	☐ No		9.
-Pace Containers Used?	☒ Yes	☐ No		
Containers Intact?	☒ Yes	☐ No		10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	11. Note if sediment is visible in the dissolved container.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: WT	☒ Yes	☐ No		12.
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☒ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH Positive for Res. Chlorine? Y N
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, NaOH>9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC/DOC, Oil and Grease, DRO/8015 (water) and Dioxin. Per method, VOA pH is checked after analysis	☐ Yes ☒ Yes	☐ No ☐ No	☒ N/A ☐ N/A	Sample # Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☒ Yes	☐ No	☐ N/A	14. See exception sheet
3 Trip Blanks Present?	☒ Yes	☐ No	☐ N/A	15.
Trip Blank Custody Seals Present?	☒ Yes	☐ No	☐ N/A	
Pace Trip Blank Lot # (if purchased): 120462 042417-3CYR				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Cole Grover Date/Time: 6/21/17

Comments/Resolution: Analyze all samples.

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins		
Opened Time: 1410	Temp: 1.2	Corrected Temp: 1.3
Time: 1420	put in cooler	
Time:	Temp:	Corrected Temp:

Project Manager Review: Carol Doug **Date:** 6/21/17

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)

SCUR Exceptions: **Workorder #:**

Issue	Sample ID	Container Type/#
headspace	MW-01	3/3 VGAA
"	MW-04	2/3 "
"	MW-03	1/3 "
"	MW-Dup	2/3 "
"	MW-22	2/3 "
"	MW-09	2/3 "
"	~~MW~~ EB-01 VT 6/21/17	2/3 "
"	FB-01	2/3 "
"	trip blank	2/2 "

pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH Upon Receipt	Date Preservation Adjusted	Time Preservation Adjusted	Amount of Additional Preservative Added	Lot # of Preservative Added	pH After Adjustment	Initials

Attachment 2

Data Validation Reports

Environment

Submitted to:
BNSF Railway Company
Mission Wye Site

Submitted by:
AECOM
Denver, CO
December 17, 2015

December 17, 2015

Organic
Limited Data Validation Report

BNSF Mission Wye
Water and Water Quality Control (QC) Samples
Pace Analytical Services, Inc. data

July, 2015 Sampling

Prepared By Anne Kakai
Validation Chemist/Database Manager

Overview

The samples analyzed for the BNSF Mission Wye Sampling event of July 2015 are listed in the Table of Samples Analyzed (page 3). Data validation was performed on fourteen groundwater samples, one field duplicate sample, one equipment rinse blank sample, one field blank sample and one trip blank sample.

The samples were analyzed by Pace Analytical of Minneapolis, MN. Limited data validation was performed on the following analyses: Volatile Organic Compounds (VOCs) by Gas Chromatography Mass-Spectrometry (GC/MS) Method SW-846 8260B and Environmental Protection Agency (EPA) Method 524.2.

The Analytical Data Validation Checklist is presented as pages 4-9. Data were evaluated based on validation criteria set forth in the National Functional Guidelines for Superfund Organic Methods Data Review, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, October 2013 (with additional guidance from the USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review, document number USEPA-540-R-08-01, June 2008), as applied to the reported methodology.

The following data components were reviewed during the data validation procedure

Reviewed Deliverables/Data
Chain-of-Custody form(s) and sample integrity
Case Narratives (including any laboratory flags)
Sample results, reporting detection limits, dilution factors
Holding times
Laboratory blank results
Trip blank results
Organic surrogate recoveries
LCS (blank spike) results
MS, MSD (matrix spike, matrix spike duplicate) results
Laboratory duplicate (or spiked duplicate) results
Electronic data deliverables (EDDs)

Data Validation Qualifiers Assigned During this Review

J estimated concentration

Assigned qualifiers are detailed in the Analytical Data Validation Checklist and are summarized in the Table of Qualified Analytical Results (page 10).

Overall Data Assessment

Field and laboratory precision, field and laboratory accuracy, method compliance, and data set completeness have been determined to be acceptable, based on the data submitted. No data were missing or rejected. All reported data are suitable for their intended use with the qualifications and clarifications noted.

Table of Samples Analyzed
BNSF Mission Wye Groundwater and Water QC Samples
Pace Analytical of Minneapolis, MN
Laboratory SDG: 10315840
July 2015 Sampling

Table 1

Matrix	Sample ID	Sample Date	Sample Time	Lab SDG	Lab ID	Sample Type
WG	Harris Stock Well	7/22/2015	11:05	10315840	10315840001	N
WG	MW-19	7/22/2015	11:20	10315840	10315840002	N
WG	MW-18	7/22/2015	13:20	10315840	10315840003	N
WQ	MW-32	7/22/2015	11:40	10315840	10315840004	EB
WG	MW-12	7/22/2015	14:00	10315840	10315840005	N
WG	MW-14	7/22/2015	14:35	10315840	10315840006	N
WG	Gravel Pit Well	7/22/2015	14:30	10315840	10315840007	N
WG	Gravel Pit Pond	7/22/2015	14:55	10315840	10315840008	N
WG	MW-1	7/22/2015	15:40	10315840	10315840009	N
WG	MW-21	7/22/2015	16:30	10315840	10315840010	N
WG	MW-22	7/23/2015	11:25	10315840	10315840011	N
WG	MW-9	7/23/2015	12:09	10315840	10315840012	N
WG	MW-4	7/23/2015	13:45	10315840	10315840013	N
WG	MW-33	7/23/2015	13:45	10315840	10315840014	FD
WG	MW-5	7/23/2015	14:25	10315840	10315840015	N
WQ	MW-30	7/23/2015	14:35	10315840	10315840016	FB
WG	MW-3	7/23/2015	15:05	10315840	10315840017	N
WQ	Trip Blank	7/22/2015	00:00	10315840	10315840018	TB

EB = equipment rinse blank sample
FB = field blank sample
FD = field duplicate sample
ID = Identification
N = normal sample
TB = trip blank
WG = groundwater sample
WQ = water QC sample

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Project Name: BNSF Mission Wye	Laboratory: Pace Analytical of Minneapolis, MN
Project Reference: Groundwater Monitoring	Sample Matrix: Groundwater and Water QC
AECOM Project: 60333790	Sample Start Date: 07/22/2015
Validator/Date Validated: Anne Kakai 12/17/15 (completed)	Sample End Date: 07/23/2015
Secondary Review by: Steve Szocik	Secondary Review Date: 12/17/15
Samples Analyzed: Refer to the Table of Samples Analyzed (page 3).	
Parameters Validated: Volatile Organic Compounds (VOCs) by SW-846 GC/MS Method 8260B and EPA Method 524.2.	
Laboratory Project IDs/Sample Delivery Group (SDG): 10315840.	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision is determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits. Overall field and laboratory precision is acceptable since data does not require qualification and no data is rejected based on these measurements.						
Accuracy:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Field accuracy, a measure of the sampling bias, was determined by reviewing field, trip and equipment rinse blank results for evidence of sample contamination stemming from sampling activities and/or sample transport/bottle contamination. Laboratory accuracy is a measure of the system bias, and is measured by evaluating laboratory control sample/laboratory control sample duplicate (LCS/LCSD), matrix spike/matrix spike duplicate (MS/MSD), and organic system monitoring compounds (surrogate and internal standard) percent recoveries (%Rs). LCS/LCSD %Rs, which demonstrated the overall performance of the analytical procedure, were compared to published or recommended EPA QC limits. MS/MSD %Rs, which provided information on sample matrix interferences, were compared to EPA published QC limits or laboratory control charted limits. System monitoring compound or surrogate recoveries, which measured system performance and efficiency during organic analysis, were compared to EPA published or laboratory QC limits. Overall field and laboratory precision is acceptable since data does not require qualification and no data is rejected based on these measurements. Accuracy measurements are reviewed in items 12, 14, 15, and 16.						
Method Compliance:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: For this sample set, method compliance was determined by evaluating sample integrity, holding time, and laboratory blanks against method specified requirements, while applying EPA data validation guidelines. Although some data require qualification based estimated results (see item 6), overall method compliance is acceptable since a majority of the data are unqualified and no data are rejected based on these measurements. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20 and 22.						
Completeness: (Continued on next page)	**X**	Acceptable		Unacceptable	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and reporting limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and EQuIS electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23.

All of the reported data are usable, some with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.

VALIDATION CRITERIA CHECK						
Data validation qualifiers assigned during this review: J estimated concentration The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary. **Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 10).**						
1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	AK	Initials
Explanation by laboratory: Comments: A few laboratory control sample outliers, calibration outliers, and evidence of contamination were noted. All laboratory case narrative comments are included in the hardcopy (or pdf) laboratory report. All assigned laboratory flags were also reviewed during the limited validation procedure. Data qualification, if any, related to the narrative comments and/or assigned laboratory flags contained in the analytical reports are discussed in the following sections.						
2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	AK	Initials
Comments: COC records from field to laboratory were complete. Custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt.						
3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	AK	Initials
Comments: All requested analyses, as designated on the supplied COC forms and supporting project documentation, were completed and reported by the laboratory.						
4. Were samples received in good condition and at the appropriate temperature?	**X**	Yes		No	AK	Initials
Comments: All samples were received intact and within acceptable cooler temperatures of 2-6°C as documented on the laboratory's sample receipt documentation.						
5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	AK	Initials
Comments: Reported methods met those requested on the original COC or are compliant with the requested analytes and matrix.						
6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Reported detection limits are achievable by the quoted methods, and are in compliance with the project requirements. All Methods - **Sample results reported at concentrations ≥ the method detection limit (MDL) but < the limit of quantitation (LOQ)/RL require J qualifiers to indicate estimated concentrations. The analyte cannot be accurately quantitated at this trace concentration level**. **Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 10).**						
7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	AK	Initials
Comments: The reported target analytes are in compliance with the constituents identified on the COC.						
8. Were sample holding times met?	**X**	Yes		No	AK	Initials
Comments: Sample preparation/extraction and analytical holding times were met for all samples and analyses.						
9. Were correct concentration units reported?	**X**	Yes		No	AK	Initials
Comments: Correct concentration units were reported for all constituents.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	AK	Initials
Comments: Data validation qualifiers override any assigned laboratory data flags.						
11. Were laboratory blank samples free of target analyte contamination?		Yes	**X**	No	AK	Initials
Comments: Laboratory blank samples were free of target analyte contamination with the exceptions of trace detections of Naphthalene (2033996BLANK-10315840 – 0.18 ug/L). The listed detection did not affect the associated investigative samples results because all were non-detect. Data qualification is not required.						
12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?	**X**	Yes		No	AK	Initials
Comments: The trip blank, equipment rinse blank and field blank samples were free of target analyte contamination.						
13. Were instrument calibrations within method or data validation control limits?		Yes	**X- no effect**	No	AK	Initials
Comments: For this level of limited data validation, instrument calibrations were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that instrument calibrations met acceptance criteria. The laboratory's narrative did not identify any outliers; with the exceptions discussed below: *Method 8260:* *Bromomethane was recovered in the continuing calibration, outside laboratory control charted QC limits (biased high). All associated samples were non-detect and data qualification is not required.*						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Surrogate %Rs for organic analyses were within laboratory control-charted QC limits (as allowed for SW-846 methods) for all project samples and associated laboratory QC samples.						

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

15. Were laboratory control sample recoveries within control limits?		Yes	**X**	No	AK	Initials
Comments: Submitted LCS %Rs were within laboratory control-charted QC limits for organic target analytes as allowed for SW-846 organic methods with the exception of trans-1,2-Dichloroethene % R (133%) which was outside laboratory control-charted QC limits (69% - 125%). All associated samples were non-detect and data qualification is not required.						
16. Were matrix spike recoveries and % RPDs within control limits?	**X**	Yes		No	AK	Initials
Comments: Project specific MS, MSD %Rs for target analytes were within laboratory control charted QC limits for organics data qualification is not required.						
17. Were serial dilution %Ds within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: *Serial Dilution %Ds: Not applicable for the methods reviewed.*						
18. Were organic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
19. Were internal standards within method criteria for GC/MS sample analyses?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
20. Were inorganic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, inorganic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that inorganic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	AK	Initials

SDG	Primary Sample ID	Duplicate Sample ID	Sample Date
10315840	MW-4-7/23/2015	MW-33-7/23/2015	7/23/2015

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Field duplicate RPDs were within data validation QC limits of 0-30% for water matrices, or RPDs were not applicable due to results that were within X2 the reporting limit or were undetected in both samples, except as noted. All field duplicate/source samples are groundwaters.

The following field duplicate pairs were evaluated:

Method	Unit	Analyte	RPD	RL	MW-33	MW-4	Qualifier
8260B	ug/L	1,4-Dichlorobenzene	± RL	1.0	0.19	< 1.0	None
8260B	ug/L	Tetrachloroethene	7.4	1.0	1.4	1.3	None
8260B	ug/L	Trichloroethene	10.7	0.40	0.53	0.59	None

All RPDs were within QC acceptance criteria and based on this data qualification is not required.

22. Were qualitative criteria for organic target analyte identification met?	**NA**	Yes	**NA**	No	AK	Initials

Comments: Not applicable for this level of limited data validation – chromatograms, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review. There were no analyte qualitative flags assigned by the laboratory.

23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	AK	Initials

Comments: The EDD entries were resolved with the hardcopy data results and corrected as necessary. According to validation protocol, the hardcopy data report was accepted as the correct reference. Qualifiers and reason codes were added to the EDD files for all reportable data. The four EQuIS EDD files were formatted for upload once data validation secondary review was completed.

Additional edits made to the EDD files by the Database Manager prior to data upload are listed below.

Per project requirements, non-detect results will be reported at the MDL while tables are being generated. Data will be entered into the database by the data validator as presented by the laboratory with non-detects reported at the RL.

Unique sys_loc_codes were assigned to all samples. In order to upload multiple SDGs under one EDD, SDG numbers were appended to all laboratory QC data and dates were appended to trip blank samples in order to keep them unique. Parent sample designations were made for all LCS/LCSD and field duplicate samples. MS/MSD and laboratory duplicate samples already had pre-assigned parent sample designations which were verified using the hard copy laboratory report.

The result_comment field was updated from <PQL to <LOQ and the interpreted_qualifier field was updated accordingly.

A task_code field was assigned, “MWye_GW_July2015”. The QC_level and collection_quarter fields were verified as populated appropriately.

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

24. General Comments: The Analytical Data Validation Checklist is presented as pages 3-9. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, October 2013 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008), as applied to the reported methodology.

Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 10).

Table of Qualified Analytical Results
BNSF Mission Wye Groundwater and Water QC Samples
Pace Analytical of Minneapolis, MN
Laboratory SDG: 10315840
July 2015 Sampling

SDG	Sample ID	Method	DF	Analyte	Conc	Unit	Qualifier	Reason Code
10315840	Harris Stock Well	524.2	1	Tetrachloroethene	0.76	ug/L	J	<LOQ
10315840	Harris Stock Well	524.2	1	Trichloroethene	0.41	ug/L	J	<LOQ
10315840	MW-19	8260B	1	Tetrachloroethene	0.23	ug/L	J	<LOQ
10315840	MW-18	8260B	1	Tetrachloroethene	0.39	ug/L	J	<LOQ
10315840	MW-12	8260B	1	Tetrachloroethene	0.24	ug/L	J	<LOQ
10315840	MW-14	8260B	1	cis-1,2-Dichloroethene	0.94	ug/L	J	<LOQ
10315840	Gravel Pit Pond	8260B	1	Chloroform	0.32	ug/L	J	<LOQ
10315840	MW-22	8260B	1	cis-1,2-Dichloroethene	0.48	ug/L	J	<LOQ
10315840	MW-22	8260B	1	Trichloroethene	0.38	ug/L	J	<LOQ
10315840	MW-33	8260B	1	1,4-Dichlorobenzene	0.19	ug/L	J	<LOQ

Conc – concentration
DF - dilution factor
ID - identification
SDG – sample delivery group
Per project requirements, non-detect results will be reported at the MDL while tables are being generated. Data will be entered into the database by the data validator as presented by the laboratory with non-detects reported at the RL.

Reason Codes:

< LOQ - concentration reported is ≥ the method detection limit but is < the limit of quantitation/reporting limit

Environment

Submitted to:
BNSF Railway Company
Mission Wye

Submitted by:
AECOM
Denver, CO
January 19, 2016

January 19, 2016

Organic
Limited Data Validation Report

BNSF Mission Wye
Air Samples
ALS Environmental data

August, 2015 Sampling

Prepared By Anne Kakai
Validation Chemist/Database Manager

Overview

The samples analyzed for the BNSF Mission Wye Sampling event of August 2015 are listed in the Table of Samples Analyzed (page 3). Limited data validation was performed on results for seven air samples and one field duplicate sample as detailed below.

The samples were analyzed by ALS Environmental of Simi Valley, CA. Limited data validation was performed on the following analyses: Volatile Organic Compounds (VOCs) by Method TO-15 Modified and Fixed Gases by ASTM Method D1946.

The Analytical Data Validation Checklist is presented as pages 4-8 of this report. Data were evaluated based on validation criteria set forth in the June 2015 Quality Assurance Project Plan (QAPP) for the Feasibility Study Pilot Test Work Plan – Revision 2, BNSF Mission Wye, Livingston, Montana.

The following data components were reviewed during the data validation procedure.

Reviewed Deliverables/Data
Chain-of-Custody form(s) and sample integrity
Case Narratives (including any laboratory flags)
Sample results, reporting detection limits, dilution factors
Holding times
Laboratory blank results
Organic surrogate recoveries
LCS (blank spike) results
Laboratory duplicate (or spiked duplicate) results
Field duplicates
Electronic data deliverables (EDDs)

Data Validation Qualifiers Assigned During this Review

J estimated concentration

Assigned qualifiers (when applicable) are detailed in the Analytical Data Validation Checklist and are summarized in a Table of Qualified Analytical Results on Page 10.

Overall Data Assessment

Field and laboratory precision, field and laboratory accuracy, method compliance, and data set completeness have been determined to be acceptable, based on the data submitted. No data were missing or rejected. All reported data are suitable for their intended use as qualified.

Table of Samples Analyzed
BNSF Mission Wye Air Samples
ALS Environmental, CA
Laboratory SDG: P1503608
August 2015 Sampling

Table 1

Matrix	Sample ID	Sample Date	Sample Time	Lab SDG	Lab ID	Sample Type
AA	VMP-1S/08252015	8/25/2015	10:48	P1503608	P1503608-001	N
AA	VMP-1D/08252015	8/25/2015	12:48	P1503608	P1503608-002	N
AA	VMP-DUP/08252015	8/25/2015	12:00	P1503608	P1503608-003	FD
AA	VMP-2S/08252015	8/25/2015	14:32	P1503608	P1503608-004	N
AA	VMP-2D/08252015	8/25/2015	15:00	P1503608	P1503608-005	N
AA	VMP-5/08262015	8/26/2015	08:10	P1503608	P1503608-006	N
AA	VMP-4/08262015	8/26/2015	09:22	P1503608	P1503608-007	N
AA	VMP-3/08262015	8/26/2015	10:27	P1503608	P1503608-008	N

AA – Ambient Air sample
FD – field duplicate of sample VMP-2D/08252015
ID - identification
N - normal sample
SDG – sample delivery group

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Project Name: BNSF Mission Wye	Laboratory: ALS Environmental, CA
Project Reference: Air Monitoring	Sample Matrix: Air
AECOM Project: 60436173-200	Sample Start Date: 08/25/2015
Validator/Date Validated: Anne Kakai 01/19/2016 (completed)	Sample End Date: 08/26/2015
Secondary Review by: Larry Brook	Secondary Review Date: 01/19/2016
Samples Analyzed: Refer to the Table of Samples Analyzed (page 3).	
Parameters Validated: Volatile Organic Compounds (VOCs) by Method TO-15 Modified and Fixed Gases by ASTM Method D1946.	
Laboratory Project IDs/Sample Delivery Groups (SDGs): P1503608	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced validation criteria set forth in the QAPP. Overall field and laboratory precision is acceptable since data does not require qualification and no data is rejected based on these measurements.						
Accuracy:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Field accuracy, a measure of the sampling bias, is generally determined by reviewing trip blank results for evidence of sample contamination stemming from sampling activities and/or sample transport/bottle contamination in applicable methods. Laboratory accuracy is a measure of the system bias, and is measured by evaluating laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and organic system monitoring compounds (surrogate and internal standard) percent recoveries (%Rs). LCS/LCSD %Rs, which demonstrated the overall performance of the analytical procedure, were compared to QAPP limits. MS/MSD %Rs, which provide information on sample matrix interferences, would be compared to QAPP limits, EPA published QC limits or laboratory control charted limits to evaluate matrix effects upon sample analysis. MS/MSD sample volumes were not collected for the data set discussed in this DVR. System monitoring compounds or surrogate recoveries, which measure system performance and efficiency during organic analysis, are compared to QAPP limits or EPA published QC limits when applicable. Overall surrogate recovery was acceptable and that can be used in lieu of the missing MS/MSD data to evaluate accuracy. Laboratory accuracy was evaluated and determined to be acceptable, no data required qualification and no data is rejected based on these measurements. Accuracy measurements are reviewed in items 12, 14, 15, and 16 below.						
Method Compliance:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: For this sample set, method compliance was determined by evaluating sample integrity and holding time against method specified requirements, while applying QAPP validation guidelines. Overall method compliance is acceptable since majority of the data does not require qualification and no data is rejected based on these measurements. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20 and 22 below.						
Completeness:	**X**	Acceptable		Unacceptable	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and reporting limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and EQuIS electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23.

All of the reported data are usable, some with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.

VALIDATION CRITERIA CHECK

Data validation qualifiers assigned during this review:

J estimated concentration.

Comments in bold type (when shown) indicate sample results requiring qualification. The other comments are of interest, but qualification of the sample results is not necessary.

Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 10)..

1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	AK	Initials

Explanation by laboratory: The following notations were included in the laboratory Quality Control Summary:

Sample Receipt: All sample aliquots were received in the proper containers. All method specified holding times were met.

SDG P1503608: No analytical anomalies were noted for the samples in this data set. Specific comments made with reference to the methods analyzed and reported are reflected below:

Method associations to NELAP and/or AIHA-LAP were noted. Data qualification, if any, related to the laboratory comments and/or assigned laboratory data flags are discussed in the following sections.

2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	AK	Initials

Comments: The COC records from field to laboratory were complete. Custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Data qualification was not required.

3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	AK	Initials

Comments: All requested analyses, as designated on the supplied COC forms and supporting project documentation, were completed and reported by the laboratory.

4. Were samples received in good condition and at the appropriate temperature?	**X**	Yes		No	AK	Initials

Comments: All samples were received intact, in good condition, and at ambient temperature, consistent with QAPP requirements. Custody seals were noted as missing, however, sample canister vacuums were noted as being intact per the laboratory sample receipt form.

5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?		Yes	**X**	No	AK	Initials

Comments: Reported methods/results met those requested on the original COC or are compliant with the requested analytes and matrix with the exception of the fixed gases method. The QAPP requires fixed gases analysis by ASTM Method D1946. The laboratory initially referenced use of Method 3C Modified for fixed gases analysis and the laboratory report was revised to cite ASTM Method D1946. Both methods are equivalent and corrective action was not required.

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	AK	Initials
Comments: Reporting limits (RLs) are achievable by the quoted methods. Some samples had to be diluted or the sample extract could not be concentrated to the routine final volume. The reporting limits were raised appropriately. **Sample results reported at concentrations ≥ the stated method detection limit or instrument detection limit (MDL/IDL) but < the limit of quantitation/reporting limit (LOQ/RL), require J qualifiers to indicate estimated concentrations. The analyte cannot be accurately quantitated at this concentration level.** **Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 10).**						
7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	AK	Initials
Comments: The reported target analytes are in compliance with the constituents identified on the COC.						
8. Were sample holding times met?	**X**	Yes		No	AK	Initials
Comments: Sample preparation/extraction and analytical holding times were met for all samples and analyses reported in this SDG.						
9. Were correct concentration units reported?		Yes	**X**	No	AK	Initials
Comments: Correct concentration units were reported for all constituents with the exception of the fixed gases results. The initial reported result units were presented as "%, v/v", while the QAPP requires fixed gases analysis by ASTM Method 1946 with the units "ppmv". As detailed in item #5, the laboratory referenced use of Method 3C Modified for fixed gases analysis. The laboratory revised the method referenced as well as provided the results in the units referenced in the QAPP (ppmv). *No further corrective action is required.*						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	AK	Initials
Comments: Data validation qualifiers override any assigned laboratory data flags.						
11. Were laboratory blank samples free of target analyte contamination?	**X**	Yes		No	AK	Initials
Comments: Laboratory blank samples were free of target analyte contamination. Data qualification is not required.						
12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?	**NA**	Yes	**NA**	No	AK	Initials
Comments: No trip blank, field blank, and/or equipment rinse blank samples were collected for the air data evaluated in this DVR. Other than notation of this observation, no other corrective action is required.						
13. Were instrument calibrations within method or data validation control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, instrument calibrations were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that instrument calibrations met acceptance criteria.						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Surrogate %Rs for organic analyses were within laboratory control-charted QC limits (as allowed for method TO-15 Modified) for all project samples and associated laboratory QC samples reported in this SDG.						

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

15. Were laboratory control sample recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Submitted LCS %Rs were within laboratory control-charted QC limits for target analytes reported in this SDG, as allowed for the methods specified. Data qualification is not required.						
16. Were matrix spike recoveries and % RPDs within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: Project specific MS, MSD volumes were not collected for the methods in this SDG and as such no MS/MSD evaluation was completed. Data qualification is not required.						
17. Were serial dilution %Ds within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: *Serial Dilution %Ds: Not applicable for the methods reviewed.*						
18. Were organic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
19. Were internal standards within method criteria for GC/MS sample analyses?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
20. Were inorganic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: Not applicable for the methods reviewed.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	AK	Initials

SDG	Primary Sample ID	Duplicate Sample ID	Sample Date
P1503608	VMP-2D/08252015	VMP-DUP/08252015	8/25/2015

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Field duplicate RPDs were within data validation QC limits of ≤ 25% for air matrices, or RPDs were not applicable due to results that were within 2X the reporting limit or were undetected in both samples, except as noted. All field duplicate/source samples are air samples.

The following field duplicate pairs were evaluated:

Method	Unit	Analyte	RPD	RL	VMP-2D/08252015	VMP-DUP/08252015	Qualifier
ASTM D1946	ppmv	Carbon Dioxide	0.2	2000/1900	9370	9390	None
ASTM D1946	ppmv	Nitrogen	0	2000/1900	776000	776000	None
ASTM D1946	ppmv	Oxygen + Argon	0.5	2000/1900	215000	214000	None
TO-15	ug/m3	Tetrachloroethene	0	41	3500	3500	None
TO-15	ug/m3	trans-1,2-Dichloroethene	0	8.4/8.2	3.6	3.6	None
TO-15	ug/m3	Trichloroethene	6.1	8.4/8.2	340	320	None

All RPDs were within QAPP-listed QC acceptance criteria and based on this data qualification is not required.

22. Were qualitative criteria for organic target analyte identification met?	**NA**	Yes	**NA**	No	AK	Initials

Comments: Not applicable for this level of limited data validation – chromatograms, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review. There were no analyte qualitative flags assigned by the laboratory.

23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	AK	Initials

Comments: The EDD entries were resolved with the hardcopy data results and corrected as necessary. According to validation protocol, the hardcopy data report was accepted as the correct reference. Qualifiers and reason codes (when applicable) were added to the EDD files for all reportable data. The four EQuIS EDD files were formatted for upload once data validation secondary review was completed.

Additional edits made to the EDD files by the Database Manager prior to data upload are listed below, as necessary for the reviewed SDG.

Unique sys_loc_codes were assigned to all samples. Parent sample designations were made for all LCS/LCSD and field duplicate samples.

A task_code field was assigned, “2015ALSAirChecks”. The laboratory was notified of fixes needed to EDDs as shown below. Revised EDDs were provided following the fix.

- LCS Parent Associations: Revise LCS parent associations to Method blank and LCS1 for LCS2.
- RPD: Include LCS and LCSD RPD information on EDD.
- Validator_qualifier and result_comment: remove automatic population of these fields in the case of non-detects.

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

24. General Comments: EDD modifications by the laboratory needed as detailed in item #23. The results presented are acceptable; however; the data deliverables need to be revised to match the methods and units specified in the QAPP. Revised data was presented and are equivalent within the method and units presented. Repeat data validation was not required, but results were updated to the correct methods and units.

Table of Qualified Analytical Results
BNSF Mission Wye Air Samples
ALS Environmental, CA
Laboratory SDG: P1503608
August 2015 Sampling

SDG	Sample ID	Method	DF	Analyte	Conc	Unit	Qualifier	Reason Code
P1503608	VMP-1S/08252015	TO-15	64.16	trans-1,2-Dichloroethene	22	ug/m3	J	<LOQ
P1503608	VMP-1D/08252015	TO-15	112.36	trans-1,2-Dichloroethene	49	ug/m3	J	<LOQ
P1503608	VMP-DUP/08252015	TO-15	16.36	trans-1,2-Dichloroethene	3.6	ug/m3	J	<LOQ
P1503608	VMP-2D/08252015	TO-15	16.89	trans-1,2-Dichloroethene	3.6	ug/m3	J	<LOQ
P1503608	VMP-3/08262015	TO-15	8.35	trans-1,2-Dichloroethene	1.6	ug/m3	J	<LOQ

Notes:
DF = dilution factor
Conc = concentration
ug/m3 = micrograms per cubic meter
SDG = sample delivery group
Per project requirements, non-detect results will be reported at the MDL while tables are being generated. Data will be entered into the database by the data validator as presented by the laboratory with non-detects reported at the RL.

Reason Codes:

< LOQ - concentration reported is ≥ the method detection limit but is < the Limit of quantitation

Environment

Submitted to:
BNSF Railway Company
Mission Wye

Submitted by:
AECOM
Denver, CO
January 19, 2016

January 19, 2016

Organic
Limited Data Validation Report

BNSF Mission Wye
Air Samples
ALS Environmental data

September, 2015 Sampling

Prepared By Anne Kakai
Validation Chemist/Database Manager

Overview

The samples analyzed for the BNSF Mission Wye September 2015 sampling events are listed in the Table of Samples Analyzed (page 3). Limited data validation was performed on results for ten air samples and one field duplicate sample as detailed below.

The samples were analyzed by ALS Environmental of Simi Valley, CA. Limited data validation was performed on the following analyses: Volatile Organic Compounds (VOCs) by Method TO-15 Modified and Fixed Gases by ASTM Method D1946.

The Analytical Data Validation Checklist is presented as pages 4-8 of this report. Data were evaluated based on validation criteria set forth in the June 2015 Quality Assurance Project Plan (QAPP) for the Feasibility Study Pilot Test Work Plan – Revision 2, BNSF Mission Wye, Livingston, Montana.

The following data components were reviewed during the data validation procedure.

Reviewed Deliverables/Data
Chain-of-Custody form(s) and sample integrity
Case Narratives (including any laboratory flags)
Sample results, reporting detection limits, dilution factors
Holding times
Laboratory blank results
Organic surrogate recoveries
LCS (blank spike) results
Laboratory duplicate (or spiked duplicate) results
Field duplicates
Electronic data deliverables (EDDs)

Data Validation Qualifiers Assigned During this Review

J estimated concentration

UJ undetected, reporting limit is estimated

Assigned qualifiers are detailed in the Analytical Data Validation Checklist and are summarized in the Table of Qualified Analytical Results (page 9).

Overall Data Assessment

Field and laboratory precision, field and laboratory accuracy, method compliance, and data set completeness have been determined to be acceptable, based on the data submitted. No data were missing or rejected. All reported data are suitable for their intended use as qualified.

Table of Samples Analyzed
BNSF Mission Wye Air Samples
ALS Environmental, CA
Laboratory SDGs: P1504149 and P1503846
September 2015 Sampling

Table 1

Matrix	Sample ID	Sample Date	Sample Time	Lab SDG	Lab ID	Sample Type
AA	SVE-EB/09092015	9/9/2015	10:45	P1503846	P1503846-001	N
AA	SVE-1/09292015	9/29/2015	12:34	P1504149	P1504149-001	N
AA	SVE-2/09292015	9/29/2015	13:01	P1504149	P1504149-002	N
AA	SVE-3/09292015	9/29/2015	13:15	P1504149	P1504149-003	N
AA	SVE-4/09292015	9/29/2015	13:35	P1504149	P1504149-004	N
AA	SVE-5/09292015	9/29/2015	13:50	P1504149	P1504149-005	N
AA	SVE-6/09292015	9/29/2015	14:12	P1504149	P1504149-006	N
AA	SVE-DUP/09292015	9/29/2015	14:30	P1504149	P1504149-007	FD
AA	SVE-7/09292015	9/29/2015	14:41	P1504149	P1504149-008	N
AA	SVE-8/09292015	9/29/2015	15:04	P1504149	P1504149-009	N
AA	SVE-EV/09292015	9/29/2015	15:20	P1504149	P1504149-010	N

AA – ambient air sample
AQ – ambient air quality control sample
FD – field duplicate of sample SVE-7/09292015
ID - identification
N - normal sample
SDG – sample delivery group

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Project Name: BNSF Mission Wye	Laboratory: ALS Environmental, CA
Project Reference: Air Monitoring	Sample Matrix: Air
AECOM Project: 60436173-200	Sample Start Date: 09/09/2015
Validator/Date Validated: Anne Kakai 01/19/2016 (completed)	Sample End Date: 09/29/2015
Secondary Review by: Steve Szocik	Secondary Review Date: 01/19/2016
Samples Analyzed: Refer to the Table of Samples Analyzed (page 3).	
Parameters Validated: Volatile Organic Compounds (VOCs) by Method TO-15 Modified and Fixed Gases by ASTM Method D1946.	
Laboratory Project IDs/Sample Delivery Groups (SDGs): P1504149 and P1503846	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced validation criteria set forth in the QAPP. Overall field and laboratory precision is acceptable since data does not require qualification and no data is rejected based on these measurements.						
Accuracy:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Field accuracy, a measure of the sampling bias, is generally determined by reviewing trip and/or field blank results for evidence of sample contamination stemming from sampling activities and/or sample transport/bottle contamination in applicable methods. No field blanks were required because the method uses dedicated pre-cleaned sample containers supplied by the laboratory. Laboratory accuracy is a measure of the system bias, and is measured by evaluating laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and organic system monitoring compounds (surrogate and internal standard) percent recoveries (%Rs). LCS/LCSD %Rs, which demonstrated the overall performance of the analytical procedure, were compared to QAPP limits. MS/MSD %Rs, which provide information on sample matrix interferences, would be compared to QAPP limits, EPA published QC limits or laboratory control charted limits to evaluate matrix effects upon sample analysis. MS/MSD sample volumes were not collected for the data set discussed in this DVR. System monitoring compounds or surrogate recoveries, which measure system performance and efficiency during organic analysis, are compared to QAPP limits or EPA published QC limits when applicable. Overall, accuracy was evaluated and determined to be acceptable because limited data required qualification and no data is rejected based on these measurements. Accuracy measurements are reviewed in items 12, 14, 15, and 16 below.						
Method Compliance:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: For this sample set, method compliance was determined by evaluating sample integrity and holding time against method specified requirements, while applying QAPP validation guidelines. Overall method compliance is acceptable since data does not require qualification and no data is rejected based on these measurements. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20 and 22 below.						
Completeness:	**X**	Acceptable		Unacceptable	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and reporting limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and EQuIS electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23.

All of the reported data are usable, some with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.

VALIDATION CRITERIA CHECK

Data validation qualifiers assigned during this review:

J estimated concentration

UJ undetected, reporting limit is estimated

Comments in bold type (when shown) indicate sample results requiring qualification. The other comments are of interest, but qualification of the sample results is not necessary.

Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).

1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	AK	Initials

Explanation by laboratory: The following notations were included in the laboratory Quality Control Summary:

Sample Receipt: All sample aliquots were received in the proper containers. All method specified holding times were met.

No analytical anomalies were noted for the samples in this data set. Specific comments made with reference to the methods analyzed and reported are reflected below:

Method associations to NELAP and/or AIHA-LAP were noted. The laboratory also flagged the Oxygen result with the comment, “The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.” All laboratory case narrative comments are included in the hardcopy (or .pdf) laboratory report. All assigned laboratory flags were also reviewed during the limited validation procedure.

Data qualification, if any, related to the laboratory comments and/or assigned laboratory data flags are discussed in the following sections.

2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	AK	Initials

Comments: The COC records from field to laboratory were complete. Custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Data qualification was not required.

3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	AK	Initials

Comments: All requested analyses, as designated on the supplied COC forms and supporting project documentation, were completed and reported by the laboratory.

4. Were samples received in good condition and at the appropriate temperature?	**X**	Yes		No	AK	Initials

Comments: All samples were received intact, in good condition, and at ambient temperature, consistent with QAPP requirements. Custody seals were noted as missing, however, sample canister vacuums were noted as being intact per the laboratory sample receipt form.

5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Reported methods/results met those requested on the original COC or are compliant with QAPP requested analytes.						
6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	AK	Initials
Comments: Reported detection limits are achievable by the quoted methods, and are in compliance with the project requirements. Some samples had to be diluted. The reporting limits were raised appropriately. **Sample results reported at concentrations ≥ the method detection limit (MDL) but < the limit of quantitation (LOQ) require J qualifiers to indicate estimated concentrations. The analyte cannot be accurately quantitated at this trace concentration level. Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).**						
7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	AK	Initials
Comments: The reported target analytes are in compliance with the constituents identified on the COC.						
8. Were sample holding times met?	**X**	Yes		No	AK	Initials
Comments: Sample preparation/extraction and analytical holding times were met for all samples and analyses reported in this SDG.						
9. Were correct concentration units reported?	**X**	Yes		No	AK	Initials
Comments: Correct concentration units were reported for all constituents.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	AK	Initials
Comments: Data validation qualifiers override any assigned laboratory data flags.						
11. Were laboratory blank samples free of target analyte contamination?	**X**	Yes		No	AK	Initials
Comments: Methylene Chloride was detected at trace concentrations in the method blank sample P151006-MB. This analyte is not part of the target analyte list. Laboratory blank samples were free of target analyte contamination. Data qualification is not required.						
12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?	**NA**	Yes	**NA**	No	AK	Initials
Comments: No trip blank, field blank, and/or equipment rinse blank samples were applicable for the air data evaluated in this DVR. Other than notation of this observation, data qualification is not required.						
13. Were instrument calibrations within method or data validation control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, instrument calibrations were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that instrument calibrations met acceptance criteria.						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Surrogate %Rs for organic analyses were within laboratory control-charted QC limits (as allowed for method TO-15 Modified) for all project samples and associated laboratory QC samples reported in this SDG.						
15. Were laboratory control sample recoveries within control limits?		Yes	**X**	No	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Submitted LCS %Rs were within laboratory control-charted QC limits for target analytes reported in this SDG, as allowed for the methods specified with the exception of the %R for Bromoform in MS9092515-LCS2-P1503846 that was recovered (73%) outside QC control limits (76% -149%). Sample SVE-EB/09092015 (the only associated sample), was non-detect for bromoform and was qualified UJ to indicate an estimated concentration due to LCS outlier. **Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).**						
16. Were matrix spike recoveries and % RPDs within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: Project specific MS, MSD volumes were not collected for the methods in this SDG and as such no MS/MSD evaluation was completed. Data qualification is not required.						
17. Were serial dilution %Ds within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: *Serial Dilution %Ds: Not applicable for the methods reviewed.*						
18. Were organic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
19. Were internal standards within method criteria for GC/MS sample analyses?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
20. Were inorganic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: Not applicable for the methods reviewed.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	AK	Initials

SDG	Primary Sample ID	Duplicate Sample ID	Sample Date
P1504149	SVE-7/09292015	SVE-DUP/09292015	9/29/2015

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Field duplicate RPDs were within data validation QC limits of ≤ 25% for air matrices, or RPDs were not applicable due to results that were within 2X the reporting limit or were undetected in both samples, except as noted. All field duplicate/source samples are air samples.

The following field duplicate pairs were evaluated:

Method	Unit	Analyte	RPD	RL	SVE-7/09292015	SVE-DUP/09292015	Qualifier
ASTM D1946	ppmv	Nitrogen	0	1800	777000	777000	None
ASTM D1946	ppmv	Oxygen (O2)	0	1800	221000	221000	None
TO-15	ug/m3	Tetrachloroethene	8.8	23	870	950	None
TO-15	ug/m3	Trichloroethene	5.6	23	69	73	None

All RPDs were within QAPP-listed QC acceptance criteria and based on this data qualification is not required.

22. Were qualitative criteria for organic target analyte identification met?	**NA**	Yes	**NA**	No	AK	Initials

Comments: Not applicable for this level of limited data validation – chromatograms, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review. There were no analyte qualitative flags assigned by the laboratory.

23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	AK	Initials

Comments: The EDD entries were resolved with the hardcopy data results and corrected as necessary. According to validation protocol, the hardcopy data report was accepted as the correct reference. Qualifiers and reason codes (when applicable) were added to the EDD files for all reportable data. The four EQuIS EDD files were formatted for upload once data validation secondary review was completed.

Additional edits made to the EDD files by the Database Manager prior to data upload are listed below, as necessary for the reviewed SDG.

Unique sys_loc_codes were assigned to all samples. Parent sample designations were made for all LCS/LCSD and field duplicate samples.

A task_code field was assigned, “2015ALSAirChecks”.

24. General Comments: The laboratory flagged the Oxygen result with the comment, “The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.” Other than notation of this comment, data qualification is not required. **Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).**

Table of Qualified Analytical Results
BNSF Mission Wye Air Samples
ALS Environmental, CA
Laboratory SDGs: P1504149 and P1503846
September 2015 Sampling

Table 2

SDG	Sample ID	Method	DF	Analyte	Conc	Unit	Qualifier	Reason Code
P1503846	SVE-EB/09092015	TO-15	18.5	2-Propanol	44	ug/m3	J	<LOQ
P1503846	SVE-EB/09092015	TO-15	18.5	Carbon disulfide	3	ug/m3	J	<LOQ
P1503846	SVE-EB/09092015	TO-15	18.5	trans-1,2-Dichloroethene	5.4	ug/m3	J	<LOQ
P1503846	SVE-EB/09092015	TO-15	18.5	N-Octante	8	ug/m3	J	<LOQ
P1503846	SVE-EB/09092015	TO-15	18.5	Bromoform	9.3	ug/m3	UJ	LCS
P1503846	SVE-EB/09092015	TO-15	18.5	2-Butanone	29	ug/m3	J	<LOQ
P1504149	SVE-3/09292015	TO-15	55.5	trans-1,2-Dichloroethene	20	ug/m3	J	<LOQ
P1504149	SVE-4/09292015	TO-15	6.96	1,2,4-Trimethylbenzene	1.1	ug/m3	J	<LOQ
P1504149	SVE-EV/09292015	TO-15	61.0	1,2,4-Trimethylbenzene	10	ug/m3	J	<LOQ
P1504149	SVE-EV/09292015	TO-15	61.0	Trichloroethene	29	ug/m3	J	<LOQ

Notes:
DF = dilution factor
Conc = concentration
ug/m3 = micrograms per cubic meter
SDG = sample delivery group
Per project requirements, non-detect results will be reported at the MDL while tables are being generated. Data will be entered into the database by the data validator as presented by the laboratory with non-detects reported at the RL.

Reason Codes:

LCS – laboratory control sample recovery outlier; evidence of laboratory contamination
< LOQ - concentration reported is ≥ the method detection limit but is < the Limit of quantitation

Environment

Submitted to:
BNSF Railway Company
Mission Wye

Submitted by:
AECOM
Denver, CO
January 19, 2016

January 19, 2016

Organic
Limited Data Validation Report

BNSF Mission Wye
Air Samples
ALS Environmental data

October, 2015 Sampling

Prepared By Anne Kakai
Validation Chemist/Database Manager

Overview

The samples analyzed for the BNSF Mission Wye October 2015 sampling events are listed in the Table of Samples Analyzed (page 3). Limited data validation was performed on results for four air samples, and one field duplicate sample as detailed below.

The samples were analyzed by ALS Environmental of Simi Valley, CA. Limited data validation was performed on the following analyses: Volatile Organic Compounds (VOCs) by Method TO-15 Modified and Fixed Gases by ASTM Method D1946.

The Analytical Data Validation Checklist is presented as pages 4-8 of this report. Data were evaluated based on validation criteria set forth in the June 2015 Quality Assurance Project Plan (QAPP) for the Feasibility Study Pilot Test Work Plan – Revision 2, BNSF Mission Wye, Livingston, Montana.

The following data components were reviewed during the data validation procedure.

Reviewed Deliverables/Data
Chain-of-Custody form(s) and sample integrity
Case Narratives (including any laboratory flags)
Sample results, reporting detection limits, dilution factors
Holding times
Laboratory blank results
Organic surrogate recoveries
LCS (blank spike) results
Laboratory duplicate (or spiked duplicate) results
Field duplicates
Electronic data deliverables (EDDs)

Data Validation Qualifiers Assigned During this Review

J estimated concentration

Assigned qualifiers (when applicable) are detailed in the Analytical Data Validation Checklist and are summarized in the Table of Qualified Analytical Results.

Overall Data Assessment

Field and laboratory precision, field and laboratory accuracy, method compliance, and data set completeness have been determined to be acceptable, based on the data submitted. No data were missing or rejected. All reported data are suitable for their intended use as qualified.

Table of Samples Analyzed
BNSF Mission Wye Air Samples
ALS Environmental, CA
Laboratory SDGs: P1504466
October 2015 Sampling

Table 1

Matrix	Sample ID	Sample Date	Sample Time	Lab SDG	Lab ID	Sample Type
AA	SVE-CEV/10162015	10/16/2015	10:58	P1504466	P1504466-001	N
AA	SVE-DUP/10162015	10/16/2015	11:00	P1504466	P1504466-002	FD
AA	SVE-Pre-T/10162015	10/16/2015	11:15	P1504466	P1504466-003	N
AA	SVE-Mid-T/10162015	10/16/2015	11:28	P1504466	P1504466-004	N
AA	SVE-EV/10162015	10/16/2015	11:48	P1504466	P1504466-005	N

AA – Ambient Air sample
FD – field duplicate of sample SVE-CEV/10162015
ID - identification
N - normal sample
SDG – sample delivery group

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Project Name: BNSF Mission Wye	Laboratory: ALS Environmental, CA
Project Reference: Air Monitoring	Sample Matrix: Air
AECOM Project: 60436173-200	Sample Start Date: 10/16/2015
Validator/Date Validated: Anne Kakai 01/19/2016 (completed)	Sample End Date: 10/16/2015
Secondary Review by: DP and Steve Szocik	Secondary Review Date: 01/19/2016
Samples Analyzed: Refer to the Table of Samples Analyzed (page 3).	
Parameters Validated: Volatile Organic Compounds (VOCs) by Method TO-15 Modified and Fixed Gases by ASTM Method D1946.	
Laboratory Project IDs/Sample Delivery Groups (SDGs): P1504466	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced validation criteria set forth in the QAPP. Overall field and laboratory precision is acceptable since data does not require qualification and no data is rejected based on these measurements.						
Accuracy:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Field accuracy, a measure of the sampling bias, is generally determined by reviewing trip and/or field blank results for evidence of sample contamination stemming from sampling activities and/or sample transport/bottle contamination in applicable methods. The equipment blank supplied was not associated to any sample and was used to assess the construction material used and so will be evaluated based on system performance. Laboratory accuracy is a measure of the system bias, and is measured by evaluating laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and organic system monitoring compounds (surrogate and internal standard) percent recoveries (%Rs). LCS/LCSD %Rs, which demonstrated the overall performance of the analytical procedure, were compared to QAPP limits. MS/MSD %Rs, which provide information on sample matrix interferences, would be compared to QAPP limits, EPA published QC limits or laboratory control charted limits to evaluate matrix effects upon sample analysis. MS/MSD sample volumes were not collected for the data set discussed in this DVR. System monitoring compounds or surrogate recoveries, which measure system performance and efficiency during organic analysis, are compared to QAPP limits or EPA published QC limits when applicable. Overall surrogate recoveries were acceptable and that can be used in lieu of the missing MS/MSD data to evaluate accuracy. Laboratory accuracy was evaluated and determined to be acceptable, data does not require qualification and no data is rejected based on these measurements. Accuracy measurements are reviewed in items 12, 14, 15, and 16 below.						
Method Compliance:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: For this sample set, method compliance was determined by evaluating sample integrity and holding time against method specified requirements, while applying QAPP validation guidelines. Overall method compliance is acceptable since majority of the data does not require qualification and no data is rejected based on these measurements. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20 and 22 below.						
Completeness:	**X**	Acceptable		Unacceptable	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and reporting limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and EQuIS electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23.

All of the reported data are usable, some with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.

VALIDATION CRITERIA CHECK

Data validation qualifiers assigned during this review:

J estimated concentration

Comments in bold type (when shown) indicate sample results requiring qualification. The other comments are of interest, but qualification of the sample results is not necessary.

Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).

1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	AK	Initials

Explanation by laboratory:

Comments: A few LCS %R outliers were noted. Method associations to NELAP and/or AIHA-LAP were noted. The laboratory also flagged the Oxygen result with the comment, “The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.” All laboratory case narrative comments are included in the hardcopy (or .pdf) laboratory report. All assigned laboratory flags were also reviewed during the limited validation procedure.

Data qualification, if any, related to the narrative comments and/or assigned laboratory flags contained in the analytical reports are discussed in the following sections.

2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	AK	Initials

Comments: The COC records from field to laboratory were complete. Custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Data qualification was not required.

3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	AK	Initials

Comments: All requested analyses, as designated on the supplied COC forms and supporting project documentation, were completed and reported by the laboratory. It was noted that Hydrogen was analyzed in addition to the 4 contaminants of concern under ASTM method D1946 despite COC request to report only 4 analytes for samples SVE-DUP/10162015 and SVE-CEV/10162015. This analyte was non-detect in both samples. The laboratory was reminded to report only analytes requested on COC. Other than notation of this observation, data qualification is not required.

4. Were samples received in good condition and at the appropriate temperature?	**X**	Yes		No	AK	Initials

Comments: All samples were received intact, in good condition, and at ambient temperature, consistent with QAPP requirements. Custody seals were noted as missing, however, sample canister vacuums were noted as being intact per the laboratory sample receipt form.

5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Reported methods/results met those requested on the original COC or are compliant with QAPP requested analytes. It was noted that Hydrogen was analyzed in addition to the 4 contaminants of concern under ASTM method D1946 despite COC request to report only 4 analytes for samples SVE-DUP/10162015 and SVE-CEV/10162015. This analyte was non-detect in both samples. The laboratory was reminded to report only analytes requested on COC. Other than notation of this observation, data qualification is not required.						
6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	AK	Initials
Comments: Reported detection limits are achievable by the quoted methods, and are in compliance with the project requirements. Some samples had to be diluted. The reporting limits were raised appropriately. **Sample results reported at concentrations ≥ the method detection limit (MDL) but < the limit of quantitation (LOQ) require J qualifiers to indicate estimated concentrations. The analyte cannot be accurately quantitated at this trace concentration level. The carbon dioxide result for sample SVE-CEV/10162015 was detected above the method reporting limit prior to normalization but less than the reporting limit after. A laboratory qualifier of "K" was assigned to this analyte. An equivalent qualifier, "J" was assigned during validation to indicate that the analyte cannot be accurately quantitated at this concentration level and the result is considered to be an estimated concentration. Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).**						
7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	AK	Initials
Comments: The reported target analytes are in compliance with the constituents identified on the COC.						
8. Were sample holding times met?	**X**	Yes		No	AK	Initials
Comments: Sample preparation/extraction and analytical holding times were met for all samples and analyses reported in this SDG.						
9. Were correct concentration units reported?	**X**	Yes		No	AK	Initials
Comments: Correct concentration units were reported for all constituents.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	AK	Initials
Comments: Data validation qualifiers override any assigned laboratory data flags.						
11. Were laboratory blank samples free of target analyte contamination?	**X**	Yes		No	AK	Initials
Comments: Acetone and methylene chloride were detected at trace concentrations in the method blank sample P151022-MB. This analyte is not part of the target analyte list. Laboratory blank samples were free of target analyte contamination. Data qualification is not required.						
12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?	**NA**	Yes	**NA**	No	AK	Initials
Comments: No trip blank, field blank or equipment blank samples were collected for the air data evaluated in this DVR. Other than notation of this observation, no data qualification is required.						
13. Were instrument calibrations within method or data validation control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, instrument calibrations were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that instrument calibrations met acceptance criteria.						

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

14. Were surrogate recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Surrogate %Rs for organic analyses were within laboratory control-charted QC limits (as allowed for method TO-15 Modified) for all project samples and associated laboratory QC samples reported in this SDG.						
15. Were laboratory control sample recoveries within control limits?		Yes	**X**	No	AK	Initials

Comments: Submitted LCS %Rs were within laboratory control-charted QC limits for target analytes reported in this SDG, as allowed for the methods specified with the exception of the %Rs shown on the table below.

SDG	Sample ID	Matrix	Method	Analyte	LCL	UCL	LCSRecovery
P1504466	MS13102315-LCS2-P1504466	AQ	TO-15	ETHANOL	57	126	127
P1504466	MS13102315-LCS2-P1504466	AQ	TO-15	1,4-DIOXANE (P-DIOXANE)	67	122	128
P1504466	MS13102315-LCS2-P1504466	AQ	TO-15	2-Hexanone	59	128	130

Associated sample results were all non-detect and data qualification is not required.

16. Were matrix spike recoveries and % RPDs within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: Project specific MS, MSD volumes were not collected for the methods in this SDG and as such no MS/MSD evaluation was completed. Data qualification is not required.						
17. Were serial dilution %Ds within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: *Serial Dilution %Ds: Not applicable for the methods reviewed.*						
18. Were organic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
19. Were internal standards within method criteria for GC/MS sample analyses?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
20. Were inorganic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: Not applicable for the methods reviewed.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	AK	Initials

SDG	Primary Sample ID	Duplicate Sample ID	Sample Date
P1504466	SVE-CEV/10162015	SVE-DUP/10162015	10/16/2015

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Field duplicate RPDs were within data validation QC limits of ≤ 25% for air matrices, or RPDs were not applicable due to results that were within 2X the reporting limit or were undetected in both samples, except as noted. All field duplicate/source samples are air samples.

The following field duplicate pairs were evaluated:

Method	Unit	Analyte	RPD	RL	SVE-CEV/10162015	SVE-DUP/10162015	Qualifier
ASTM D1946	ppmv	NITROGEN	0.1	2000	778000	777000	None
ASTM D1946	ppmv	OXYGEN	0	2000	221000	221000	None
TO-15	ug/m3	Tetrachloroethene	3.8	28	2600	2700	None
TO-15	ug/m3	Trichloroethene	2.1	28	490	480	None

All RPDs were within QAPP-listed QC acceptance criteria and based on this data qualification is not required.

22. Were qualitative criteria for organic target analyte identification met?	**NA**	Yes	**NA**	No	AK	Initials

Comments: Not applicable for this level of limited data validation – chromatograms, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review. There were no analyte qualitative flags assigned by the laboratory.

23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	AK	Initials

Comments: The EDD entries were resolved with the hardcopy data results and corrected as necessary. According to validation protocol, the hardcopy data report was accepted as the correct reference. Qualifiers and reason codes (when applicable) were added to the EDD files for all reportable data. The four EQuIS EDD files were formatted for upload once data validation secondary review was completed.

Additional edits made to the EDD files by the Database Manager prior to data upload are listed below, as necessary for the reviewed SDG.

Unique sys_loc_codes were assigned to all samples. Parent sample designations were made for all LCS/LCSD and field duplicate samples.

Result comments “not detected” assigned by the laboratory for non-detects were deleted from the result_comments field. A “U” qualifier was added to the interpreted_qualifier field where missing.

A task_code field was assigned, “2015ALSAirChecks”.

24. General Comments: It was noted that Hydrogen was analyzed in addition to the 4 contaminants of concern under ASTM method 1946 despite COC request to report only 4 analytes for samples SVE-DUP/10162015 and SVE-CEV/10162015. This analyte was non-detect in both samples. The laboratory was reminded to report only analytes requested on COC. The laboratory flagged the Oxygen result with the comment, “The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.” Other than notation of these observations, data qualification is not required.

Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).

Table of Qualified Analytical Results
BNSF Mission Wye Air Samples
ALS Environmental, CA
Laboratory SDGs: P1504466
October 2015 Sampling

Table 2

SDG	Sample ID	Method	DF	Analyte	Conc	Unit	Qualifier	Reason Code
P1504466	SVE-CEV/10162015	ASTM D1946	2.02	Carbon Dioxide	1490	ppmv	J	<LOQ
P1504466	SVE-Pre-T/10162015	TO-15	140	1,1,1-Trichloroethane	31	ug/m3	J	<LOQ
P1504466	SVE-Mid-T/10162015	TO-15	115	1,1,1-Trichloroethane	37	ug/m3	J	<LOQ
P1504466	SVE-EV/10162015	TO-15	94.5	Isopropylbenzene	32	ug/m3	J	<LOQ
P1504466	SVE-EV/10162015	TO-15	94.5	1,1,1-Trichloroethane	41	ug/m3	J	<LOQ
P1504466	SVE-EV/10162015	TO-15	94.5	Acetone	140	ug/m3	J	<LOQ
P1504466	SVE-EV/10162015	TO-15	94.5	d-Limonene	27	ug/m3	J	<LOQ

Notes:
DF = dilution factor
Conc = concentration
ug/m3 – micrograms per cubic meter
ppmV - parts per million by volume
SDG – sample delivery group
Per project requirements, non-detect results will be reported at the MDL while tables are being generated. Data will be entered into the database by the data validator as presented by the laboratory with non-detects reported at the RL.

Reason Codes:

< LOQ - concentration reported is >/= the method detection limit but is < the limit of quantitation/reporting limit

Environment

Submitted to:
BNSF Railway Company
Mission Wye

Submitted by:
AECOM
Denver, CO
January 19, 2016

January 19, 2016

Organic
Limited Data Validation Report

BNSF Mission Wye
Air Samples
ALS Environmental data

October 30, 2015 Sampling

Prepared By Anne Kakai
Validation Chemist/Database Manager

Overview

The samples analyzed for the BNSF Mission Wye October 30, 2015 sampling event are listed in the Table of Samples Analyzed (page 3). Limited data validation was performed on results for one air sample, and one field duplicate sample as detailed below.

The samples were analyzed by ALS Environmental of Simi Valley, CA. Limited data validation was performed on the following analyses: Volatile Organic Compounds (VOCs) by Method TO-15 Modified and Fixed Gases by ASTM Method D1946.

The Analytical Data Validation Checklist is presented as pages 4-8 of this report. Data were evaluated based on validation criteria set forth in the June 2015 Quality Assurance Project Plan (QAPP) for the Feasibility Study Pilot Test Work Plan – Revision 2, BNSF Mission Wye, Livingston, Montana.

The following data components were reviewed during the data validation procedure.

Reviewed Deliverables/Data
Chain-of-Custody form(s) and sample integrity
Case Narratives (including any laboratory flags)
Sample results, reporting detection limits, dilution factors
Holding times
Laboratory blank results
Organic surrogate recoveries
LCS (blank spike) results
Laboratory duplicate (or spiked duplicate) results
Field duplicates
Electronic data deliverables (EDDs)

Data Validation Qualifiers Assigned During this Review

No data qualifiers were assigned during this review.

Assigned qualifiers (when applicable) are detailed in the Analytical Data Validation Checklist and are summarized in a Table of Qualified Analytical Results.

Overall Data Assessment

Field and laboratory precision, field and laboratory accuracy, method compliance, and data set completeness have been determined to be acceptable, based on the data submitted. No data were missing or rejected. All reported data are suitable for their intended use.

Table of Samples Analyzed
BNSF Mission Wye Air Samples
ALS Environmental, CA
Laboratory SDG: P1504770
October 30, 2015 Sampling

Table 1

Matrix	Sample ID	Sample Date	Sample Time	Lab SDG	Lab ID	Sample Type
AA	SVE-CEV/10302015	10/30/2015	16:38	P1504770	P1504770-001	N
AA	SVE-DUP/10302015	10/30/2015	16:45	P1504770	P1504770-002	FD

AA – Ambient Air sample
FD – field duplicate of sample SVE-CEV/10302015
ID - identification
N - normal sample
SDG – sample delivery group

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Project Name: BNSF Mission Wye	Laboratory: ALS Environmental, CA
Project Reference: Air Monitoring	Sample Matrix: Air
AECOM Project: 60436173-200	Sample Start Date: 10/30/2015
Validator/Date Validated: Anne Kakai 01/19/2016 (completed)	Sample End Date: 10/30/2015
Secondary Review by: Steve Szocik	Secondary Review Date: 01/19/2016
Samples Analyzed: Refer to the Table of Samples Analyzed (page 3).	
Parameters Validated: Volatile Organic Compounds (VOCs) by Method TO-15 Modified and Fixed Gases by ASTM Method D1946.	
Laboratory Project IDs/Sample Delivery Groups (SDGs): P1504770	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced validation criteria set forth in the QAPP. Overall field and laboratory precision is acceptable since data does not require qualification and no data is rejected based on these measurements.						
Accuracy:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Field accuracy, a measure of the sampling bias, is generally determined by reviewing trip and/or field blank results for evidence of sample contamination stemming from sampling activities and/or sample transport/bottle contamination in applicable methods. Because trip and equipment blanks are not applicable to air samples, field accuracy was based on previously field construction blanks. Laboratory accuracy is a measure of the system bias, and is measured by evaluating laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and organic system monitoring compounds (surrogate and internal standard) percent recoveries (%Rs). LCS/LCSD %Rs, which demonstrated the overall performance of the analytical procedure, were compared to QAPP limits. MS/MSD %Rs, which provide information on sample matrix interferences, would be compared to QAPP limits, EPA published QC limits or laboratory control charted limits to evaluate matrix effects upon sample analysis. MS/MSD sample volumes were not collected for the data set discussed in this DVR. System monitoring compounds or surrogate recoveries, which measure system performance and efficiency during organic analysis, are compared to QAPP limits or EPA published QC limits when applicable. Overall surrogate recoveries were acceptable indicating acceptable accuracy for the samples analyzed by the method. Laboratory accuracy was evaluated and determined to be acceptable, data does not require qualification and no data is rejected based on these measurements. Accuracy measurements are reviewed in items 12, 14, 15, and 16 below.						
Method Compliance:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: For this sample set, method compliance was determined by evaluating sample integrity and holding time against method specified requirements, while applying QAPP validation guidelines. Overall method compliance is acceptable since data does not require qualification and no data is rejected based on these measurements. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20 and 22 below.						
Completeness:	**X**	Acceptable		Unacceptable	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and reporting limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and EQuIS electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23.

All of the reported data are usable, some with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.

VALIDATION CRITERIA CHECK

Data validation qualifiers assigned during this review:

No qualifiers were assigned during this review.

Assigned qualifiers (when applicable) are detailed in the Analytical Data Validation Checklist and are summarized in a Table of Qualified Analytical Results following the checklist.

1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	AK	Initials

Explanation by laboratory:

Comments: Method associations to NELAP and/or AIHA-LAP were noted. The laboratory also flagged the Oxygen result with the comment, “The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.” All laboratory case narrative comments are included in the hardcopy (or .pdf) laboratory report. All assigned laboratory flags were also reviewed during the limited validation procedure.

Data qualification, if any, related to the narrative comments and/or assigned laboratory flags contained in the analytical reports are discussed in the following sections.

2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	AK	Initials

Comments: The COC records from field to laboratory were complete. Custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Data qualification was not required.

3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	AK	Initials

Comments: All requested analyses, as designated on the supplied COC forms and supporting project documentation, were completed and reported by the laboratory.

4. Were samples received in good condition and at the appropriate temperature?	**X**	Yes		No	AK	Initials

Comments: All samples were received intact, in good condition, and at ambient temperature, consistent with QAPP requirements. Custody seals were noted as missing, however, sample canister vacuums were noted as being intact per the laboratory sample receipt form.

5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	AK	Initials

Comments: Reported methods/results met those requested on the original COC or are compliant with QAPP requested analytes.

6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	AK	Initials

Comments: Reported detection limits are achievable by the quoted methods, and are in compliance with the project requirements. Some samples had to be diluted. The reporting limits were raised appropriately. No data qualification is required.

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	AK	Initials
Comments: The reported target analytes are in compliance with the constituents identified on the COC.						
8. Were sample holding times met?	**X**	Yes		No	AK	Initials
Comments: Sample preparation/extraction and analytical holding times were met for all samples and analyses reported in this SDG.						
9. Were correct concentration units reported?	**X**	Yes		No	AK	Initials
Comments: Correct concentration units were reported for all constituents.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	AK	Initials
Comments: Data validation qualifiers override any assigned laboratory data flags.						
11. Were laboratory blank samples free of target analyte contamination?	**X**	Yes		No	AK	Initials
Comments: Laboratory blank samples were free of target analyte contamination. Data qualification is not required.						
12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?	**NA**	Yes	**NA**	No	AK	Initials
Comments: No trip blank, field blank or equipment blank samples were collected for the air data evaluated in this DVR. Other than notation of this observation, no data qualification is required.						
13. Were instrument calibrations within method or data validation control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, instrument calibrations were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that instrument calibrations met acceptance criteria.						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Surrogate %Rs for organic analyses were within laboratory control-charted QC limits (as allowed for method TO-15 Modified) for all project samples and associated laboratory QC samples reported in this SDG.						
15. Were laboratory control sample recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Submitted LCS %Rs were within laboratory control-charted QC limits for target analytes reported in this SDG, as allowed for the methods specified. Data qualification is not required.						
16. Were matrix spike recoveries and % RPDs within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: Project specific MS, MSD volumes were not collected for the methods in this SDG and as such no MS/MSD evaluation was completed. Data qualification is not required.						
17. Were serial dilution %Ds within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: *Serial Dilution %Ds: Not applicable for the methods reviewed.*						
18. Were organic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.

19. Were internal standards within method criteria for GC/MS sample analyses?	**NA**	Yes	**NA**	No	AK	Initials

Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.

20. Were inorganic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials

Comments: Not applicable for the methods reviewed.

21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	AK	Initials

SDG	Primary Sample ID	Duplicate Sample ID	Sample Date
P1504770	SVE-CEV/10302015	SVE-DUP/10302015	10/30/2015

Comments: Field duplicate RPDs were within data validation QC limits of ≤ 25% for air matrices, or RPDs were not applicable due to results that were within 2X the reporting limit or were undetected in both samples, except as noted. All field duplicate/source samples are air samples.

The following field duplicate pairs were evaluated:

Method	Unit	Analyte	RPD	RL	SVE-CEV/10302015	SVE-DUP/10302015	Qualifier
ASTM D1946	ppmv	Carbon Dioxide	0	1900/2100	2730	2730	None
ASTM D1946	ppmv	Nitrogen	0	1900/2100	777000	777000	None
ASTM D1946	ppmv	Oxygen (O2)	0	1900/2100	220000	220000	None
TO-15	ug/m3	Tetrachloroethene	0	47/52	8700	8700	None
TO-15	ug/m3	Trichloroethene	0	47/52	1200	1200	None

All RPDs were within QAPP-listed QC acceptance criteria and based on this data qualification is not required.

22. Were qualitative criteria for organic target analyte identification met?	**NA**	Yes	**NA**	No	AK	Initials

Comments: Not applicable for this level of limited data validation – chromatograms, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review. There were no analyte qualitative flags assigned by the laboratory.

23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: The EDD entries were resolved with the hardcopy data results and corrected as necessary. According to validation protocol, the hardcopy data report was accepted as the correct reference. Qualifiers and reason codes (when applicable) were added to the EDD files for all reportable data. The four EQuIS EDD files were formatted for upload once data validation secondary review was completed. Additional edits made to the EDD files by the Database Manager prior to data upload are listed below, as necessary for the reviewed SDG. Unique sys_loc_codes were assigned to all samples. Parent sample designations were made for all LCS/LCSD and field duplicate samples. A task_code field was assigned, “2015ALSAirChecks”.
24. General Comments: No qualifiers were assigned during this review. The laboratory flagged the Oxygen result with the comment, “The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.” Other than notation of this comment, data qualification is not required.

Table of Qualified Analytical Results
BNSF Mission Wye Air Samples
ALS Environmental, CA
Laboratory SDG: P1504770
October 30, 2015 Sampling

No qualifiers were assigned during this review

Environment

Submitted to:
BNSF Railway Company
Mission Wye

Submitted by:
AECOM
Denver, CO
January 19, 2016

January 19, 2016

Organic
Limited Data Validation Report

BNSF Mission Wye
Air Samples
ALS Environmental data

November 13, 2015 Sampling

Prepared By Anne Kakai
Validation Chemist/Database Manager

Overview

The samples analyzed for the BNSF Mission Wye November 13, 2015 sampling event are listed in the Table of Samples Analyzed (page 3). Limited data validation was performed on results for one air sample, and one field duplicate sample as detailed below.

The samples were analyzed by ALS Environmental of Simi Valley, CA. Limited data validation was performed on the following analyses: Volatile Organic Compounds (VOCs) by Method TO-15 Modified and Fixed Gases by ASTM Method D1946.

The Analytical Data Validation Checklist is presented as pages 4-8 of this report. Data were evaluated based on validation criteria set forth in the June 2015 Quality Assurance Project Plan (QAPP) for the Feasibility Study Pilot Test Work Plan – Revision 2, BNSF Mission Wye, Livingston, Montana.

The following data components were reviewed during the data validation procedure.

Reviewed Deliverables/Data
Chain-of-Custody form(s) and sample integrity
Case Narratives (including any laboratory flags)
Sample results, reporting detection limits, dilution factors
Holding times
Laboratory blank results
Organic surrogate recoveries
LCS (blank spike) results
Laboratory duplicate (or spiked duplicate) results
Field duplicates
Electronic data deliverables (EDDs)

Data Validation Qualifiers Assigned During this Review

No data qualifiers were assigned during this review.

Assigned qualifiers (when applicable) are detailed in the Analytical Data Validation Checklist and are summarized in a Table of Qualified Analytical Results.

Overall Data Assessment

Field and laboratory precision, field and laboratory accuracy, method compliance, and data set completeness have been determined to be acceptable, based on the data submitted. No data were missing or rejected. All reported data are suitable for their intended use.

Table of Samples Analyzed
BNSF Mission Wye Air Samples
ALS Environmental, CA
Laboratory SDG: P1505006
November 13, 2015 Sampling

Table 1

Matrix	Sample ID	Sample Date	Sample Time	Lab SDG	Lab ID	Sample Type
AA	SVE-CEV/11132015	11/13/2015	16:34	P1505006	P1505006-001	N
AA	SVE-DUP/11132015	11/13/2015	16:40	P1505006	P1505006-002	FD

AA – Ambient Air sample
FD – field duplicate of sample SVE-CEV/11132015
ID - identification
N - normal sample
SDG – sample delivery group

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Project Name: BNSF Mission Wye	Laboratory: ALS Environmental, CA
Project Reference: Air Monitoring	Sample Matrix: Air
AECOM Project: 60436173-200	Sample Start Date: 11/13/2015
Validator/Date Validated: Anne Kakai 01/19/2016 (completed)	Sample End Date: 11/13/2015
Secondary Review by: Steve Szocik	Secondary Review Date: 01/19/2016
Samples Analyzed: Refer to the Table of Samples Analyzed (page 3).	
Parameters Validated: Volatile Organic Compounds (VOCs) by Method TO-15 Modified and Fixed Gases by ASTM Method D1946.	
Laboratory Project IDs/Sample Delivery Groups (SDGs): P1505006	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced validation criteria set forth in the QAPP. Overall field and laboratory precision is acceptable since data does not require qualification and no data is rejected based on these measurements.						
Accuracy:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Field accuracy, a measure of the sampling bias, is generally determined by reviewing trip and/or field blank results for evidence of sample contamination stemming from sampling activities and/or sample transport/bottle contamination in applicable methods. Because trip and equipment blanks are not applicable to air samples, field accuracy was based on previously field construction blanks. Laboratory accuracy is a measure of the system bias, and is measured by evaluating laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and organic system monitoring compounds (surrogate and internal standard) percent recoveries (%Rs). LCS/LCSD %Rs, which demonstrated the overall performance of the analytical procedure, were compared to QAPP limits. MS/MSD %Rs, which provide information on sample matrix interferences, would be compared to QAPP limits, EPA published QC limits or laboratory control charted limits to evaluate matrix effects upon sample analysis. MS/MSD sample volumes were not collected for the data set discussed in this DVR. System monitoring compounds or surrogate recoveries, which measure system performance and efficiency during organic analysis, are compared to QAPP limits or EPA published QC limits when applicable. Overall surrogate recoveries were acceptable indicating acceptable accuracy for the samples analyzed by the method. Laboratory accuracy was evaluated and determined to be acceptable, data does not require qualification and no data is rejected based on these measurements. Accuracy measurements are reviewed in items 12, 14, 15, and 16 below.						
Method Compliance:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: For this sample set, method compliance was determined by evaluating sample integrity and holding time against method specified requirements, while applying QAPP validation guidelines. Overall method compliance is acceptable since data does not require qualification and no data is rejected based on these measurements. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20 and 22 below.						
Completeness:	**X**	Acceptable		Unacceptable	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and reporting limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and EQuIS electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23.

All of the reported data are usable, some with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.

VALIDATION CRITERIA CHECK

Data validation qualifiers assigned during this review:

No qualifiers were assigned during this review.

Assigned qualifiers (when applicable) are detailed in the Analytical Data Validation Checklist and are summarized in a Table of Qualified Analytical Results following the checklist.

1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	AK	Initials

Explanation by laboratory:

Comments: Method associations to NELAP and/or AIHA-LAP were noted. The laboratory also flagged the Oxygen result with the comment, “The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.” All laboratory case narrative comments are included in the hardcopy (or .pdf) laboratory report. All assigned laboratory flags were also reviewed during the limited validation procedure.

Data qualification, if any, related to the narrative comments and/or assigned laboratory flags contained in the analytical reports are discussed in the following sections.

2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	AK	Initials

Comments: The COC records from field to laboratory were complete. Custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Data qualification was not required.

3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	AK	Initials

Comments: All requested analyses, as designated on the supplied COC forms and supporting project documentation, were completed and reported by the laboratory.

4. Were samples received in good condition and at the appropriate temperature?	**X**	Yes		No	AK	Initials

Comments: All samples were received intact, in good condition, and at ambient temperature, consistent with QAPP requirements. Custody seals were noted as missing, however, sample canister vacuums were noted as being intact per the laboratory sample receipt form.

5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	AK	Initials

Comments: Reported methods/results met those requested on the original COC or are compliant with QAPP requested analytes.

6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	AK	Initials

Comments: Reported detection limits are achievable by the quoted methods, and are in compliance with the project requirements. Some samples had to be diluted. The reporting limits were raised appropriately. No data qualification is required.

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	AK	Initials
Comments: The reported target analytes are in compliance with the constituents identified on the COC.						
8. Were sample holding times met?	**X**	Yes		No	AK	Initials
Comments: Sample preparation/extraction and analytical holding times were met for all samples and analyses reported in this SDG.						
9. Were correct concentration units reported?	**X**	Yes		No	AK	Initials
Comments: Correct concentration units were reported for all constituents.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	AK	Initials
Comments: Data validation qualifiers override any assigned laboratory data flags.						
11. Were laboratory blank samples free of target analyte contamination?	**X**	Yes		No	AK	Initials
Comments: Laboratory blank samples were free of target analyte contamination. Data qualification is not required.						
12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?	**NA**	Yes	**NA**	No	AK	Initials
Comments: No trip blank, field blank or equipment blank samples were collected for the air data evaluated in this DVR. Other than notation of this observation, no data qualification is required.						
13. Were instrument calibrations within method or data validation control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, instrument calibrations were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that instrument calibrations met acceptance criteria.						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Surrogate %Rs for organic analyses were within laboratory control-charted QC limits (as allowed for method TO-15 Modified) for all project samples and associated laboratory QC samples reported in this SDG.						
15. Were laboratory control sample recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Submitted LCS %Rs were within laboratory control-charted QC limits for target analytes reported in this SDG, as allowed for the methods specified. Data qualification is not required.						
16. Were matrix spike recoveries and % RPDs within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: Project specific MS, MSD volumes were not collected for the methods in this SDG and as such no MS/MSD evaluation was completed. Data qualification is not required.						
17. Were serial dilution %Ds within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: *Serial Dilution %Ds: Not applicable for the methods reviewed.*						
18. Were organic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.

19. Were internal standards within method criteria for GC/MS sample analyses?	**NA**	Yes	**NA**	No	AK	Initials

Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.

20. Were inorganic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials

Comments: Not applicable for the methods reviewed.

21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	AK	Initials

SDG	Primary Sample ID	Duplicate Sample ID	Sample Date
P1505006	SVE-CEV/11132015	SVE-DUP/11132015	13-Nov-15

Comments: Field duplicate RPDs were within data validation QC limits of ≤ 25% for air matrices, or RPDs were not applicable due to results that were within ± 2X the reporting limit or were undetected in both samples, except as noted. All field duplicate/source samples are air samples.

The following field duplicate pairs were evaluated:

Method	Unit	Analyte	RPD	RL	SVE-CEV/11132015	SVE-DUP/11132015	Qualifier
ASTM D1946	ppmv	Carbon Dioxide	2.8	2100/2500	2430	2500	None
ASTM D1946	ppmv	Nitrogen	0	2100/2500	777000	777000	None
ASTM D1946	ppmv	Oxygen (O2)	0.5	2100/2500	220000	221000	None
TO-15	ug/m3	Tetrachloroethene	17.1	51/49	8000	9500	None
TO-15	ug/m3	Trichloroethene	8.7	51/49	1100	1200	None

All RPDs were within QAPP-listed QC acceptance criteria and based on this data qualification is not required.

22. Were qualitative criteria for organic target analyte identification met?	**NA**	Yes	**NA**	No	AK	Initials

Comments: Not applicable for this level of limited data validation – chromatograms, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review. There were no analyte qualitative flags assigned by the laboratory.

23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: The EDD entries were resolved with the hardcopy data results and corrected as necessary. According to validation protocol, the hardcopy data report was accepted as the correct reference. Qualifiers and reason codes (when applicable) were added to the EDD files for all reportable data. The four EQuIS EDD files were formatted for upload once data validation secondary review was completed. Additional edits made to the EDD files by the Database Manager prior to data upload are listed below, as necessary for the reviewed SDG. Unique sys_loc_codes were assigned to all samples. Parent sample designations were made for all LCS/LCSD and field duplicate samples. A task_code field was assigned, “2015ALSAirChecks”.
24. General Comments: No qualifiers were assigned during this review. The laboratory flagged the Oxygen result with the comment, “The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.” Other than notation of this comment, data qualification is not required.

Table of Qualified Analytical Results
BNSF Mission Wye Air Samples
ALS Environmental, CA
Laboratory SDG: P1505006
November 13, 2015 Sampling

No qualifiers were assigned during this review

Environment

Submitted to:
BNSF Railway Company
Mission Wye

Submitted by:
AECOM
Denver, CO
January 19, 2016

January 19, 2016

Organic
Limited Data Validation Report

BNSF Mission Wye
Air Samples
ALS Environmental data

December 2, 2015 Sampling

Prepared By Anne Kakai
Validation Chemist/Database Manager

Overview

The samples analyzed for the BNSF Mission Wye December 2, 2015 sampling event are listed in the Table of Samples Analyzed (page 3). Limited data validation was performed on results for ten air samples, and one field duplicate sample as detailed below.

The samples were analyzed by ALS Environmental of Simi Valley, CA. Limited data validation was performed on the following analyses: Volatile Organic Compounds (VOCs) by Method TO-15 Modified and Fixed Gases by ASTM Method D1946.

The Analytical Data Validation Checklist is presented as pages 4-8 of this report. Data were evaluated based on validation criteria set forth in the June 2015 Quality Assurance Project Plan (QAPP) for the Feasibility Study Pilot Test Work Plan – Revision 2, BNSF Mission Wye, Livingston, Montana.

The following data components were reviewed during the data validation procedure.

Reviewed Deliverables/Data
Chain-of-Custody form(s) and sample integrity
Case Narratives (including any laboratory flags)
Sample results, reporting detection limits, dilution factors
Holding times
Laboratory blank results
Organic surrogate recoveries
LCS (blank spike) results
Laboratory duplicate (or spiked duplicate) results
Field duplicates
Electronic data deliverables (EDDs)

Data Validation Qualifiers Assigned During this Review

J estimated concentration.

Assigned qualifiers (when applicable) are detailed in the Analytical Data Validation Checklist and are summarized in a Table of Qualified Analytical Results.

Overall Data Assessment

Field and laboratory precision, field and laboratory accuracy, method compliance, and data set completeness have been determined to be acceptable, based on the data submitted. No data were missing or rejected. All reported data are suitable for their intended use as qualified.

Table of Samples Analyzed
BNSF Mission Wye Air Samples
ALS Environmental, CA
Laboratory SDG: P1505308
December 2, 2015 Sampling

Table 1

Matrix	Sample ID	Sample Date	Sample Time	Lab SDG	Lab ID	Sample Type
AA	SVE-1/12022015	12/2/2015	10:33	P1505308	P1505308-001	N
AA	SVE-2/12022015	12/2/2015	10:38	P1505308	P1505308-002	N
AA	SVE-3/12022015	12/2/2015	10:42	P1505308	P1505308-003	N
AA	SVE-4/12022015	12/2/2015	10:45	P1505308	P1505308-004	N
AA	SVE-5/12022015	12/2/2015	10:48	P1505308	P1505308-005	N
AA	SVE-6/12022015	12/2/2015	10:52	P1505308	P1505308-006	N
AA	SVE-7/12022015	12/2/2015	10:55	P1505308	P1505308-007	N
AA	SVE-8/12022015	12/2/2015	10:57	P1505308	P1505308-008	N
AA	SVE-CEV/12022015	12/2/2015	11:03	P1505308	P1505308-009	N
AA	SVE-EV/12022015	12/2/2015	11:12	P1505308	P1505308-010	N
AA	SVE-DUP/12022015	12/2/2015	10:15	P1505308	P1505308-011	FD

AA – Ambient Air sample
FD – field duplicate of sample SVE-CEV/10302015
ID - identification
N - normal sample
SDG – sample delivery group

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Project Name: BNSF Mission Wye	Laboratory: ALS Environmental, CA
Project Reference: Air Monitoring	Sample Matrix: Air
AECOM Project: 60436173-200	Sample Start Date: 12/02/2015
Validator/Date Validated: Anne Kakai 01/19/2016 (completed)	Sample End Date: 12/02/2015
Secondary Review by: Steve Szocik	Secondary Review Date: 01/19/2016
Samples Analyzed: Refer to the Table of Samples Analyzed (page 3).	
Parameters Validated: Volatile Organic Compounds (VOCs) by Method TO-15 Modified and Fixed Gases by ASTM Method D1946.	
Laboratory Project IDs/Sample Delivery Groups (SDGs): P1505308	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced validation criteria set forth in the QAPP. Overall field and laboratory precision is acceptable since data does not require qualification and no data is rejected based on these measurements.						
Accuracy:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Field accuracy, a measure of the sampling bias, is generally determined by reviewing trip and/or field blank results for evidence of sample contamination stemming from sampling activities and/or sample transport/bottle contamination in applicable methods. Because trip and equipment blanks are not applicable to air samples, field accuracy was based on previous field construction blanks. Laboratory accuracy is a measure of the system bias, and is measured by evaluating laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and organic system monitoring compounds (surrogate and internal standard) percent recoveries (%Rs). LCS/LCSD %Rs, which demonstrated the overall performance of the analytical procedure, were compared to QAPP limits. MS/MSD %Rs, which provide information on sample matrix interferences, would be compared to QAPP limits, EPA published QC limits or laboratory control charted limits to evaluate matrix effects upon sample analysis. MS/MSD sample volumes were not collected for the data set discussed in this DVR. System monitoring compounds or surrogate recoveries, which measure system performance and efficiency during organic analysis, are compared to QAPP limits or EPA published QC limits when applicable. Overall surrogate recoveries were acceptable indicating acceptable accuracy for the samples analyzed by the method. Laboratory accuracy was evaluated and determined to be acceptable, data does not require qualification and no data is rejected based on these measurements. Accuracy measurements are reviewed in items 12, 14, 15, and 16 below.						
Method Compliance:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: For this sample set, method compliance was determined by evaluating sample integrity and holding time against method specified requirements, while applying QAPP validation guidelines. Overall method compliance is acceptable since data does not require qualification and no data is rejected based on these measurements. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20 and 22 below.						
Completeness:	**X**	Acceptable		Unacceptable	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and reporting limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and EQuIS electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23.

All of the reported data are usable, some with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.

VALIDATION CRITERIA CHECK

Data validation qualifiers assigned during this review:

J estimated concentration

Comments in bold type (when shown) indicate sample results requiring qualification. The other comments are of interest, but qualification of the sample results is not necessary.

Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).

1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	AK	Initials

Explanation by laboratory:

Comments: Method associations to NELAP and/or AIHA-LAP were noted. The laboratory also flagged the Oxygen result with the comment, “The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.” All laboratory case narrative comments are included in the hardcopy (or .pdf) laboratory report. All assigned laboratory flags were also reviewed during the limited validation procedure.

Data qualification, if any, related to the narrative comments and/or assigned laboratory flags contained in the analytical reports are discussed in the following sections.

2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	AK	Initials

Comments: The COC records from field to laboratory were complete. Custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Data qualification was not required.

3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	AK	Initials

Comments: All requested analyses, as designated on the supplied COC forms and supporting project documentation, were completed and reported by the laboratory.

4. Were samples received in good condition and at the appropriate temperature?	**X**	Yes		No	AK	Initials

Comments: All samples were received intact, in good condition, and at ambient temperature, consistent with QAPP requirements. Custody seals were noted as missing, however, sample canister vacuums were noted as being intact per the laboratory sample receipt form.

5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	AK	Initials

Comments: Reported methods/results met those requested on the original COC or are compliant with QAPP requested analytes.

6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Reporting limits (RLs) are achievable by the quoted methods. Some samples had to be diluted or the sample extract could not be concentrated to the routine final volume. The reporting limits were raised appropriately. **Sample results reported at concentrations ≥ the method detection limit (MDL) but < the limit of quantitation (LOQ) require J qualifiers to indicate estimated concentrations. The analyte cannot be accurately quantitated at this trace concentration level. Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).**						
7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	AK	Initials
Comments: The reported target analytes are in compliance with the constituents identified on the COC.						
8. Were sample holding times met?	**X**	Yes		No	AK	Initials
Comments: Sample preparation/extraction and analytical holding times were met for all samples and analyses reported in this SDG.						
9. Were correct concentration units reported?	**X**	Yes		No	AK	Initials
Comments: Correct concentration units were reported for all constituents.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	AK	Initials
Comments: Data validation qualifiers override any assigned laboratory data flags.						
11. Were laboratory blank samples free of target analyte contamination?	**X**	Yes		No	AK	Initials
Comments: Laboratory blank samples were free of target analyte contamination. Data qualification is not required.						
12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?	**NA**	Yes	**NA**	No	AK	Initials
Comments: No trip blank, field blank or equipment blank samples were collected for the air data evaluated in this DVR. Other than notation of this observation, no data qualification is required.						
13. Were instrument calibrations within method or data validation control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, instrument calibrations were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that instrument calibrations met acceptance criteria.						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Surrogate %Rs for organic analyses were within laboratory control-charted QC limits (as allowed for method TO-15 Modified) for all project samples and associated laboratory QC samples reported in this SDG.						
15. Were laboratory control sample recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Submitted LCS %Rs were within laboratory control-charted QC limits for target analytes reported in this SDG, as allowed for the methods specified. Data qualification is not required.						
16. Were matrix spike recoveries and % RPDs within control limits?	**NA**	Yes	**NA**	No	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Project specific MS, MSD volumes were not collected for the methods in this SDG and as such no MS/MSD evaluation was completed. Data qualification is not required.

17. Were serial dilution %Ds within control limits?	**NA**	Yes	**NA**	No	AK	Initials

Comments: *Serial Dilution %Ds: Not applicable for the methods reviewed.*

18. Were organic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials

Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.

19. Were internal standards within method criteria for GC/MS sample analyses?	**NA**	Yes	**NA**	No	AK	Initials

Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.

20. Were inorganic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials

Comments: Not applicable for the methods reviewed.

21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	AK	Initials

SDG	Primary Sample ID	Duplicate Sample ID	Sample Date
P1505308	SVE-8/12022015	SVE-DUP/12022015	02-Dec-15

Comments: Field duplicate RPDs were within data validation QC limits of ≤ 25% for air matrices, or RPDs were not applicable due to results that were within ± 2X the reporting limit or were undetected in both samples, except as noted. All field duplicate/source samples are air samples.

The following field duplicate pairs were evaluated:

Method	Unit	Analyte	RPD	RL	SVE-8/12022015	SVE-DUP/12022015	Qualifier
ASTM D1946	ppmv	Carbon Dioxide	±RL	1800/2700	2620	2700	None
ASTM D1946	ppmv	Nitrogen	0	1800/2700	777000	777000	None
ASTM D1946	ppmv	Oxygen (O2)	0	1800/2700	220000	220000	None
TO-15	ug/m3	Tetrachloroethene	10.5	18/16	3000	2700	None
TO-15	ug/m3	Trichloroethene	6.1	18/16	170	160	None

All RPDs were within QAPP-listed QC acceptance criteria and based on this data qualification is not required.

22. Were qualitative criteria for organic target analyte identification met?	**NA**	Yes	**NA**	No	AK	Initials

Comments: Not applicable for this level of limited data validation – chromatograms, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review. There were no analyte qualitative flags assigned by the laboratory.

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	AK	Initials
Comments: The EDD entries were resolved with the hardcopy data results and corrected as necessary. According to validation protocol, the hardcopy data report was accepted as the correct reference. Qualifiers and reason codes (when applicable) were added to the EDD files for all reportable data. The four EQuIS EDD files were formatted for upload once data validation secondary review was completed. Additional edits made to the EDD files by the Database Manager prior to data upload are listed below, as necessary for the reviewed SDG. Unique sys_loc_codes were assigned to all samples. Parent sample designations were made for all LCS/LCSD and field duplicate samples. A task_code field was assigned, “2015ALSAirChecks”.						
24. General Comments: The laboratory flagged the Oxygen result with the comment, “The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.” Other than notation of this comment, data qualification is not required.						

Table of Qualified Analytical Results
BNSF Mission Wye Air Samples
ALS Environmental, CA
Laboratory SDG: P1505308
December 2, 2015 Sampling

Table 2

SDG	Sample ID	Method	DF	Analyte	Conc	Unit	Qualifier	Reason Code
P1505308	SVE-3/12022015	TO-15	177	trans-1,2-Dichloroethene	36	ug/m3	J	<LOQ
P1505308	SVE-7/12022015	TO-15	30.6	trans-1,2-Dichloroethene	7.3	ug/m3	J	<LOQ

Notes:
DF = dilution factor
Conc = concentration
ug/m3 = micrograms per cubic meter
SDG = sample delivery group
Per project requirements, non-detect results will be reported at the MDL while tables are being generated. Data will be entered into the database by the data validator as presented by the laboratory with non-detects reported at the RL.

Reason Codes:
< LOQ - concentration reported is ≥ the method detection limit but is < the Limit of quantitation

Environment

Submitted to:
BNSF Railway Company
Mission Wye

Submitted by:
AECOM
Denver, CO
February 16, 2016

February 16, 2016

Organic
Limited Data Validation Report

BNSF Mission Wye
Air Samples
ALS Environmental data

January 11, 2016 Sampling

Prepared By Anne Kakai
Validation Chemist/Database Manager

Overview

The samples analyzed for the BNSF Mission Wye January 11, 2016 sampling event are listed in the Table of Samples Analyzed (page 3). Limited data validation was performed on results for one air sample, and one field duplicate sample as detailed below.

The samples were analyzed by ALS Environmental of Simi Valley, CA. Limited data validation was performed on the following analyses: Volatile Organic Compounds (VOCs) by Method TO-15 Modified and Fixed Gases by ASTM Method D1946.

The Analytical Data Validation Checklist is presented as pages 4-8 of this report. Data were evaluated based on validation criteria set forth in the June 2015 Quality Assurance Project Plan (QAPP) for the Feasibility Study Pilot Test Work Plan – Revision 2, BNSF Mission Wye, Livingston, Montana.

The following data components were reviewed during the data validation procedure.

Reviewed Deliverables/Data
Chain-of-Custody form(s) and sample integrity
Case Narratives (including any laboratory flags)
Sample results, reporting detection limits, dilution factors
Holding times
Laboratory blank results
Organic surrogate recoveries
LCS (blank spike) results
Laboratory duplicate (or spiked duplicate) results
Field duplicates
Electronic data deliverables (EDDs)

Data Validation Qualifiers Assigned During this Review

No qualifiers were assigned during this review

Overall Data Assessment

Precision, accuracy, method compliance, and completeness of the data set are determined to be acceptable for all methods reported. All submitted data are suitable for their intended use.

Table of Samples Analyzed
BNSF Mission Wye Air Samples
ALS Environmental, CA
Laboratory SDG: P1600207
January 11, 2016 Sampling

Table 1

Matrix	Sample ID	Sample Date	Sample Time	Lab SDG	Lab ID	Sample Type
AA	SVE-CEV/1112016	1/11/2016	15:55	P1600207	P1600207-001	N
AA	SVE-DUP/1112016	1/11/2016	16:00	P1600207	P1600207-002	FD

AA – Ambient Air Sample
FD – Field Duplicate of Sample SVE-CEV/1112016
ID – Identification
Lab - Laboratory
N - Normal Sample
SDG – Sample Delivery Group

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Project Name: BNSF Mission Wye	Laboratory: ALS Environmental, CA
Project Reference: Air Monitoring	Sample Matrix: Air
AECOM Project: 60436173-200	Sample Start Date: 01/11/2016
Validator/Date Validated: Anne Kakai 02/16/2016 (completed)	Sample End Date: 01/11/2016
Secondary Review by: Steve Szocik	Secondary Review Date: 02/16/2016
Samples Analyzed: Refer to the Table of Samples Analyzed (page 3).	
Parameters Validated: Volatile Organic Compounds (VOCs) by Method TO-15 Modified and Fixed Gases by ASTM Method D1946.	
Laboratory Project IDs/Sample Delivery Groups (SDGs): P1600207	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced validation criteria set forth in the QAPP. Overall field and laboratory precision is acceptable since data does not require qualification and no data is rejected based on these measurements.						
Accuracy:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: Field accuracy, a measure of the sampling bias, is generally determined by reviewing trip and/or field blank results for evidence of sample contamination stemming from sampling activities and/or sample transport/bottle contamination in applicable methods. Because trip and equipment blanks are not applicable to air samples, field accuracy was based on previous field construction blanks. Laboratory accuracy is a measure of the system bias, and is measured by evaluating laboratory control sample/laboratory control sample duplicate (LCS/LCSD), and organic system monitoring compounds (surrogate and internal standard) percent recoveries (%Rs). LCS/LCSD %Rs, which demonstrated the overall performance of the analytical procedure, were compared to QAPP limits. MS/MSD %Rs, which provide information on sample matrix interferences, would be compared to QAPP limits, EPA published QC limits or laboratory control charted limits to evaluate matrix effects upon sample analysis. MS/MSD sample volumes were not collected for the data set discussed in this DVR. System monitoring compounds or surrogate recoveries, which measure system performance and efficiency during organic analysis, are compared to QAPP limits or EPA published QC limits when applicable. Overall surrogate recoveries were acceptable indicating acceptable accuracy for the samples analyzed by the method. Laboratory accuracy was evaluated and determined to be acceptable, data does not require qualification and no data is rejected based on these measurements. Accuracy measurements are reviewed in items 12, 14, 15, and 16 below.						
Method Compliance:	**X**	Acceptable		Unacceptable	AK	Initials
Comments: For this sample set, method compliance was determined by evaluating sample integrity and holding time against method specified requirements, while applying QAPP validation guidelines. Overall method compliance is acceptable since data does not require qualification and no data is rejected based on these measurements. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20 and 22 below.						
Completeness: *Continued on next page.*	**X**	Acceptable		Unacceptable	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and reporting limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and EQuIS electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23. All of the reported data are usable, some with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.						
VALIDATION CRITERIA CHECK						
Data validation qualifiers assigned during this review: No qualifiers were assigned during this review.						
1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	AK	Initials
Explanation by laboratory: Comments: Method associations to NELAP and/or AIHA-LAP were noted. The laboratory also flagged the Oxygen result with the comment, “The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.” All laboratory case narrative comments are included in the hardcopy (or .pdf) laboratory report. All assigned laboratory flags were also reviewed during the limited validation procedure. Data qualification, if any, related to the narrative comments and/or assigned laboratory flags contained in the analytical reports are discussed in the following sections.						
2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	AK	Initials
Comments: The COC records from field to laboratory were complete. Custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. Data qualification was not required.						
3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	AK	Initials
Comments: All requested analyses, as designated on the supplied COC forms and supporting project documentation, were completed and reported by the laboratory.						
4. Were samples received in good condition and at the appropriate temperature?	**X**	Yes		No	AK	Initials
Comments: All samples were received intact, in good condition, and at ambient temperature, consistent with QAPP requirements. Custody seals were noted as missing, however, sample canister vacuums were noted as being intact per the laboratory sample receipt form.						
5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	AK	Initials
Comments: Reported methods/results met those requested on the original COC or are compliant with QAPP requested analytes.						
6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	AK	Initials
Comments: Reporting limits (RLs) are achievable by the quoted methods. Some samples had to be diluted or the sample extract could not be concentrated to the routine final volume. The reporting limits were raised appropriately. Data qualification was not required.						

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	AK	Initials
Comments: The reported target analytes are in compliance with the constituents identified on the COC.						
8. Were sample holding times met?	**X**	Yes		No	AK	Initials
Comments: Sample preparation/extraction and analytical holding times were met for all samples and analyses reported in this SDG.						
9. Were correct concentration units reported?	**X**	Yes		No	AK	Initials
Comments: Correct concentration units were reported for all constituents.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	AK	Initials
Comments: Data validation qualifiers override any assigned laboratory data flags.						
11. Were laboratory blank samples free of target analyte contamination?	**X**	Yes		No	AK	Initials
Comments: Laboratory blank samples were free of target analyte contamination. Data qualification is not required.						
12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?	**NA**	Yes	**NA**	No	AK	Initials
Comments: No trip blank, field blank or equipment blank samples were collected for the air data evaluated in this DVR. Other than notation of this observation, no data qualification is required.						
13. Were instrument calibrations within method or data validation control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, instrument calibrations were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that instrument calibrations met acceptance criteria.						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Surrogate %Rs for organic analyses were within laboratory control-charted QC limits (as allowed for method TO-15 Modified) for all project samples and associated laboratory QC samples reported in this SDG.						
15. Were laboratory control sample recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Submitted LCS %Rs were within laboratory control-charted QC limits for target analytes reported in this SDG, as allowed for the methods specified. Data qualification is not required.						
16. Were matrix spike recoveries and % RPDs within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: MS/MSD analyses were not applicable for the methods in this SDG and as such no MS/MSD evaluation was completed. Data qualification is not required.						
17. Were serial dilution %Ds within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: *Serial Dilution %Ds: Not applicable for the methods reviewed.*						

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

18. Were organic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
19. Were internal standards within method criteria for GC/MS sample analyses?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
20. Were inorganic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: Not applicable for the methods reviewed.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	AK	Initials

SDG	Primary Sample ID	Duplicate Sample ID	Sample Date
P1600207	SVE-CEV/1112016	SVE-DUP/1112016	1/11/2016

Comments: Field duplicate RPDs were within data validation QC limits of ≤ 25% for air matrices, or RPDs were not applicable due to results that were within ± 2X the reporting limit or were undetected in both samples, except as noted. All field duplicate/source samples are air samples.

The following field duplicate pairs were evaluated:

Method	Unit	Analyte	RPD	RL	SVE-CEV/1112016	SVE-DUP/1112016	Qualifier
ASTM D1946	ppmv	Carbon Dioxide	+/-RL	1600/1800	1810	1800	None
ASTM D1946	ppmv	Nitrogen	0	1600/1800	777000	777000	None
ASTM D1946	ppmv	Oxygen (O2)	0	1600/1800	221000	221000	None
TO-15	ug/m3	Tetrachloroethene	2.4	28/31	4200	4300	None
TO-15	ug/m3	Trichloroethene	2	14/16	490	500	None

All RPDs were within QAPP-listed QC acceptance criteria and based on this data qualification is not required.

22. Were qualitative criteria for organic target analyte identification met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: Not applicable for this level of limited data validation – chromatograms, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review. There were no analyte qualitative flags assigned by the laboratory.						
23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports? *Continued on next page.*	**X**	Yes		No	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: The EDD entries were resolved with the hardcopy data results and corrected as necessary. According to validation protocol, the hardcopy data report was accepted as the correct reference. Qualifiers and reason codes (when applicable) were added to the EDD files for all reportable data. The four EQuIS EDD files were formatted for upload once data validation secondary review was completed. Additional edits made to the EDD files by the Database Manager prior to data upload are listed below, as necessary for the reviewed SDG. Unique sys_loc_codes were assigned to all samples. Parent sample designations were made for all LCS/LCSD and field duplicate samples. A task_code field was assigned, “Mwye_Air_Jan112016”.
24. General Comments: The laboratory flagged the Oxygen result with the comment, “The oxygen result may include argon due to coelution. Ambient air includes 0.93% argon.” Other than notation of this comment, data qualification is not required.

Submitted to:
Exxon Mobile

Submitted by:
AECOM
Seattle, WA
March 23, 2016

Organic
Limited Data Validation Report

BNSF – Mission Wye - Livingston, Montana
Soil Vapor Samples
ALS Environmental Laboratory data
February 2016

Prepared By Lucy Panteleeff
Chemist

Overview

The samples analyzed for BNSF – Mission Wye, Livingston, Montana sampling event of February 2016 are listed in the Table of Samples Analyzed (page 2). Limited data validation was performed on a total of 3 soil vapor samples.

Samples were analyzed by the ALS Environmental laboratory located in Simi Valley CA. The reviewed analyses were fixed gases by Method ASTM D1946 and select volatile organic compounds by TO-15.

The Analytical Data Validation Checklist is presented as pages 3-7. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate Relative Percent Difference (RPD) review and applicable control limits were taken from Montana Department of Environmental Qualities' Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Holding times
Method blank results
Organic surrogate recoveries
LCS, LCSD (blank spike, blank spike duplicate) results
MS, MSD (matrix spike, matrix spike duplicate) results
Laboratory duplicate (or spiked duplicate) results
Electronic data deliverables (EDDs) – EQuIS format

Data Validation Qualifiers Assigned During this Review

No data validation qualifiers were assigned during this review.

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for all methods based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use with qualification.

Table of Samples Analyzed
BNSF – Wye Mission
Soil Vapor Samples
ALS Laboratory Report P1600816
February 2016

Matrix	Sample ID	Sample Date/Time		Laboratory ID
Soil Vapor	SVE-CEV/02122016	2/12/2016	12:50	P1600816-001
Soil Vapor	SVE-DUP/02122016	2/12/2016	13:10	P1600816-002
Soil Vapor	SVE-PHX/02122016	2/12/2016	13:30	P1600816-003

ANALYTICAL DATA VALIDATION CHECKLIST

Project Name: BNSF Wye Mission	Laboratory: ALS Environmental, Simi Valley, CA
Project Reference: February 2016 Soil Vapor Samples	Sample Matrix: Vapor samples
AECOM Project No.: 60436173.300	Sample Start Date: 2/12/2016
Validator/Date Validated: Lucy Panteleeff 3/23/16 (completed)	Sample End Date: 2/12/2016

Samples Analyzed: see Table of Samples Analyzed, BNSF Wye Mission, Vapor Samples, February 2016 (page 2).

Parameters Reviewed –
Fixed Gases by Method ASTM D1946 and
Volatile Organic Compounds (VOC) by Method TO-15.

Laboratory Project IDs/Sample Delivery Group (SDG): P1600816

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	LP	Initials

Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory control sample and field duplicate results. Evaluation of a LCS for precision was done by comparing analyte recoveries to established control limits. Evaluation a of field duplicate for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published or laboratory control charted QC limits. No data require qualification based on these measurements, and overall field and laboratory precision are acceptable. Precision measurements are reviewed in items 17 and 21.

Accuracy: (Laboratory only)	**X**	Acceptable		Unacceptable	LP	Initials

Comments: Field accuracy, a measure of the sampling bias, was not determined for this sample set since equipment rinse, field, and trip blank samples were not submitted for analysis/were not required. Laboratory accuracy is a measure of the system bias, and was measured by evaluating laboratory control sample and organic system monitoring compound (surrogate) percent recoveries (%Rs), where applicable. LCS %Rs demonstrated the overall performance of the extraction/analysis. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. The %Rs was compared to EPA published and/or laboratory control charted QC limits. No data require qualification based on these measurements, and overall laboratory accuracy is acceptable. Accuracy measurements are reviewed in items 12, 14, 15, 16, and 20.

Method Compliance:	**X**	Acceptable		Unacceptable	LP	Initials

Comments: For this data set, method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data require qualification based on these measurements and overall method compliance and are acceptable based on the data reported. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20, and 22.

ANALYTICAL DATA VALIDATION CHECKLIST

Completeness:	X	Acceptable		Unacceptable	LP	Initials
Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and detection limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23. All of the reported data are usable with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.						
VALIDATION CRITERIA CHECK						
Data validation qualifiers assigned during this review: No data required qualifiers during this review						
1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	LP	Initials
Comments: No analytical problems were identified by the laboratory in the report narrative. The laboratory noted that the report was revised to contain only the compounds of concern. Data qualification, if any, related to the laboratory comments and/or laboratory-assigned data flags are discussed in the following sections.						
2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	LP	Initials
Comments: The COC records from field to laboratory were complete and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. No discrepancies were found.						
3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	LP	Initials
Comments: All requested analyses as documented on the original COCs were completed.						
4. Were samples received in good condition and at the appropriate temperature?	**X**	Yes		No	LP	Initials
Comments: Samples were received intact and in good condition as documented on the signed and accepted COCs and Sample Acceptance Check Forms.						
5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	LP	Initials
Comments: Reported methods met those requested on the COCs or are compliant with the requested analytes and matrix.						
6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	LP	Initials
Comments: Reported detection limits are achievable by the quoted methods. Some samples were analyzed at diluted levels due to high target analyte concentrations. Reporting limits were adjusted appropriately to reflect dilution factors as needed.						
7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	LP	Initials
Comments: Only analytes applicable to the requested methods were reported.						
8. Were sample holding times met?	**X**	Yes		No	LP	Initials

ANALYTICAL DATA VALIDATION CHECKLIST

Comments: Extraction and/or analytical holding times were met for all samples and analyses.						
9. Were correct concentration units reported?	**X**	Yes		No	LP	Initials
Comments: Correct concentration units were reported. Method ASTM D1946 data was reported as ppmV and Method TO-15 data were reported as ug/m3 and ppbV.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	LP	Initials
Comments: Any laboratory-assigned flags were reviewed and evaluated during the limited validation process. Data validation qualifiers override any laboratory-assigned data flags.						
11. Were laboratory blank samples free of target analyte contamination?	**X**	Yes		No	LP	Initials
Comments: Submitted laboratory blanks were free of target analyte contamination.						
12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?		Yes		No	LP	Initials
Comments: Not applicable - Equipment rinse, field, and trip blank samples were not submitted for analysis/were not required.						
13. Were instrument calibrations within method or data validation control limits?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Instrument calibration data were not supplied in analytical laboratory reports and are therefore not included in this data review.						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: Reported surrogate %Rs were within method/laboratory QC limits for all project samples and associated QC samples.						
15. Were laboratory control sample recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: Reported LCS %Rs were within method/laboratory QC limits.						
16. Were matrix spike recoveries within control limits?		Yes		No	LP	Initials
Comments: A matrix spike was not performed in association with this sample set. Accuracy was assessed using the LCS results.						
17. Were duplicate RPDs and/or serial dilution %Ds within control limits?		Yes		No	LP	Initials
Comments: A laboratory duplicate was not performed in association with this sample set.						
18. Were organic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Organic system performance data were not supplied in analytical laboratory reports and are therefore not included in this data review.						
19. Were internal standards within method criteria for GC/MS sample analyses?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – GC/MS internal standard data were not supplied in analytical laboratory reports and are therefore not included in this data review.						

ANALYTICAL DATA VALIDATION CHECKLIST

20. Were inorganic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation or for the reported methods.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	LP	Initials
Duplicate Sample No.	SVE-DUP/02122016	Primary Sample No.	SVE-CEV/02122016			

Comments: Field duplicate RPDs were within data validation QC limits of 0-25% for aqueous matrices, or RPDs were not applicable due to results that were undetected in one or both samples.

The following RPDs were calculated:

Method	Units	Analyte	SVE-CEV/02122016	SVE-DUP/02122016	RPD	Qualifiers
ASTMD1946	ppmV	Oxygen	220,000	220,000	0.0	none
ASTMD1946	ppmV	Nitrogen	778,000	778,000	0.0	none
TO-15	µg/m3	trans-1,2-Dichloroethene	2.7	2.7	0.0	none
TO-15	µg/m3	Trichloroethene	160	180	12	none
TO-15	µg/m3	Tetrachloroethene	710	760	6.8	none

22. Were qualitative criteria for organic target analyte identification met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Chromatographs, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review.						
23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	LP	Initials

Comments: During the limited validation procedure, 100% of the positive sample concentrations and 100% of the LOQ/RLs for project samples were compared to hardcopy laboratory reports. No discrepancies were noted.

The data validator made sure that LOQ/RLs and MDLs (EDDs only) were entered into the correct EDD fields, and that correct method references were noted.

The AECOM project manager was informed of all changes made to the EDD files via this Checklist. The EDD files, with any corrections made, were imported into the EQuIS project database by the data validator on 2/2/2015.

24. General Comments: Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate Relative Percent Difference (RPD) review and applicable control limits were taken from the *EPA New England Environmental Data Review Supplement For Regional Data Review Elements and Superfund Specific Guidance/Procedures April 22, 2013,* document number EQADR-Supplement 0.

Submitted to:
BNSF

Submitted by:
AECOM
Seattle, WA
April 26, 2016

Organic
Limited Data Validation Report

BNSF – Mission Wye - Livingston, Montana
Soil Vapor Extraction Samples
ALS Environmental Laboratory data
March 2016

Prepared By Lucy Panteleeff
Chemist

Overview

The samples analyzed for BNSF – Mission Wye, Livingston, Montana 2nd Quarter Soil Vapor Extraction (SVE) sampling event (March 2016) are listed in the Table of Samples Analyzed (page 2). Limited data validation was performed on a total of 11 soil vapor samples.

Samples were analyzed by the ALS Environmental laboratory located in Simi Valley California. The reviewed analyses were fixed gases by Method ASTM D1946 and select volatile organic compounds by TO-15.

The Analytical Data Validation Checklist is presented as pages 3-7. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate relative percent difference (RPD) review and applicable control limits were taken from Montana Department of Environmental Qualities' Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Holding times
Method blank results
Organic surrogate recoveries
LCS, LCSD (blank spike, blank spike duplicate) results
MS, MSD (matrix spike, matrix spike duplicate) results
Laboratory duplicate (or spiked duplicate) results
Electronic data deliverables (EDDs) – EQuIS format

Data Validation Qualifiers Assigned During this Review

J Estimated concentration

Assigned qualifiers are detailed in the Analytical Data Validation Checklist and are summarized in the Table of Qualified Analytical Results (page 8).

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for all methods based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use with qualification.

Table of Samples Analyzed
BNSF – Wye Mission
2nd Quarter Soil Vapor Samples
ALS Laboratory Report P1601476
March 2016

Matrix	Sample ID	Sample Date/Time		Laboratory ID
Soil Vapor	SVE-1/03152016	3/15/2016	12:48	P1601476-001
Soil Vapor	SVE-2/03152016	3/15/2016	12:55	P1601476-002
Soil Vapor	SVE-3/03152016	3/15/2016	13:00	P1601476-003
Soil Vapor	SVE-4/03152016	3/15/2016	13:08	P1601476-004
Soil Vapor	SVE-5/03152016	3/15/2016	13:15	P1601476-005
Soil Vapor	SVE-6/03152016	3/15/2016	13:20	P1601476-006
Soil Vapor	SVE-7/03152016	3/15/2016	13:25	P1601476-007
Soil Vapor	SVE-8/03152016	3/15/2016	13:30	P1601476-008
Soil Vapor	SVE-CEV/03152016	3/15/2016	12:35	P1601476-009
Soil Vapor	SVE-EV/03152016	3/15/2016	12:15	P1601476-010
Soil Vapor	SVE-DUP/03152016 (Duplicate of SVE-CEV/03152016)	3/15/2016	12:00	P1601476-011

The sample date suffixes (/03152016) are included in this table for completeness, but will not be used in the discussions below.

ANALYTICAL DATA VALIDATION CHECKLIST

Project Name: BNSF Wye Mission	Laboratory: ALS Environmental, Simi Valley, California
Project Reference: 2nd Quarter March 2016 Soil Vapor Extraction Samples	Sample Matrix: Vapor samples
AECOM Project No.: 60436173.300	Sample Start Date: 3/15/2016
Validator/Date Validated: Lucy Panteleeff 4/26/16 (completed)	Sample End Date: 3/15/2016
Samples Analyzed: see Table of Samples Analyzed, BNSF Wye Mission, Soil Vapor Extraction Samples, March 2016 (page 2).	
Parameters Reviewed – Fixed Gases by Method ASTM D1946 Volatile Organic Compounds (VOC) by Method TO-15	
Laboratory Project IDs/Sample Delivery Group (SDG): P1601476	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	LP	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation a of field and laboratory duplicates for precision was done using the relative percent difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published or laboratory control charted QC limits. No data require qualification based on these measurements, and overall field and laboratory precision are acceptable. Precision measurements are reviewed in items 17 and 21.						
Accuracy: (Laboratory only)	**X**	Acceptable		Unacceptable	LP	Initials
Comments: Field accuracy, a measure of the sampling bias, was not determined for this sample set since equipment rinse, field, and trip blank samples were not submitted for analysis/were not required. Laboratory accuracy is a measure of the system bias, and was measured by evaluating laboratory control sample and organic system monitoring compound (surrogate) percent recoveries (%Rs), where applicable. LCS %Rs demonstrated the overall performance of the extraction/analysis. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. The %Rs was compared to EPA published and/or laboratory control charted QC limits. No data require qualification based on these measurements, and overall laboratory accuracy is acceptable. Accuracy measurements are reviewed in items 12, 14, 15, 16, and 20.						
Method Compliance:	**X**	Acceptable		Unacceptable	LP	Initials
Comments: For this data set, method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data require qualification based on these measurements and overall method compliance and are acceptable based on the data reported. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20, and 22.						

ANALYTICAL DATA VALIDATION CHECKLIST

Completeness:	X	Acceptable		Unacceptable	LP	Initials
Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and detection limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23. All of the reported data are usable with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.						
VALIDATION CRITERIA CHECK						
Data validation qualifiers assigned during this review: J Estimated concentration The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary. Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 8).						
1. Did the laboratory identify any non-conformances related to the analytical results?		Yes	**X**	No	LP	Initials
Comments: No analytical problems were identified by the laboratory in the report cover letter. Data qualification, if any, related to the laboratory comments and/or laboratory-assigned data flags are discussed in the following sections.						
2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	LP	Initials
Comments: The COC records from field to laboratory were complete and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. No discrepancies were found.						
3. Were all the analyses requested for the samples on the COC completed by the laboratory?	**X**	Yes		No	LP	Initials
Comments: All requested analyses as documented on the original COCs were completed.						
4. Were samples received in good condition and at the appropriate temperature?	**X**	Yes		No	LP	Initials
Comments: Samples were received in good condition as documented on the signed and accepted COC and Sample Acceptance Check Form.						
5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	LP	Initials
Comments: Reported methods met those requested on the COC or are compliant with the requested analytes and matrix.						

ANALYTICAL DATA VALIDATION CHECKLIST

6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	LP	Initials
Comments: Reported detection limits are achievable by the quoted methods. Some samples were analyzed at diluted levels due to canister pressurization. Reporting limits were adjusted appropriately to reflect dilution factors as needed. <u>VOCs by EPA Method TO-15</u> **The result for trans-1,2-dichloroethene in SVE-3 was reported by the laboratory at a concentration between the method detection limit (MDL) and the reporting limit and qualified by the laboratory with a 'J' flag. Laboratory 'J'-flagged results are considered estimated results. The analyte cannot be accurately quantitated at this trace concentration level.**						
7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	LP	Initials
Comments: Only analytes applicable to the requested methods were reported.						
8. Were sample holding times met?	**X**	Yes		No	LP	Initials
Comments: Analytical holding times were met for all samples and analyses.						
9. Were correct concentration units reported?	**X**	Yes		No	LP	Initials
Comments: Correct concentration units were reported. Method ASTM D1946 data was reported as ppmV and Method TO-15 data were reported as ug/m3 and ppbV. No action is required other than to alert the data user to these varying units of measure.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	LP	Initials
Comments: Any laboratory-assigned flags were reviewed and evaluated during the limited validation process. Data validation qualifiers override any laboratory-assigned data flags.						
11. Were laboratory blank samples free of target analyte contamination?	**X**	Yes		No	LP	Initials
Comments: Laboratory blanks were free of target analyte contamination.						
12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?		Yes		No	LP	Initials
Comments: Not applicable - Equipment rinse, field, and trip blank samples were not submitted for analysis/were not required.						
13. Were instrument calibrations within method or data validation control limits?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Instrument calibration data were not supplied in analytical laboratory reports and are therefore not included in this data review.						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: Reported surrogate %Rs were within method/laboratory QC limits for all project samples and associated QC samples, where applicable.						
15. Were laboratory control sample recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: Reported LCS %Rs were within method/laboratory QC limits.						

ANALYTICAL DATA VALIDATION CHECKLIST

16. Were matrix spike recoveries within control limits?		Yes		No	LP	Initials
Comments: Matrix spikes were not performed in association with these analyses. Accuracy was assessed using the LCS results.						
17. Were duplicate RPDs and/or serial dilution %Ds within control limits?	**X**	Yes		No	LP	Initials
Comments: Laboratory duplicates were within method/laboratory QC limits, where applicable.						
18. Were organic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Organic system performance data were not supplied in analytical laboratory reports and are therefore not included in this data review.						
19. Were internal standards within method criteria for GC/MS sample analyses?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – GC/MS internal standard data were not supplied in analytical laboratory reports and are therefore not included in this data review.						
20. Were inorganic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation or for the reported methods.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	LP	Initials
Duplicate Sample ID.	SVE-DUP	Primary Sample ID.	SVE-CEV			

Comments: Field duplicate RPDs were within data validation QC limits of 0-25% for air matrices, or RPDs were not applicable due to results that were not detected in one or both samples or for results that were less than 5 times the reporting limits except trichloroethene as shown below.

The following RPDs were calculated:

Method	Units	Analyte	SVE-CEV/03152016	SVE-DUP/03152016	RPD	Qualifiers
ASTMD1946	ppmV	Oxygen	221,000	221,000	0.0	none
ASTMD1946	ppmV	Nitrogen	778,000	778,000	0.0	none
TO-15	µg/m3	Trichloroethene	290	390	29%	J
TO-15	µg/m3	Tetrachloroethene	2,900	31,00	6.7%	none

The results for trichloroethene in the field duplicate and the primary sample were qualified as estimated and flagged 'J' based on this field duplicate RPD.

22. Were qualitative criteria for organic target analyte identification met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Chromatographs, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review.						

ANALYTICAL DATA VALIDATION CHECKLIST

23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	LP	Initials
Comments: During the limited validation procedure, 100% of the positive sample concentrations and 100% of the LOQ/RLs for project samples were compared to hardcopy laboratory reports. No discrepancies were noted. The data validator made sure that LOQ/RLs and MDLs (EDDs only) were entered into the correct EDD fields, and that correct method references were noted. The AECOM project manager was informed of all changes made to the EDD files via this Checklist. The EDD files, with any corrections made, were imported into the EQuIS project database by the data validator on 4/26/16.						
24. General Comments: Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate relative percent difference (RPD) review and applicable control limits were taken from the *EPA New England Environmental Data Review Supplement For Regional Data Review Elements and Superfund Specific Guidance/Procedures April 22, 2013,* document number EQADR-Supplement 0.						

Table of Qualified Analytical Results
BNSF - Mission Wye
2nd Quarter Soil Vapor Extraction Monitoring - March 2016
ALS Laboratory Group P1601476

SDG	Sample ID	ALS ID	Method	Analyte	Laboratory Result	Units	Final Result	Reason Code
P1601476	SVE-CVE/03152016	P1601476-009	TO-15	Trichloroethene	770	ug//m3	770 J	fd
P1601476	SVE-DUP/03152016	P1601476-0011	TO-15	Trichloroethene	390	ug//m3	390 J	fd

fd - field duplicate outlier

Submitted to:
BNSF

Submitted by:
AECOM
Seattle, WA
May 17, 2016

Organic
Limited Data Validation Report

BNSF – Mission Wye - Livingston, Montana
Monthly Soil Vapor Extraction Samples
ALS Environmental Laboratory data
April 2016

Prepared By Lucy Panteleeff
Chemist

Overview

The samples analyzed for BNSF – Mission Wye, Livingston, Montana monthly Soil Vapor Extraction (SVE) sampling event (April 2016) are listed in the Table of Samples Analyzed (page 2). Limited data validation was performed on a total of 3 soil vapor samples.

Samples were analyzed by the ALS Environmental laboratory located in Simi Valley, California. The reviewed analyses were fixed gases by Method ASTM D 1946 and select volatile organic compounds by TO-15.

The Analytical Data Validation Checklist is presented as pages 3-7. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate Relative Percent Difference (RPD) reviews and applicable control limits were taken from Montana Department of Environmental Qualities' Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Holding times
Method blank results
Organic surrogate recoveries
LCS (blank spike) results
Field duplicate results
Electronic data deliverables (EDDs) – EQuIS format

Data Validation Qualifiers Assigned During this Review

No data validation qualifiers were assigned during this review.

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for all methods based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use without qualification.

Table of Samples Analyzed
BNSF – Wye Mission
Monthly Soil Vapor Samples
ALS Laboratory Report P1602261
April 2016

Matrix	Sample ID	Sample Date/Time		Laboratory ID
Soil Vapor	SVE-DUP/04262016	4/26/2016	11:00	P1602261-001
Soil Vapor	SVE-CEV/04262016	4/26/2016	11:17	P1602261-002
Soil Vapor	SVE-PHX/04262016	4/26/2016	11:29	P1602261-003

The sample date suffixes (/04262016) are included in this table for completeness, but will not be used in the discussions below.

ANALYTICAL DATA VALIDATION CHECKLIST

Project Name: BNSF Wye Mission	Laboratory: ALS Environmental, Simi Valley, California
Project Reference: Monthly Soil Vapor Extraction Samples, April 2016	Sample Matrix: Vapor samples
AECOM Project No.: 60436173.300	Sample Start Date: 4/26/2016
Validator/Date Validated: Lucy Panteleeff 5/17/2016 (completed)	Sample End Date: 4/26/2016
Samples Analyzed: see Table of Samples Analyzed, BNSF Wye Mission, Vapor Extraction Samples, April 2016 (page 2).	
Parameters Reviewed – Fixed Gases by Method ASTM D 1946 Volatile Organic Compounds (VOC) by Method TO-15	
Laboratory Project IDs/Sample Delivery Group (SDG): P1602261	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	LP	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory control sample and field duplicate results. Evaluation of a LCS for precision was done by comparing analyte recoveries to established control limits. Evaluation of a field duplicate for precision was done by evaluating the relative percent difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published or laboratory control charted QC limits. No data require qualification based on these measurements, and overall field and laboratory precision are acceptable. Precision measurements are reviewed in items 17 and 21.						
Accuracy: (Laboratory only)	**X**	Acceptable		Unacceptable	LP	Initials
Comments: Field accuracy, a measure of the sampling bias, was not determined for this sample set since equipment rinse, field, and trip blank samples were not submitted for analysis/were not required. Laboratory accuracy is a measure of the system bias, and was measured by evaluating laboratory control sample and organic system monitoring compound (surrogate) percent recoveries (%Rs), where applicable. LCS %Rs demonstrated the overall performance of the extraction/analysis. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. The %Rs were compared to EPA published and/or laboratory control charted QC limits. No data require qualification based on these measurements, and overall laboratory accuracy is acceptable. Accuracy measurements are reviewed in items 12, 14, 15, 16, and 20.						
Method Compliance:	**X**	Acceptable		Unacceptable	LP	Initials
Comments: For this data set, method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data require qualification based on these measurements and overall method compliance and are acceptable based on the data reported. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20, and 22.						

ANALYTICAL DATA VALIDATION CHECKLIST

Completeness:	X	Acceptable		Unacceptable	LP	Initials
Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and detection limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23. All of the reported data are usable without qualification. Since no data are missing or rejected, completeness of the data set is calculated to be 100% and is acceptable.						
VALIDATION CRITERIA CHECK						
Data validation qualifiers assigned during this review: No data required qualifiers during this review.						
1. Did the laboratory identify any non-conformances related to the analytical results?	X	Yes		No	LP	Initials
Comments: No analytical problems were identified by the laboratory in the report narrative. Data qualification, if any, related to the laboratory comments and/or laboratory-assigned data flags are discussed in the following sections.						
2. Were sample Chain-of-Custody forms complete?	X	Yes		No	LP	Initials
Comments: The COC records from field to laboratory were complete and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. No discrepancies were found.						
3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	X	Yes		No	LP	Initials
Comments: All requested analyses as documented on the original COCs were completed.						
4. Were samples received in good condition and at the appropriate temperature?	X	Yes		No	LP	Initials
Comments: Samples were received intact and in good condition as documented on the signed and accepted COCs and Sample Acceptance Check Forms.						
5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	X	Yes		No	LP	Initials
Comments: Reported methods met those requested on the COCs or are compliant with the requested analytes and matrix.						
6. Were detection limits in accordance with WP/QAPP, permit, or method?	X	Yes		No	LP	Initials
Comments: Reported detection limits are achievable by the quoted methods. Some samples were analyzed at diluted levels due to high target analyte concentrations. Reporting limits were adjusted appropriately to reflect dilution factors as needed.						
7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	X	Yes		No	LP	Initials
Comments: Only analytes applicable to the requested methods were reported.						
8. Were sample holding times met?	X	Yes		No	LP	Initials
Comments: Extraction and/or analytical holding times were met for all samples and analyses.						

ANALYTICAL DATA VALIDATION CHECKLIST

9. Were correct concentration units reported?	**X**	Yes		No	LP	Initials
Comments: Correct concentration units were reported. Method ASTM D1946 data was reported as ppmV and Method TO-15 data were reported as ug/m3 and ppbV.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	LP	Initials
Comments: Any laboratory-assigned flags were reviewed and evaluated during the limited validation process. Data validation qualifiers override any laboratory-assigned data flags, where applicable.						
11. Were laboratory blank samples free of target analyte contamination?	**X**	Yes		No	LP	Initials
Comments: Submitted laboratory blanks were free of target analyte contamination.						
12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?		Yes		No	LP	Initials
Comments: Not applicable - Equipment rinse, field, and trip blank samples were not submitted for analysis/were not required.						
13. Were instrument calibrations within method or data validation control limits?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Instrument calibration data were not supplied in analytical laboratory reports and are therefore not included in this data review.						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: Reported surrogate %Rs were within method/laboratory QC limits for all project samples and associated QC samples.						
15. Were laboratory control sample recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: Reported LCS %Rs were within method/laboratory QC limits.						
16. Were matrix spike recoveries within control limits?		Yes		No	LP	Initials
Comments: Not applicable - A matrix spike was not performed in association with this sample set. Accuracy was assessed using the LCS results.						
17. Were duplicate RPDs and/or serial dilution %Ds within control limits?		Yes		No	LP	Initials
Comments: Not applicable - A laboratory duplicate was not performed in association with this sample set. Precision was assessed using the field duplicate RPDs (Section 21).						
18. Were organic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Organic system performance data were not supplied in analytical laboratory reports and are therefore not included in this data review.						
19. Were internal standards within method criteria for GC/MS sample analyses?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – GC/MS internal standard data were not supplied in analytical laboratory reports and are therefore not included in this data review.						

ANALYTICAL DATA VALIDATION CHECKLIST

20. Were inorganic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation or for the reported methods.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	LP	Initials
Duplicate Sample No.	SVE-DUP/04262016	Primary Sample No.	SVE-CEV/04262016			
Comments: Field duplicate RPDs were within data validation QC limits of 0-25% for soil vapor (air) matrices, or RPDs were not applicable due to results that were reported as not detected in one or both samples or for results that were less than 5 times the reporting limits.						
22. Were qualitative criteria for organic target analyte identification met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Chromatographs, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review.						
23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	LP	Initials
Comments: During the limited validation procedure, 100% of the positive sample concentrations and 100% of the LOQ/RLs for project samples were compared to hardcopy laboratory reports. No discrepancies were noted. The data validator made sure that LOQ/RLs and MDLs (EDDs only) were entered into the correct EDD fields, and that correct method references were noted. The AECOM project manager was informed of all changes made to the EDD files via this Checklist. The EDD files, with any corrections made, were imported into the EQuIS project database by the data validator on 6/3/2016.						
24. General Comments: Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate Relative Percent Difference (RPD) review and applicable control limits were taken from Field duplicate Relative Percent Difference (RPD) review and applicable control limits were taken from Montana Department of Environmental Qualities' Data Evaluation Guidelines (MDEQ 2010).						

Submitted to:
BNSF

Submitted by:
AECOM
Seattle, WA
June 20, 2016

Organic
Limited Data Validation Report

BNSF – Mission Wye - Livingston, Montana
Monthly Soil Vapor Extraction Samples
ALS Environmental Laboratory data
May 2016

Prepared By Lucy Panteleeff
Chemist

Overview

The samples analyzed for BNSF – Mission Wye, Livingston, Montana monthly Soil Vapor Extraction (SVE) sampling event (May 2016) are listed in the Table of Samples Analyzed (page 2). Limited data validation was performed on a total of 2 soil vapor samples.

Samples were analyzed by the ALS Environmental laboratory located in Simi Valley, California. The reviewed analyses were fixed gases by Method ASTM D 1946 and select volatile organic compounds by TO-15.

The Analytical Data Validation Checklist is presented as pages 3-7. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate Relative Percent Difference (RPD) reviews and applicable control limits were taken from Montana Department of Environmental Quality's Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Holding times
Method blank results
Organic surrogate recoveries
LCS (blank spike) results
Field duplicate results
Electronic data deliverables (EDDs) – EQuIS format

Data Validation Qualifiers Assigned During this Review

No data validation qualifiers were assigned during this review.

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for all methods based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use without qualification.

Table of Samples Analyzed
BNSF – Wye Mission
Monthly Soil Vapor Samples
ALS Laboratory Report P1602261
April 2016

Matrix	Sample ID	Sample Date/Time		Laboratory ID
Soil Vapor	SVE-CEV05262016	5/26/2016	16:04	P1602804-001
Soil Vapor	SVE-DUP05262016	5/26/2016	16:12	P1602804-002

The sample date suffixes (05262016) are included in this table for completeness, but will not be used in the discussions below.

ANALYTICAL DATA VALIDATION CHECKLIST

Project Name: BNSF Wye Mission	Laboratory: ALS Environmental, Simi Valley, California
Project Reference: Monthly Soil Vapor Extraction Samples, May 2016	Sample Matrix: Vapor samples
AECOM Project No.: 60436173.300	Sample Start Date: 5/26/2016
Validator/Date Validated: Lucy Panteleeff 6/20/2016 (completed)	Sample End Date: 5/26/2016
Samples Analyzed: see Table of Samples Analyzed, BNSF Wye Mission, Vapor Extraction Samples, May 2016 (page 2).	
Parameters Reviewed: Fixed Gases by Method ASTM D 1946 Volatile Organic Compounds (VOC) by Method TO-15	
Laboratory Project IDs/Sample Delivery Group (SDG): P1602804	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	LP	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory control sample and field duplicate results. Evaluation of a LCS for precision was done by comparing analyte recoveries to established control limits. Evaluation of a field duplicate for precision was done by evaluating the relative percent difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published or laboratory control charted QC limits. No data require qualification based on these measurements, and overall field and laboratory precision are acceptable. Precision measurements are reviewed in items 17 and 21.						
Accuracy: (Laboratory only)	**X**	Acceptable		Unacceptable	LP	Initials
Comments: Field accuracy, a measure of the sampling bias, was not determined for this sample set since equipment rinse, field, and trip blank samples were not submitted for analysis/were not required. Laboratory accuracy is a measure of the system bias, and was measured by evaluating laboratory control sample and organic system monitoring compound (surrogate) percent recoveries (%Rs), where applicable. LCS %Rs demonstrated the overall performance of the extraction/analysis. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. The %Rs were compared to EPA published and/or laboratory control charted QC limits. No data require qualification based on these measurements, and overall laboratory accuracy is acceptable. Accuracy measurements are reviewed in items 12, 14, 15, 16, and 20.						
Method Compliance:	**X**	Acceptable		Unacceptable	LP	Initials
Comments: For this data set, method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data require qualification based on these measurements and overall method compliance and are acceptable based on the data reported. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20, and 22.						

ANALYTICAL DATA VALIDATION CHECKLIST

Completeness:	X	Acceptable		Unacceptable	LP	Initials
Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and detection limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23. All of the reported data are usable without qualification. Since no data are missing or rejected, completeness of the data set is calculated to be 100% and is acceptable.						
VALIDATION CRITERIA CHECK						
Data validation qualifiers assigned during this review: No data required qualifiers during this review.						
1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	LP	Initials
Comments: No analytical problems were identified by the laboratory in the report narrative. Data qualification, if any, related to the laboratory comments and/or laboratory-assigned data flags are discussed in the following sections.						
2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	LP	Initials
Comments: The COC records from field to laboratory were complete and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. No discrepancies were found.						
3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	LP	Initials
Comments: All requested analyses as documented on the original COCs were completed.						
4. Were samples received in good condition and at the appropriate temperature?	**X**	Yes		No	LP	Initials
Comments: Samples were received intact and in good condition as documented on the signed and accepted COCs and Sample Acceptance Check Forms.						
5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	LP	Initials
Comments: Reported methods met those requested on the COCs or are compliant with the requested analytes and matrix.						
6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	LP	Initials
Comments: Reported detection limits are achievable by the quoted methods. Some samples were analyzed at diluted levels due to high target analyte concentrations. Reporting limits were adjusted appropriately to reflect dilution factors and/or canister pressurization as needed.						
7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	LP	Initials
Comments: Only analytes applicable to the requested methods were reported.						
8. Were sample holding times met?	**X**	Yes		No	LP	Initials
Comments: Extraction and/or analytical holding times were met for all samples and analyses.						

ANALYTICAL DATA VALIDATION CHECKLIST

9. Were correct concentration units reported?	**X**	Yes		No	LP	Initials
Comments: Correct concentration units were reported. Method ASTM D1946 data was reported as ppmV and Method TO-15 data were reported as ug/m3 and ppbV.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	LP	Initials
Comments: Any laboratory-assigned flags were reviewed and evaluated during the limited validation process. Data validation qualifiers override any laboratory-assigned data flags, where applicable.						
11. Were laboratory blank samples free of target analyte contamination?	**X**	Yes		No	LP	Initials
Comments: Submitted laboratory blanks were free of target analyte contamination.						
12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?		Yes		No	LP	Initials
Comments: Not applicable - Equipment rinse, field, and trip blank samples were not submitted for analysis/were not required.						
13. Were instrument calibrations within method or data validation control limits?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Instrument calibration data were not supplied in analytical laboratory reports and are therefore not included in this data review.						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: Reported surrogate %Rs were within method/laboratory QC limits for all project samples and associated QC samples.						
15. Were laboratory control sample recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: Reported LCS %Rs were within method/laboratory QC limits.						
16. Were matrix spike recoveries within control limits?		Yes		No	LP	Initials
Comments: Not applicable - A matrix spike was not performed in association with this sample set. Accuracy was assessed using the LCS results.						
17. Were duplicate RPDs and/or serial dilution %Ds within control limits?		Yes		No	LP	Initials
Comments: Not applicable - A laboratory duplicate was not performed in association with this sample set. Precision was assessed using the field duplicate RPDs (Section 21).						
18. Were organic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Organic system performance data were not supplied in analytical laboratory reports and are therefore not included in this data review.						
19. Were internal standards within method criteria for GC/MS sample analyses?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – GC/MS internal standard data were not supplied in analytical laboratory reports and are therefore not included in this data review.						

ANALYTICAL DATA VALIDATION CHECKLIST

20. Were inorganic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation or for the reported methods.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	LP	Initials
Duplicate Sample No.	SVE-DUP05262016	Primary Sample No.	SVE-CEV05262016			
Comments: Field duplicate RPDs were within data validation QC limits of 0-25% for soil vapor (air) matrices, or RPDs were not applicable due to results that were reported as not detected in one or both samples or for results that were less than 5 times the reporting limits.						
22. Were qualitative criteria for organic target analyte identification met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Chromatographs, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review.						
23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	LP	Initials
Comments: During the limited validation procedure, 100% of the positive sample concentrations and 100% of the LOQ/RLs for project samples were compared to hardcopy laboratory reports. No discrepancies were noted. The data validator made sure that LOQ/RLs and MDLs (EDDs only) were entered into the correct EDD fields, and that correct method references were noted. The AECOM project manager was informed of all changes made to the EDD files via this Checklist. The EDD files, with any corrections made, were imported into the EQuIS project database by the data validator on 6/24/2016.						
24. General Comments: Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate Relative Percent Difference (RPD) review and applicable control limits were taken from Field duplicate Relative Percent Difference (RPD) review and applicable control limits were taken from Montana Department of Environmental Qualities' Data Evaluation Guidelines (MDEQ 2010).						

Submitted to:
BNSF

Submitted by:
AECOM
Seattle, WA
August 4, 2016

Organic
Limited Data Validation Report

BNSF – Mission Wye - Livingston, Montana
Soil Vapor Extraction Samples
ALS Environmental Laboratory data
June 2016

Prepared By Lucy Panteleeff
Chemist

Overview

The samples analyzed for BNSF – Mission Wye, Livingston, Montana 3rd Quarter Soil Vapor Extraction (SVE) sampling event (June 2016) are listed in the Table of Samples Analyzed (page 2). Limited data validation was performed on a total of 11 soil vapor samples.

Samples were analyzed by the ALS Environmental laboratory located in Simi Valley California. The reviewed analyses were fixed gases by Method ASTM D1946 and select volatile organic compounds by TO-15.

The Analytical Data Validation Checklist is presented as pages 3-7. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate relative percent difference (RPD) review and applicable control limits were taken from Montana Department of Environmental Qualities' Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Holding times
Method blank results
Organic surrogate recoveries (where applicable)
LCS (blank spike) results
Laboratory duplicate (or spiked duplicate) results and/or field duplicate results
Electronic data deliverables (EDDs) – EQuIS format

Data Validation Qualifiers Assigned During this Review

No data validation qualifiers were assigned during this review.

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for all methods based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use without qualification.

Table of Samples Analyzed
BNSF – Wye Mission
3rd Quarter Soil Vapor Samples
ALS Laboratory Report P1603415
June 2016

Matrix	Sample ID	Sample Date/Time		Laboratory ID
Soil Vapor	SVE-1/06302016	6/30/2016	11:42	P1603415-001
Soil Vapor	SVE-2/06302016	6/30/2016	11:49	P1603415-002
Soil Vapor	SVE-3/06302016	6/30/2016	13:34	P1603415-003
Soil Vapor	SVE-4/06302016	6/30/2016	13:39	P1603415-004
Soil Vapor	SVE-5/06302016	6/30/2016	13:46	P1603415-005
Soil Vapor	SVE-6/06302016	6/30/2016	14:12	P1603415-006
Soil Vapor	SVE-7/06302016	6/30/2016	14:26	P1603415-007
Soil Vapor	SVE-8/06302016	6/30/2016	14:31	P1603415-008
Soil Vapor	SVE-EV/06302016	6/30/2016	15:05	P1603415-009
Soil Vapor	SVE-CEV/06302016	6/30/2016	14:44	P1603415-010
Soil Vapor	SVE-DUP/06302016 (Duplicate of SVE-CEV/06302016)	6/30/2016	14:46	P1603415-011

The sample date suffixes (/06302016) are included in this table for completeness, but will not be used in the discussions below.

ANALYTICAL DATA VALIDATION CHECKLIST

Project Name: BNSF Wye Mission	Laboratory: ALS Environmental, Simi Valley, California
Project Reference: 3rd Quarter June 2016 Soil Vapor Extraction Samples	Sample Matrix: Soil vapor samples
AECOM Project No.: 60436173.300	Sample Start Date: 6/30/2016
Validator/Date Validated: Lucy Panteleeff 8/1/16 Peer Reviewer/Date Reviewed: Jennifer B. Garner 8/1/16 (completed)	Sample End Date: 6/30/2016
Samples Analyzed: see Table of Samples Analyzed, BNSF-Wye Mission, 3rd Quarter Soil Vapor Samples, ALS Laboratory Report P1603415, June 2016 (page 2).	
Parameters Reviewed: Fixed Gases by Method ASTM D1946 Volatile Organic Compounds (VOC) by Method TO-15	
Laboratory Project IDs/Sample Delivery Group (SDG): P1603415	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	LP	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of field and laboratory duplicates for precision was done using the relative percent difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published or laboratory control charted QC limits. No data require qualification based on these measurements, and overall field and laboratory precision are acceptable. Precision measurements are reviewed in items 17 and 21.						
Accuracy: (Laboratory only)	**X**	Acceptable		Unacceptable	LP	Initials
Comments: Field accuracy, a measure of the sampling bias, was not determined for this sample set since equipment rinse, field, and trip blank samples were not submitted for analysis/were not required. Laboratory accuracy is a measure of the system bias, and was measured by evaluating laboratory control sample and organic system monitoring compound (surrogate) percent recoveries (%Rs), where applicable. LCS %Rs demonstrated the overall performance of the extraction/analysis. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. The %Rs were compared to EPA published and/or laboratory control charted QC limits. No data require qualification based on these measurements, and overall laboratory accuracy is acceptable. Accuracy measurements are reviewed in items 12, 14, 15, 16, and 20.						
Method Compliance:	**X**	Acceptable		Unacceptable	LP	Initials
Comments: For this data set, method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. No data require qualification based on these measurements and overall method compliance and are acceptable based on the data reported. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20, and 22.						

ANALYTICAL DATA VALIDATION CHECKLIST

Completeness:	X	Acceptable		Unacceptable	LP	Initials
Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and detection limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23. All of the reported data are usable without qualification. Since no data are missing or rejected, completeness of the data set is calculated to be 100% and is acceptable.						
VALIDATION CRITERIA CHECK						
Data validation qualifiers assigned during this review: No data validation qualifiers were assigned during this review. Comments in *italics* are not applicable to this level of limited validation.						
1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	LP	Initials
Comments: No analytical problems were identified by the laboratory in the report cover letter. Data qualification, if any, related to the laboratory comments and/or laboratory-assigned data flags are discussed in the following sections.						
2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	LP	Initials
Comments: The COC records from field to laboratory were complete and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. No discrepancies were found.						
3. Were all the analyses requested for the samples on the COC completed by the laboratory?	**X**	Yes		No	LP	Initials
Comments: All requested analyses as documented on the original COCs were completed.						
4. Were samples received in good condition and at the appropriate temperature?	**X**	Yes		No	LP	Initials
Comments: Samples were received in good condition as documented on the signed and accepted COC and Sample Acceptance Check Form.						
5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	LP	Initials
Comments: Reported methods met those requested on the COC and are compliant with the requested analytes and matrix.						
6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	LP	Initials
Comments: Reported detection limits are achievable by the quoted methods. Some samples were analyzed at diluted levels due to canister pressurization. Reporting limits were adjusted appropriately to reflect dilution factors as needed.						
7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	LP	Initials
Comments: Only analytes applicable to the requested methods were reported.						
8. Were sample holding times met?	**X**	Yes		No	LP	Initials
Comments: Analytical holding times were met for all samples and analyses.						

ANALYTICAL DATA VALIDATION CHECKLIST

9. Were correct concentration units reported?	**X**	Yes		No	LP	Initials
Comments: Correct concentration units were reported. Method ASTM D1946 data was reported as ppmV and Method TO-15 data were reported as ug/m3 and ppbV. No action is required other than to alert the data user to these varying units of measure.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	LP	Initials
Comments: Any laboratory-assigned flags were reviewed and evaluated during the limited validation process. Data validation qualifiers, when assigned, override any laboratory-assigned data flags.						
11. Were laboratory blank samples free of target analyte contamination?	**X**	Yes		No	LP	Initials
Comments: Laboratory blanks were free of target analyte contamination.						
12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?		Yes		No	LP	Initials
Comments: Not applicable - Equipment rinse, field, and trip blank samples were not submitted for analysis/were not required.						
13. Were instrument calibrations within method or data validation control limits?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Instrument calibration data were not provided in analytical laboratory reports and were not assessed during this data review.						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: Reported surrogate %Rs were within method/laboratory QC limits for all project samples and associated QC samples, where applicable.						
15. Were laboratory control sample recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: Reported LCS %Rs were within method/laboratory QC limits.						
16. Were matrix spike recoveries within control limits?		Yes		No	LP	Initials
Comments: Not applicable. Matrix spikes were not performed in association with these analyses. Accuracy was assessed using the LCS results.						
17. Were duplicate RPDs and/or serial dilution %Ds within control limits?	**X**	Yes		No	LP	Initials
Comments: Laboratory duplicates were within method/laboratory QC limits, where applicable.						
18. Were organic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Organic system performance data were not provided in analytical laboratory reports and were not assessed during this data review.						
19. Were internal standards within method criteria for GC/MS sample analyses?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – GC/MS internal standard data were not provided in analytical laboratory reports and were not assessed during this data review.						

ANALYTICAL DATA VALIDATION CHECKLIST

20. Were inorganic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for the reported methods.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	LP	Initials
Duplicate Sample ID.	SVE-DUP	Primary Sample ID.	SVE-CEV			

Comments: Field duplicate RPDs were within data validation QC limits of 0-25% for air matrices, or RPDs were not applicable due to results that were not detected in one or both samples or for results that were less than 5 times the reporting limits.

The following RPDs were calculated:

Method	Units	Analyte	SVE-CEV/06302016	SVE-DUP/06302016	RPD	Qualifiers
ASTMD1946	ppmV	Oxygen	221,000	221,000	0.0	none
ASTMD1946	ppmV	Nitrogen	778,000	778,000	0.0	none
TO-15	ug/m3	Trichloroethene	160	160	0.0	none
TO-15	ug/m3	Tetrachloroethene	1,100	1,100	0.0	none

22. Were qualitative criteria for organic target analyte identification met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Chromatographs, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review.						
23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	LP	Initials

Comments: During the limited validation procedure, 100% of the positive sample concentrations and 100% of the LOQ/RLs for project samples were compared to hardcopy laboratory reports. No discrepancies were noted.

The data validator made sure that LOQ/RLs and MDLs (EDDs only) were entered into the correct EDD fields, and that correct method references were noted.

The AECOM project manager was informed of all changes made to the EDD files via this Checklist. The EDD files, with any corrections made, were imported into the EQuIS project database by the data validator on 8/1/16.

24. General Comments: Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate relative percent difference (RPD) review and applicable control limits were taken from the *EPA New England Environmental Data Review Supplement For Regional Data Review Elements and Superfund Specific Guidance/Procedures April 22, 2013,* document number EQADR-Supplement 0.

Submitted to:
BNSF

Submitted by:
AECOM
Seattle, WA
June 20, 2016

Organic
Limited Data Validation Report

BNSF – Mission Wye - Livingston, Montana
Monthly Soil Vapor Extraction Samples
ALS Environmental Laboratory data
July 2016

Prepared By Lucy Panteleeff, Chemist
Reviewed By Jennifer B. Garner, Chemist

ANALYTICAL DATA VALIDATION CHECKLIST

Overview

The samples analyzed for BNSF – Mission Wye, Livingston, Montana monthly Soil Vapor Extraction (SVE) sampling event (July 2016) are listed in the Table of Samples Analyzed (page 2). Limited data validation was performed on a total of 2 soil vapor samples.

Samples were analyzed by the ALS Environmental laboratory located in Simi Valley, California. The reviewed analyses were fixed gases by Method ASTM D 1946 and select volatile organic compounds by TO-15.

The Analytical Data Validation Checklist is presented as pages 4-8. The Analytical Data Validation Checklist was updated by the Montana Department of Environmental Quality on December 15, 2015 and is presented below. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate Relative Percent Difference (RPD) reviews and applicable control limits were taken from Montana Department of Environmental Quality's Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Holding times
Method blank results
Organic surrogate recoveries
LCS (blank spike) results
Field duplicate results
Electronic data deliverables (EDDs) – EQuIS format

Data Validation Qualifiers Assigned During this Review

The following data qualifiers were assigned during this data review:

J Estimated concentration

Assigned qualifiers are detailed in the Analytical Data Validation Checklist and are summarized in the Table of Qualified Analytical Results (page 3).

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for all methods based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use without qualification.

ANALYTICAL DATA VALIDATION CHECKLIST

Table of Samples Analyzed
BNSF – Wye Mission
Monthly Soil Vapor Samples
ALS Laboratory Report P1603773
July 2016

Matrix	Sample ID	Sample Date/Time		Laboratory ID
Soil Vapor	SVE-CEV07272016	7/27/2016	12:05	P1603773-001
Soil Vapor	SVE-DUP07272016	7/27/2016	12:06	P1603773-002

The sample date suffixes (07272016) are included in this table for completeness, but will not be used in the discussions below.

ANALYTICAL DATA VALIDATION CHECKLIST

Table of Qualified Analytical Results
BNSF – Wye Mission
Monthly Soil Vapor Samples
ALS Laboratory Report P1603773
July 2016

Sample ID	Laboratory ID	Method	Analyte	Method Detection Limit	Reporting Limit	Laboratory Result	Final Result	Units	Reason Code
SVE-CEV	P1603773-001	TO-15	Trichloroethene	0.75	2.7	290	290 J	ug/m^3	fd
		TO-15	Tetrachloroethene	4.5	16	1,800	1,800 J	ug/m^3	fd
SVE-DUP	P1603773-002	TO-15	Trichloroethene	1.1	3.8	190	190 J	ug/m^3	fd
		TO-15	Tetrachloroethene	2.1	7.6	1,000	1,000 J	ug/m^3	fd

fd – field duplicate relative percent difference
J – estimated concentration
ug/m^3 – microgram per meter cubed

Montana DEQ - Remediation Division

Data Validation Summary Form (Version 1.0, Revised 12/15/15)

Please fill out the information below, using one form for each lab batch (one form can be used for multiple analytical methods). The form will grow and adjust, based on your responses. A discussion regarding the sampling event must also be included in the report that is sent to DEQ with this form. For additional instructions, please click the Open Complete Instructions button.

Open Complete Instructions

Basic Questions

1. Site/Facility name	BNSF
2. Site code or facility ID (if applicable)	Mission Wye
3. Release ID (if applicable)	Not applicable
4. Project name	2016 July Monthly SVE
5. Name of DEQ-approved sampling plan	FS Pilot Test Work Plan, Revision 2
6. Date DEQ approved the sampling plan	6/24/2015 M/D/YY
7. Name of data validator	Lucy Panteleeff, Peer Reviewer Jennifer B. Garner
8. Phone	206-438-2277
9. Date validated	10/27/2016 M/D/YY

Field Collection Questions

10. Sample matrix	☐ Soil ☐ Sediment ☐ Surface water ☐ Groundwater ☐ Tap water ☒ Air (including soil gas)
11. Sample collection start date	7/27/16 M/D/YY
12. Sample collection end date	7/27/16 M/D/YY
13. Analytical methods used *Use Add Method button to list multiple methods. Enter any other methods in the field manually.*	Add Method / Delete Method: Analytical Method(s): TO15 Analysis of Volatile Organic Compounds (Vocs) In Air

Laboratory-related Questions

14. Laboratory name and location	ALS Laboratories, Simi Valley, CA		
15. Laboratory project ID	P1603773		
16. All data conforms to analytical methods and data quality objectives specified for this project?	Yes ◉	No ○	Comments: Reported methods met those requested on the chain of custody (COC) and are compliant with the requested analytes and matrix.
17. Samples received in good condition and at appropriate temperature, chain-of-custody forms complete, and all samples analyzed within holding times?	Yes ○	No ◉	Comments

			Samples were received intact and in good condition and all samples were analyzed within the method holding time. The COC form was not properly relinquished by AECOM personnel as described in Section 17a and custody seals were not present.
17a. Chain-of-custody forms complete?	Yes	No	Comments The COC was not relinquished properly by AECOM personnel. The COC was not signed the individual who relinquished the samples and the date and time when the samples were relinquished were not indicated on the COC. Data were not qualified based on these omissions.
17b. Samples received in good condition, preserved, and at appropriate temperature (VOA no headspace, appropriate pH, temperature 4° C +/- 2° for most samples)?	Yes	No	Comments Samples were received in good condition as indicated by the Sample Acceptance Check Form provided by ALS.
17c. Were the samples analyzed within method-specified or technical holding times?	Yes	No	Comments All samples were analyzed within the method-specified holding times of 30 days for requested methods.
18. All laboratory quality control procedures complied with and data is validated without qualifiers? Note: non-QA/QC related U and J flags do not require additional qualification in this section	Yes	No	Comments Laboratory quality control samples (i.e., method blanks and laboratory control sample) were performed and procedures complied with. Data qualifiers were not assigned to the data reported in this data set except as noted below. The results for trichloroethene and tetrachloroethene were qualified based on field duplicate relative percent difference (RPD) outliers as described in Section 28c.
18a. Were all calibration verification results within acceptable limits?	Yes	No	Comments Not applicable for this level of limited data validation. Instrument calibration data were not provided in analytical laboratory reports and were not assessed during this data review.
18b. Laboratory blank samples free of contamination?	Yes	No	Comments Laboratory blanks were free of target analyte contamination.
18c. Are the percent recoveries and relative percent differences of matrix spike and matrix spike duplicates within quality control limits?	Yes	No	Comments Not applicable - Matrix spikes were not performed in association with the methods reported in this sample set. Accuracy was assessed using the associated LCS results.
18d. Control samples are the same matrix as samples, and prepared the same as associated samples?	Yes	No	Comments Laboratory quality control samples were performed using an air matrix.
18e. Were laboratory control samples and laboratory control sample duplicate percent recoveries and relative percent differences within laboratory control limits?	Yes	No	Comments Not applicable - Laboratory control sample duplicates were not performed in association with the methods reported in this sample set. Precision was assessed using the field duplicate RPDs.
	Yes	No	Comments

18f. Were surrogate recoveries within laboratory quality control limits?	●	○	Surrogate recoveries were within control limits, where applicable, for all project samples and associated QC samples.
18g. Laboratory duplicate relative percent differences within data validation quality control limits?	Yes ○	No ○	Comments: Not applicable - Laboratory duplicates were not performed in association with the methods reported in this sample set. Precision was assessed using the field duplicate RPDs.
19. Total number of lab method blanks at least 5% of total number of samples, or as required by the method?	Yes ●	No ○	Comments: Laboratory method blanks were prepared as required by the method.
20. Total number of lab matrix spike samples prepared at least 5% of the total number of samples, or as required by the method?	Yes ●	No ○	Comments: Not applicable - Matrix spikes were not performed in association with the methods reported in this sample set. Accuracy was assessed using the LCS results.

21. Please list any project samples used for matrix spike/matrix spike duplicates.

Add Sample	Lab ID	Field Sample ID	Comments
Delete Sample	Not applicable	Not applicable	Matrix spikes were not performed in association with the methods reported in this sample set

22. Total number of laboratory control samples at least 5% of the total number of samples?	Yes ●	No ○	Comments: Laboratory control samples were prepared as required by the method.

Consultant/Validator Questions

23. Are the detection limits appropriate for the project (i.e. at or below screening levels)?	Yes ●	No ○	Comments: Reported detection limits are achievable by the quoted methods. SVE-CEV/07272016 and SVE-DUP/07272016 were analyzed at diluted levels due to high target analyte concentrations. The results for tetrachloroethene in these samples were reported from the dilutions and were flagged 'D' by the laboratory. The laboratory-assigned 'D' qualifiers are qualitative and do not indicate bias to the sample results or issues with the data quality. Reporting limits were adjusted appropriately to reflect dilution factors and/or canister pressurization as needed. The result for trans-1,2-dichloroethene in SVE-CEV was flagged 'J' by the laboratory to indicate that the concentration was less than the laboratory reporting limit but above the method detection limit (MDL). Laboratory J-flagged results are considered estimated results. As the results are between the MDLs and the reporting limits, there are greater levels of uncertainty associated with the numerical results.
24. Are the reported units appropriate for the sample matrix (i.e. water results in ug/L, not mg/kg)?	Yes ●	No ○	Comments: Correct concentration units were reported. Method ASTM D1946 data were reported as ppmV and Method TO-15 data were reported as ug/m3 and ppbV.
25. Analytical methods comply with project requirements (e.g. in the SAP or work plan)?	Yes ●	No ○	Comments: The reported methods met project requirements.

26. Do the laboratory reports include all constituents requested to be analyzed on the chain-of-custody or under the sampling plan or other applicable document?	Yes ●	No ○	Comments Only analytes applicable to the requested method were reported.
27. Number of sample collection blanks (e.g. equipment, trip, or field blanks) equal to at least 10% of the total number of samples, or as otherwise required?	Yes ○	No ○	Comments Not applicable - Equipment, trip, and field blanks were not collected.
28. Field blanks free from contamination, duplicates collected as required, and field duplicate percent differences within data validation quality control limits?	Yes ○	No ●	Comments Field blanks were not collected as part of this sampling event. A field duplicate was collected at SVE-CEV/07272016 and identified as SVE-DUP/07272016. One or more field duplicate relative percent differences (RPDs) were outside control limits as described in Section 28c.
28a. Were all blank samples free of analyte contamination?	Yes ●	No ○	Comments Method blanks were free of analyte contamination. Field blanks were not collected or submitted as part of this sampling event.
28b. Field duplicates collected as required?	Yes ●	No ○	Comments A field duplicate was collected at SVE-CEV/07272016 and identified as SVE-DUP/07272016.
28c. Field duplicate relative percent differences within data validation quality control limits?	Yes ○	No ●	Comments The RPDs for trichloroethene (42%) and tetrachloroethene (57%) were more than 25%. The results for trichloroethene and tetrachloroethene were qualified as estimated and flagged 'J' based on the elevated field duplicate RPDs.

29. Please provide an Excel or CSV file to the DEQ project manager (via e-mail or CD) that lists all samples evaluated in this summary and lists any qualified data.
Format must be as follows:

Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Example 48310-2.31E	Example GW-1	R	Sample dropped in lab and unrecoverable
Example 48310-2.32D	Example GW-2		

Qualifiers must be in the following format. See National Functional Guidelines for more information on qualifiers for unique samples such as dioxins.

Qualifier	Explanation
C	Pesticide and Arochlor results confirmed with GC/MS
J-	Estimated value, may be biased low
J	Analyte identified, but concentration is estimated
J+	Estimated value, may be biased high
NJ	Tentatively identified compound
R	Sample result rejected
U	Analyte analyzed for, but not detected above quantitation limit
UJ	Analyte not detected above CRQL, but CRQL may be inaccurate
X	Pesticide and Arochlor results attempted using GC/MS, but unsuccessful

If you wish to manually enter qualified sample results, please use the table below.

Add Sample	Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Delete Sample	Not applicable	Not applicable	Not applicable	See attached Table of Qualified Analytical Results

		Comments
30. Percent completeness?	100%	The data reported in this laboratory group, as qualified, are considered to be usable for meeting project objectives. No data were rejected; therefore, the percent completeness is 100%.
31. Completeness goal met?	Yes ● No ○	

32. Other general comments or observations?

Split Samples

		Comments
33. Did DEQ collect split samples?	Yes ○ No ●	

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Submitted to:
BNSF

Submitted by:
AECOM
Seattle, WA
December 12, 2016

Organic
Limited Data Validation Report

BNSF – Mission Wye - Livingston, Montana
Soil Vapor Extraction Samples
ALS Environmental Laboratory data
November 2016

Prepared By Lucy Panteleeff, Chemist
Reviewed By Jennifer B. Garner, Chemist

ANALYTICAL DATA VALIDATION CHECKLIST

Overview

The samples analyzed for BNSF – Mission Wye, Livingston, Montana Soil Vapor Extraction (SVE) sampling event (November 2016) are listed in the Table of Samples Analyzed (page 2). Limited data validation was performed on a total of 4 soil vapor samples.

Samples were analyzed by the ALS Environmental laboratory located in Simi Valley, California. The reviewed analysis was select volatile organic compounds (VOCs) by TO-15.

The Analytical Data Validation Checklist (updated by the Montana Department of Environmental Quality on December 15, 2015) is presented as pages 3-6. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, September 2016 as applied to the reported methodology. Field duplicate Relative Percent Difference (RPD) reviews and applicable control limits were taken from Montana Department of Environmental Quality's Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Holding times
Method blank results
Organic surrogate recoveries
LCS (blank spike) results
Field duplicate results
Electronic data deliverables (EDDs) – EQuIS format

Data Validation Qualifiers Assigned During this Review

No data validation qualifiers were assigned during this review.

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for the method based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use without qualification.

ANALYTICAL DATA VALIDATION CHECKLIST

Table of Samples Analyzed
BNSF – Wye Mission
Soil Vapor Samples
ALS Laboratory Report P1605348
November 2016

Matrix	Sample ID	Sample Date		Laboratory ID
Soil Vapor	SVE-CEV/11102016	11/10/2016	11:57	P1605348-001
Soil Vapor	SVE-DUP/11102016	11/10/2016	12:00	P1605348-002
Soil Vapor	SVE-Mid-T/11102016	11/10/2016	12:04	P1605348-003
Soil Vapor	SVE-EV/11102016	11/10/2016	12:10	P1605348-004

The sample date suffixes (/11102016) are included in this table for completeness, but will not be used in the discussions below.

Montana DEQ - Remediation Division

Data Validation Summary Form (Version 1.0, Revised 12/15/15)

Please fill out the information below, using one form for each lab batch (one form can be used for multiple analytical methods). The form will grow and adjust, based on your responses. A discussion regarding the sampling event must also be included in the report that is sent to DEQ with this form. For additional instructions, please click the Open Complete Instructions button.

Open Complete Instructions

Basic Questions

1. Site/Facility name	BNSF
2. Site code or facility ID (if applicable)	Mission Wye
3. Release ID (if applicable)	Not applicable
4. Project name	2016 November SVE Sampling
5. Name of DEQ-approved sampling plan	FS Pilot Test Work Plan, Revision 2
6. Date DEQ approved the sampling plan	6/24/2015 M/D/YY
7. Name of data validator	Lucy Panteleeff, Peer Reviewer Jennifer B. Garner
8. Phone	206-438-2277
9. Date validated	12/12/16 M/D/YY

Field Collection Questions

10. Sample matrix	☐ Soil ☐ Sediment ☐ Surface water ☐ Groundwater ☐ Tap water ☒ Air (including soil gas)
11. Sample collection start date	11/10/16 M/D/YY
12. Sample collection end date	11/10/16 M/D/YY
13. Analytical methods used *Use Add Method button to list multiple methods. Enter any other methods in the field manually.*	Add Method / Delete Method Analytical Method(s) TO15 Analysis of Volatile Organic Compounds (Vocs) In Air

Laboratory-related Questions

14. Laboratory name and location	ALS Laboratories, Simi Valley, CA		
15. Laboratory project ID	P1605348		
16. All data conforms to analytical methods and data quality objectives specified for this project?	Yes ◉	No ○	Comments: The reported method met the requested method indicated on the chain of custody (COC) and is compliant with the requested analytes and matrix.
17. Samples received in good condition and at appropriate temperature, chain-of-custody forms complete, and all samples analyzed within holding times?	Yes ◉	No ○	Comments: Samples were received intact and in good condition and all samples were analyzed within the method holding time.

18. All laboratory quality control procedures complied with and data is validated without qualifiers? Note: non-QA/QC related U and J flags do not require additional qualification in this section	Yes ●	No ○	Comments Laboratory quality control samples (i.e., method blanks and laboratory control sample) were performed and procedures complied with. Data qualifiers were not assigned to the data reported in this data set.
19. Total number of lab method blanks at least 5% of total number of samples, or as required by the method?	Yes ●	No ○	Comments Laboratory method blanks were prepared as required by the method.
20. Total number of lab matrix spike samples prepared at least 5% of the total number of samples, or as required by the method?	Yes ○	No ●	Comments Not applicable

If no, explain

Matrix spikes were not performed in association with the methods reported in this sample set. Accuracy was assessed using the LCS results.

21. Please list any project samples used for matrix spike/matrix spike duplicates.

Add Sample	Lab ID	Field Sample ID	Comments
Delete Sample	Not applicable	Not applicable	Matrix spikes were not performed in association with the method reported in this sample set

22. Total number of laboratory control samples at least 5% of the total number of samples?	Yes ●	No ○	Comments Laboratory control samples were prepared as required by the method.

Consultant/Validator Questions

23. Are the detection limits appropriate for the project (i.e. at or below screening levels)?	Yes ●	No ○	Comments Reported detection limits are achievable by the quoted methods. The laboratory flagged some sample results with a 'D' qualifier to indicate the reported result was from a dilution. The laboratory-assigned 'D' qualifiers are qualitative and do not indicate bias to the sample results or issues with the data quality. Reporting limits were adjusted appropriately to reflect dilution factors and/or canister pressurization as needed.
24. Are the reported units appropriate for the sample matrix (i.e. water results in ug/L, not mg/kg)?	Yes ●	No ○	Comments Correct concentration units were reported. All VOC data were reported as ug/m3 and ppbV.
25. Analytical methods comply with project requirements (e.g. in the SAP or work plan)?	Yes ●	No ○	Comments The reported methods met project requirements.
26. Do the laboratory reports include all constituents requested to be analyzed on the chain-of-custody or under the sampling plan or other applicable document?	Yes ●	No ○	Comments Only analytes applicable to the requested method were reported.
27. Number of sample collection blanks (e.g. equipment, trip, or field blanks) equal to at least 10% of the total number of samples, or as otherwise required?	Yes ○	No ●	Comments Not applicable

If no, explain

Equipment, trip, and field blanks were not collected or submitted to the laboratory

	Yes	No	Comments
28. Field blanks free from contamination, duplicates collected as required, and field duplicate percent differences within data validation quality control limits?	○	●	Field blanks were not collected as part of this sampling event. A field duplicate was collected at SVE-CEV and identified as SVE-DUP. The duplicate relative percent differences were comparable for all analytes reported at more than five times the reporting limits.
28a. Were all blank samples free of analyte contamination?	○	●	Method blanks were free of analyte contamination. Field blanks were not collected or submitted as part of this sampling event.

If no, explain

Field blanks were not collected or submitted as part of this sampling event.

	Yes	No	Comments
28b. Field duplicates collected as required?	●	○	A field duplicate was collected at SVE-CEV and identified as SVE-DUP. Results were comparable
28c. Field duplicate relative percent differences within data validation quality control limits?	●	○	

29. Please provide an Excel or CSV file to the DEQ project manager (via e-mail or CD) that lists all samples evaluated in this summary and lists any qualified data.
Format must be as follows:

Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Example 48310-2.31E	Example GW-1	R	Sample dropped in lab and unrecoverable
Example 48310-2.32D	Example GW-2		

Qualifiers must be in the following format. See National Functional Guidelines for more information on qualifiers for unique samples such as dioxins.

Qualifier	Explanation
C	Pesticide and Arochlor results confirmed with GC/MS
J-	Estimated value, may be biased low
J	Analyte identified, but concentration is estimated
J+	Estimated value, may be biased high
NJ	Tentatively identified compound
R	Sample result rejected
U	Analyte analyzed for, but not detected above quantitation limit
UJ	Analyte not detected above CRQL, but CRQL may be inaccurate
X	Pesticide and Arochlor results attempted using GC/MS, but unsuccessful

If you wish to manually enter qualified sample results, please use the table below.

Add Sample	Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Delete Sample	Not applicable	Not applicable	Not applicable	See attached Table of Qualified Analytical Results

		Comments
30. Percent completeness?	100%	The data reported in this laboratory group, as qualified, are considered to be usable for meeting project objectives. No data were rejected; therefore, the percent completeness is 100%.

	Yes	No	Comments

31. Completeness goal met?	◉	
32. Other general comments or observations?		

Split Samples

	Yes	No	Comments
33. Did DEQ collect split samples?	○	◉	

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Submitted to:
BNSF

Submitted by:
AECOM
Seattle, WA
February 1, 2017

Organic
Limited Data Validation Report

BNSF – Mission Wye - Livingston, Montana
SVE OM&M – SVE Samples
ALS Environmental Laboratory data
January 2017

Prepared By Lucy Panteleeff, Chemist
Reviewed By Jennifer B. Garner, Chemist

ANALYTICAL DATA VALIDATION CHECKLIST

Overview

The samples analyzed for BNSF – Mission Wye, Livingston, Montana Soil Vapor Extraction (SVE) sampling event (January 2017) are listed in the Table of Samples Analyzed (page 2). Limited data validation was performed on a total of 4 soil vapor samples.

Samples were analyzed by the ALS Environmental laboratory located in Simi Valley, California. The reviewed analyses were select volatile organic compounds (VOCs) by TO-15 and fixed gases by Method ASTM D1946.

The Analytical Data Validation Checklist (updated by the Montana Department of Environmental Quality on December 15, 2015) is presented as pages 3-6. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, September 2016, as applied to the reported methodology. Field duplicate relative percent difference (RPD) reviews and applicable control limits were taken from Montana Department of Environmental Quality's Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Holding times
Method blank results
Organic surrogate recoveries
LCS (blank spike) results
Field duplicate results
Electronic data deliverables (EDDs) – EQuIS format

Data Validation Qualifiers Assigned During this Review

No data validation qualifiers were assigned during this review.

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for the method based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use without qualification.

ANALYTICAL DATA VALIDATION CHECKLIST

Table of Samples Analyzed
BNSF – Wye Mission
Soil Vapor Samples
ALS Laboratory Report P1700066
January 2017

Matrix	Sample ID	Sample Date		Laboratory ID
Soil Vapor	SVE-CEV/01032017	1/3/2017	13:57	P1700066-001
Soil Vapor	SVE-DUP/01032017	1/3/2017	13:15	P1700066-002
Soil Vapor	SVE-MID-T/01032017	1/3/2017	14:17	P1700066-003
Soil Vapor	SVE-EV/01032017	1/3/2017	14:24	P1700066-004

The sample date suffixes (/01032017) are included in this table for completeness, but will not be used in the discussions below.

Montana DEQ - Remediation Division

Data Validation Summary Form (Version 1.0, Revised 12/15/15)

Please fill out the information below, using one form for each lab batch (one form can be used for multiple analytical methods). The form will grow and adjust, based on your responses. A discussion regarding the sampling event must also be included in the report that is sent to DEQ with this form. For additional instructions, please click the Open Complete Instructions button.

Open Complete Instructions

Basic Questions

1. Site/Facility name	BNSF
2. Site code or facility ID (if applicable)	Mission Wye
3. Release ID (if applicable)	Not applicable
4. Project name	Mission Wye SVE OM&M – SVE Samples – January 2017
5. Name of DEQ-approved sampling plan	FS Pilot Test Work Plan, Revision 2
6. Date DEQ approved the sampling plan	6/24/2015 M/D/YY
7. Name of data validator	Lucy Panteleeff, Peer Reviewer Jennifer B. Garner
8. Phone	206-438-2277
9. Date validated	2/1/2017 M/D/YY

Field Collection Questions

10. Sample matrix	☐ Soil ☐ Sediment ☐ Surface water ☐ Groundwater ☐ Tap water ☒ Air (including soil gas)
11. Sample collection start date	1/3/17 M/D/YY
12. Sample collection end date	1/3/17 M/D/YY
13. Analytical methods used *Use Add Method button to list multiple methods. Enter any other methods in the field manually.*	Add Method / Delete Method Analytical Method(s) TO15 Analysis of Volatile Organic Compounds (Vocs) In Air

Laboratory-related Questions

14. Laboratory name and location	ALS Laboratories, Simi Valley, CA		
15. Laboratory project ID	P1700066		
16. All data conforms to analytical methods and data quality objectives specified for this project?	Yes ◉	No ○	Comments: The reported methods met the requested methods indicated on the chain of custody (COC) and are compliant with the requested analytes and matrix.
17. Samples received in good condition and at appropriate temperature, chain-of-custody forms complete, and all samples analyzed within holding times?	Yes ◉	No ○	Comments: Samples were received intact and in good condition and all samples were analyzed within the method-specified holding times.

18. All laboratory quality control procedures complied with and data is validated without qualifiers? Note: non-QA/QC related U and J flags do not require additional qualification in this section	Yes ●	No ○	Comments Laboratory quality control samples (i.e., method blanks and laboratory control samples) were performed and procedures complied with. Data qualifiers were not assigned to the data reported in this data set.
19. Total number of lab method blanks at least 5% of total number of samples, or as required by the method?	Yes ●	No ○	Comments Laboratory method blanks were prepared as required by the method.
20. Total number of lab matrix spike samples prepared at least 5% of the total number of samples, or as required by the method?	Yes ○	No ●	Comments Not applicable

If no, explain

Matrix spikes were not performed in association with the methods reported in this sample set. Accuracy was assessed using the LCS results.

21. Please list any project samples used for matrix spike/matrix spike duplicates.

Add Sample	Lab ID	Field Sample ID	Comments
Delete Sample	Not applicable	Not applicable	Matrix spikes were not performed in association with the methods reported in this sample set

22. Total number of laboratory control samples at least 5% of the total number of samples?	Yes ●	No ○	Comments Laboratory control samples were prepared as required by the methods.

Consultant/Validator Questions

23. Are the detection limits appropriate for the project (i.e. at or below screening levels)?	Yes ●	No ○	Comments Reported detection limits are achievable by the quoted methods. Reporting limits were adjusted appropriately to reflect dilution factors and/or canister pressurization as needed. General - The results for trans-1,2-dichloroethene in SVE-CEV and SVE-DUP and tetrachloroethene in SVE-MID-T were flagged 'J' by the laboratory to indicate that the concentrations were less than the laboratory reporting limits but above the method detection limits (MDLs). Laboratory J-flagged results are considered estimated. As the results are between the MDLs and the reporting limits, there are greater levels of uncertainty associated with the numerical results. VOCs by EPA Method TO-15 The laboratory flagged the results for tetrachloroethene in SVE-CEV and SVE-DUP with 'D' qualifiers to indicate the reported results were from dilutions. The laboratory-assigned 'D' qualifiers are qualitative and do not indicate bias to the sample results or issues with the data quality.
24. Are the reported units appropriate for the sample matrix (i.e. water results in ug/L, not mg/kg)?	Yes ●	No ○	Comments Correct concentration units were reported. All VOC data were reported as ug/m3 and/or ppbV.
25. Analytical methods comply with project requirements (e.g. in the SAP or work plan)?	Yes ●	No ○	Comments The reported methods met project requirements.

	Yes	No	Comments
26. Do the laboratory reports include all constituents requested to be analyzed on the chain-of-custody or under the sampling plan or other applicable document?	●	○	Only analytes applicable to the requested method were reported.
27. Number of sample collection blanks (e.g. equipment, trip, or field blanks) equal to at least 10% of the total number of samples, or as otherwise required?	○	●	Not applicable

If no, explain

Equipment, trip, and field blanks were not collected or submitted to the laboratory with this data set.

	Yes	No	Comments
28. Field blanks free from contamination, duplicates collected as required, and field duplicate percent differences within data validation quality control limits?	○	●	Field blanks were not collected as part of this sampling event. A field duplicate was collected at SVE-CEV and identified as SVE-DUP. The field duplicate relative percent differences were comparable.
28a. Were all blank samples free of analyte contamination?	●	○	Method blanks were free of analyte contamination.
28b. Field duplicates collected as required?	●	○	A field duplicate was collected at SVE-CEV and identified as SVE-DUP.
28c. Field duplicate relative percent differences within data validation quality control limits?	●	○	Relative percent differences were comparable.

29. Please provide an Excel or CSV file to the DEQ project manager (via e-mail or CD) that lists all samples evaluated in this summary and lists any qualified data.
Format must be as follows:

Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Example 48310-2.31E	Example GW-1	R	Sample dropped in lab and unrecoverable
Example 48310-2.32D	Example GW-2		

Qualifiers must be in the following format. See National Functional Guidelines for more information on qualifiers for unique samples such as dioxins.

Qualifier	Explanation
C	Pesticide and Arochlor results confirmed with GC/MS
J-	Estimated value, may be biased low
J	Analyte identified, but concentration is estimated
J+	Estimated value, may be biased high
NJ	Tentatively identified compound
R	Sample result rejected
U	Analyte analyzed for, but not detected above quantitation limit
UJ	Analyte not detected above CRQL, but CRQL may be inaccurate
X	Pesticide and Arochlor results attempted using GC/MS, but unsuccessful

If you wish to manually enter qualified sample results, please use the table below.

Delete Sample	Not applicable	Not applicable	Not applicable	No data qualifiers were assigned to the results reported in this data set.

Add Sample	Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)

		Comments
30. Percent completeness?	100%	The data reported in this laboratory group, as reported, are considered to be usable for meeting project objectives. No data were rejected; therefore, the percent completeness is 100%.
31. Completeness goal met?	Yes ● No ○	
32. Other general comments or observations?		

Split Samples

		Comments
33. Did DEQ collect split samples?	Yes ○ No ●	

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Submitted to:
BNSF

Submitted by:
AECOM
Seattle, WA
April 17, 2017

Organic
Limited Data Validation Report

BNSF – Mission Wye - Livingston, Montana
Monthly SVE Samples
ALS Environmental Laboratory data
March 2017

Prepared By Lucy Panteleeff, Chemist
Reviewed By Jennifer B. Garner, Chemist

ANALYTICAL DATA VALIDATION CHECKLIST

Overview

The samples analyzed for BNSF – Mission Wye, Livingston, Montana Soil Vapor Extraction (SVE) sampling event (March 2017) are listed in the Table of Samples Analyzed (page 2). Limited data validation was performed on a total of 4 soil vapor samples.

Samples were analyzed by the ALS Environmental laboratory located in Simi Valley, California. The reviewed analysis was select volatile organic compounds (VOCs) by TO-15.

The Analytical Data Validation Checklist (updated by the Montana Department of Environmental Quality on November 4, 2016) is presented as pages 3-6. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Organic Superfund Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-2017-002, January 2017, as applied to the reported methodology. Field duplicate relative percent difference (RPD) reviews and applicable control limits were taken from Montana Department of Environmental Quality's Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Instrument calibrations
Holding times
Method blank results
LCS (blank spike) results
Field duplicate results
Laboratory duplicate results
Electronic data deliverables (EDDs) – EQuIS format

Data Validation Qualifiers Assigned During this Review

No data validation qualifiers were assigned during this review.

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for the method based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use without qualification.

ANALYTICAL DATA VALIDATION CHECKLIST

Table of Samples Analyzed
BNSF – Wye Mission
Soil Vapor Samples
ALS Laboratory Report P1701429
March 2017

Matrix	Sample ID	Sample Date		Laboratory ID
Soil Vapor	SVE-CEV/03212017	3/21/2017	10:28	P1701429-001
Soil Vapor	SVE-DUP/03212017	3/21/2017	10:30	P1701429-002
Soil Vapor	SVE-MID-T/03212017	3/21/2017	10:38	P1701429-003
Soil Vapor	SVE-EV/03212017	3/21/2017	10:45	P1701429-004

The sample date suffixes (/03212017) are included in this table for completeness, but will not be used in the discussions below.

Montana DEQ - Remediation Division

Data Validation Summary Form (Version 1.2, Revised 11/4/16)

Please fill out the information below, using one form for each lab batch (one form can be used for multiple analytical methods). The form will grow and adjust, based on your responses. Please include a discussion regarding the sampling event in the report that is sent to DEQ with this form. For additional instructions, please click the Open Complete Instructions button.

Open Complete Instructions

Basic Questions

1. Site/Facility name	BNSF
2. Site code or facility ID (if applicable)	Mission Wye
3. Release ID (if applicable)	Not applicable
4. Project name	Mission Wye SVE Samples - March 2017
5. Name of DEQ-approved sampling plan	FS Pilot Test Work Plan, Revision 2
6. Date DEQ approved the sampling plan	Jun 24, 2015 M/D/YY
7. Name of data validator	Lucy Panteleeff, Peer Reviewer Jennifer B. Garner
8. Phone	206-438-2277
9. Date validated	Apr 24, 2017 M/D/YY

Field Collection Questions

10. Sample matrix	☐ Soil ☐ Sediment ☐ Surface water ☐ Groundwater ☐ Tap water ☒ Air (including soil gas) ☐ Other
11. Sample collection start date	Mar 21, 2017 M/D/YY
12. Sample collection end date	Mar 21, 2017 M/D/YY
13. Analytical methods used *Use Add Method button to list multiple methods. Enter any other methods in the field manually.*	Add Method / Delete Method Analytical Method(s) TO15 Analysis of Volatile Organic Compounds (Vocs) In Air

Laboratory-related Questions

14. Laboratory name and location	ALS Laboratories, Simi Valley, CA		
15. Laboratory project ID	P1701429		
16. Does all data conform to analytical methods and data quality objectives specified for this project?	Yes ◉	No ○	Comments: The reported method met the requested method indicated on the chain of custody (COC) and was compliant with the requested analytes and matrix.
17. Were samples received in good condition and at appropriate temperature, chain-of-custody forms complete, and all samples analyzed within holding times?	Yes ◉	No ○	Comments: Samples were received intact and in good condition and all samples were analyzed within the method-specified holding times.

	Yes	No	Comments
18. Were all laboratory quality control procedures complied with and is data validated without qualifiers? Note: non-QA/QC related U and J flags do not require additional qualification in this section.	●	○	Laboratory quality control samples (i.e.,method blanks, laboratory control samples, and laboratory duplicates) were performed and procedures complied with. Data qualifiers were not assigned to the data reported in this data set.
19. Were the total number of lab method blanks at least 5% of the total number of samples, or as required by the method?	●	○	Laboratory method blanks were prepared as required by the method.
20. Were the total number of lab matrix spike samples prepared at least 5% of the total number of samples, or as required by the method?	○	●	Not applicable

21. Please list any project samples used for matrix spike/matrix spike duplicates.

Add Sample	Lab ID	Field Sample ID	Comments
Delete Sample	Not applicable	Not applicable	Matrix spikes were not performed in association with the method reported in this sample set.

	Yes	No	Comments
22. Is the total number of laboratory control samples at least 5% of the total number of samples?	●	○	Laboratory control samples were prepared as required by the method.

Consultant/Validator Questions

	Yes	No	Comments
23. Are the detection limits appropriate for the project (i.e. at or below screening levels)?	●	○	Reported detection limits are achievable by the quoted methods. Reporting limits were adjusted appropriately to reflect dilution factors and/or canister pressurization as needed. VOCs by EPA Method TO-15 - The results for trans-1,2-dichloroethene in SVE-CEV, SVE-DUP, and SVE-MID-T and tetrachloroethene in SVE-EV were flagged 'J' by the laboratory to indicate that the concentrations were less than the laboratory reporting limits but above the method detection limits (MDLs). Laboratory J-flagged results are considered estimated. As the results are between the MDLs and the reporting limits, there are greater levels of uncertainty associated with the numerical results. The laboratory flagged the results for tetrachloroethene in SVE-CEV, SVE-DUP, and SVE-MID-T with 'D' qualifiers to indicate the reported results were from dilutions. The laboratory-assigned 'D' qualifiers are qualitative and do not indicate bias to the sample results or issues with the data quality.
24. Are the reported units appropriate for the sample matrix (i.e. water results in ug/L, not mg/kg)?	●	○	Correct concentration units were reported. All VOC data were reported as ug/m3 and ppbV.
25. Do the analytical methods comply with project requirements (e.g. in the SAP, work plan, or QAPP)?	●	○	The reported methods met project requirements.

	Yes	No	Comments
26. Do the laboratory reports include all constituents requested to be analyzed on the chain-of-custody or under the sampling plan or other applicable document?	●	○	Only analytes applicable to the requested method were reported.
27. Is the number of sample blanks (e.g. equipment, trip, or field blanks) equal to at least 10% of the total number of samples, or as otherwise required?	○	●	Not applicable

If no, explain

Equipment, trip, and field blanks were not submitted with this data set.

	Yes	No	Comments
28. Are field blanks free from contamination, duplicates collected as required, and field duplicate percent differences within data validation quality control limits?	○	●	Field blanks were not collected as part of this sampling event. One field duplicate was collected as described in Section 28C.
28a. Were all blank samples free of analyte contamination?	●	○	Method blanks were free of analyte contamination.
28b. Were field duplicates collected as required?	●	○	A field duplicate was collected at SVE-CEV and identified as SVE-DUP. Results were comparable.
28c. Are field duplicate relative percent differences within data validation quality control limits?	●	○	Relative percent differences were comparable.

29. Please provide an Excel or CSV file to the DEQ project manager (via e-mail or CD) that lists all samples evaluated in this summary and lists any qualified data.
Please use the following format:

Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Example 48310-2.31E	Example GW-1	R	Sample dropped in lab and unrecoverable
Example 48310-2.32D	Example GW-2		

Please use the following format for qualifiers. See EPA's National Functional Guidelines for more information on qualifiers for unique samples such as dioxins.

Qualifier	Explanation
C	Pesticide and Arochlor results confirmed with GC/MS
J-	Estimated value, may be biased low
J	Analyte identified, but concentration is estimated
J+	Estimated value, may be biased high
NJ	Tentatively identified compound
R	Sample result rejected
U	Analyte analyzed for, but not detected above quantitation limit
UJ	Analyte not detected above CRQL, but CRQL may be inaccurate
X	Pesticide and Arochlor results attempted using GC/MS, but unsuccessful

If you wish to manually enter qualified sample results, please use the table below.

Add Sample	Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)

Delete Sample				

		Comments
30. What is the percent completeness (samples planned versus valid samples collected)?	100%	The data reported in this laboratory group, as reported, are considered to be usable for meeting project objectives. No data were rejected; therefore, the percent completeness is 100%.
31. Was the completeness goal met?	Yes ● No ○	
32. Other general comments or observations?		

Split Samples

		Comments
33. Did DEQ collect split samples?	Yes ○ No ●	

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Submitted to:
BNSF

Submitted by:
AECOM
Seattle, WA
July 10, 2017

Organic
Limited Data Validation Report

BNSF – Mission Wye - Livingston, Montana
Monthly SVE Samples
ALS Environmental Laboratory data
June 2017

Prepared By Lucy Panteleeff, Chemist
Reviewed By Jennifer B. Garner, Chemist

ANALYTICAL DATA VALIDATION CHECKLIST

Overview

The samples analyzed for BNSF – Mission Wye, Livingston, Montana Soil Vapor Extraction (SVE) sampling event (June 2017) are listed in the Table of Samples Analyzed (page 2). Limited data validation was performed on a total of 4 soil vapor samples.

Samples were analyzed by the ALS Environmental laboratory located in Simi Valley, California. The reviewed analysis was select volatile organic compounds (VOCs) by TO-15.

The Analytical Data Validation Checklist (updated by the Montana Department of Environmental Quality on November 4, 2016) is presented as pages 3-6. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Organic Superfund Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-2017-002, January 2017, as applied to the reported methodology. Field duplicate relative percent difference (RPD) reviews and applicable control limits were taken from Montana Department of Environmental Quality's Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Instrument calibrations
Holding times
Method blank results
LCS (blank spike) results
Field duplicate results
Electronic data deliverables (EDDs) – EQuIS format

Data Validation Qualifiers Assigned During this Review

No data validation qualifiers were assigned during this review.

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for the method based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use without qualification.

ANALYTICAL DATA VALIDATION CHECKLIST

Table of Samples Analyzed
BNSF – Wye Mission
Soil Vapor Samples
ALS Laboratory Report P1703049
June 2017

Matrix	Sample ID	Sample Date/Time		Laboratory ID
Soil Vapor	SVE-CEV/06192017	6/19/2017	10:32	P1703049-001
Soil Vapor	MID-T/06192017	6/19/2017	10:25	P1703049-002
Soil Vapor	SVE-EV/06192017	6/19/2017	10:15	P1703049-003
Soil Vapor	SVE-DUP/06192017 (duplicate of MID-T/06192017)	6/19/2017	10:25	P1703049-004

The sample date suffixes (/06192017) are included in this table for completeness, but will not be used in the discussions below.

Montana DEQ - Remediation Division

Data Validation Summary Form (Version 1.2, Revised 11/4/16)

Please fill out the information below, using one form for each lab batch (one form can be used for multiple analytical methods). The form will grow and adjust, based on your responses. Please include a discussion regarding the sampling event in the report that is sent to DEQ with this form. For additional instructions, please click the Open Complete Instructions button.

Open Complete Instructions

Basic Questions

1. Site/Facility name	BNSF
2. Site code or facility ID (if applicable)	Mission Wye
3. Release ID (if applicable)	Not applicable
4. Project name	Mission Wye SVE Samples - June 2017
5. Name of DEQ-approved sampling plan	FS Pilot Test Work Plan, Revision 2
6. Date DEQ approved the sampling plan	Jun 24, 2015 M/D/YY
7. Name of data validator	Lucy Panteleeff, Jennifer B. Garner (peer review)
8. Phone	206-438-2277
9. Date validated	July 10, 2017 M/D/YY

Field Collection Questions

10. Sample matrix	☐ Soil ☐ Sediment ☐ Surface water ☐ Groundwater ☐ Tap water ☒ Air (including soil gas) ☐ Other
11. Sample collection start date	Jun 19, 2017 M/D/YY
12. Sample collection end date	Jun 19, 2017 M/D/YY
13. Analytical methods used *Use Add Method button to list multiple methods. Enter any other methods in the field manually.*	Add Method / Delete Method: Analytical Method(s) TO15 Analysis of Volatile Organic Compounds (Vocs) In Air

Laboratory-related Questions

14. Laboratory name and location	ALS Laboratories, Simi Valley, California		
15. Laboratory project ID	P1703049		
16. Does all data conform to analytical methods and data quality objectives specified for this project?	Yes ◉	No ○	Comments: The reported method met the requested method indicated on the chain of custody (COC) and was compliant with the requested analytes and matrix.
17. Were samples received in good condition and at appropriate temperature, chain-of-custody forms complete, and all samples analyzed within holding times?	Yes ◉	No ○	Comments: Samples were received intact and in good condition and all samples were analyzed within the method-specified holding times.

	Yes	No	Comments
18. Were all laboratory quality control procedures complied with and is data validated without qualifiers? Note: non-QA/QC related U and J flags do not require additional qualification in this section.	●	○	Laboratory quality control samples (i.e.,method blanks and laboratory control samples) were performed and procedures complied with. Data qualifiers were not assigned to the data reported in this data set.
19. Were the total number of lab method blanks at least 5% of the total number of samples, or as required by the method?	●	○	Laboratory method blanks were prepared as required by the method.
20. Were the total number of lab matrix spike samples prepared at least 5% of the total number of samples, or as required by the method?	○	●	Not applicable

If no, explain

Matrix spikes were not performed in association with this analysis or data set.

21. Please list any project samples used for matrix spike/matrix spike duplicates.

Add Sample	Lab ID	Field Sample ID	Comments
Delete Sample	Not applicable	Not applicable	Matrix spikes were not performed in association with the method reported in this sample set.

	Yes	No	Comments
22. Is the total number of laboratory control samples at least 5% of the total number of samples?	●	○	Laboratory control samples were prepared as required by the method.

Consultant/Validator Questions

	Yes	No	Comments
23. Are the detection limits appropriate for the project (i.e. at or below screening levels)?	●	○	Reported detection limits are achievable by the quoted methods. Reporting limits were adjusted appropriately to reflect dilution factors and/or canister pressurization as needed. The laboratory flagged the result for tetrachloroethene in SVE-CEV with a 'D' qualifier to indicate the reported result was from a dilution. The laboratory-assigned 'D' qualifier was qualitative and does not indicate bias to the sample result or issues with the data quality.
24. Are the reported units appropriate for the sample matrix (i.e. water results in ug/L, not mg/kg)?	●	○	Correct concentration units were reported. All VOC data were reported as ug/m3 and ppbV.
25. Do the analytical methods comply with project requirements (e.g. in the SAP, work plan, or QAPP)?	●	○	The reported methods met project requirements.
26. Do the laboratory reports include all constituents requested to be analyzed on the chain-of-custody or under the sampling plan or other applicable document?	●	○	Only analytes applicable to the requested method were reported.
27. Is the number of sample blanks (e.g. equipment, trip, or field blanks) equal to at least 10% of the total number of samples, or as otherwise required?	○	●	Not applicable

If no, explain

Equipment, trip, and field blanks were not submitted with this data set.

28. Are field blanks free from contamination, duplicates collected as required, and field duplicate percent differences within data validation quality control limits?	Yes ○	No ●	Comments: Field blanks were not collected as part of this sampling event. One field duplicate was collected as described in Section 28C.
28a. Were all blank samples free of analyte contamination?	Yes ●	No ○	Comments: Method blanks were free of analyte contamination.
28b. Were field duplicates collected as required?	Yes ●	No ○	Comments: A field duplicate was collected at MID-T and identified as SVE-DUP.
28c. Are field duplicate relative percent differences within data validation quality control limits?	Yes ●	No ○	Comments: Field duplicate relative percent differences were comparable.

29. Please provide an Excel or CSV file to the DEQ project manager (via e-mail or CD) that lists all samples evaluated in this summary and lists any qualified data.
Please use the following format:

Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Example 48310-2.31E	Example GW-1	R	Sample dropped in lab and unrecoverable
Example 48310-2.32D	Example GW-2		

Please use the following format for qualifiers. See EPA's National Functional Guidelines for more information on qualifiers for unique samples such as dioxins.

Qualifier	Explanation
C	Pesticide and Arochlor results confirmed with GC/MS
J-	Estimated value, may be biased low
J	Analyte identified, but concentration is estimated
J+	Estimated value, may be biased high
NJ	Tentatively identified compound
R	Sample result rejected
U	Analyte analyzed for, but not detected above quantitation limit
UJ	Analyte not detected above CRQL, but CRQL may be inaccurate
X	Pesticide and Arochlor results attempted using GC/MS, but unsuccessful

If you wish to manually enter qualified sample results, please use the table below.

Add Sample	Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Delete Sample	Not applicable	Nor applicable	Not applicable	No data qualifiers were assigned to the results reported with this data set.

30. What is the percent completeness (samples planned versus valid samples collected)?	100%	Comments: The data reported in this laboratory group, as reported, are considered to be usable for meeting project objectives. No data were rejected; therefore, the percent completeness is 100%
31. Was the completeness goal met?	Yes ●	No ○ Comments:

32. Other general comments or observations?

Split Samples

33. Did DEQ collect split samples?	Yes	No	Comments
	○	●	

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Environment

Submitted to:
BNSF Railway Company
Mission Wye

Submitted by:
AECOM
Denver, CO
January 26, 2016

January 26, 2016

Organic
Limited Data Validation Report

BNSF Mission Wye
Water and Water Quality Control (QC) Samples
Pace Analytical Services, Inc. data

December, 2015 Sampling

Prepared By Anne Kakai
Validation Chemist/Database Manager

Overview

The samples analyzed for the BNSF Mission Wye Sampling event of December 2015 are listed in the Table of Samples Analyzed (page 3). Data validation was performed on three groundwater samples, one field blank sample, one equipment blank sample, one field duplicate sample, and one trip blank sample.

The samples were analyzed by Pace Analytical of Minneapolis, MN. Limited data validation was performed for Volatile Organic Compounds (VOCs) by Gas Chromatography Mass-Spectrometry (GC/MS) Method SW-846 8260B.

The Analytical Data Validation Checklist is presented as pages 4-8. Data were evaluated based on validation criteria set forth in the National Functional Guidelines for Superfund Organic Methods Data Review, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, October 2013 (with additional guidance from the USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review, document number USEPA-540-R-08-01, June 2008), as applied to the reported methodology.

The following data components were reviewed during the data validation procedure

Reviewed Deliverables/Data
Chain-of-Custody form(s) and sample integrity
Case Narratives (including any laboratory flags)
Sample results, reporting detection limits, dilution factors
Holding times
Laboratory blank results
Trip blank results
Organic surrogate recoveries
LCS (blank spike) results
MS, MSD (matrix spike, matrix spike duplicate) results
Laboratory duplicate (or spiked duplicate) results
Electronic data deliverables (EDDs)

Data Validation Qualifiers Assigned During this Review

J estimated concentration

Assigned qualifiers are detailed in the Analytical Data Validation Checklist and are summarized in the Table of Qualified Analytical Results (page 9).

Overall Data Assessment

Field and laboratory precision, field and laboratory accuracy, method compliance, and data set completeness have been determined to be acceptable, based on the data submitted. No data were missing or rejected. All reported data are suitable for their intended use with the qualifications and clarifications noted.

Table of Samples Analyzed
BNSF Mission Wye Groundwater and Water QC Samples
Pace Analytical of Minneapolis, MN
Laboratory SDG: 10332107
December 2015 Sampling

Table 1

Matrix	Sample ID	Sample Date	Sample Time	Lab SDG	Lab ID	Sample Type
WG	MW-9/12022015	12/2/2015	13:42	10332107	10332107001	N
WQ	FB-01	12/2/2015	13:35	10332107	10332107002	FB
WQ	EB-01	12/2/2015	13:45	10332107	10332107003	EB
WG	MW-4/12022015	12/2/2015	14:32	10332107	10332107004	N
WG	MW-DUP/12022015	12/2/2015	15:00	10332107	10332107005	FD
WG	MW-3/12022015	12/2/2015	15:15	10332107	10332107006	N
WQ	Trip Blank	12/2/2015	00:00	10332107	10332107007	TB

EB = Equipment blank sample
FB = field blank sample
FD = field duplicate sample
ID = identification
N = normal sample
TB = trip blank sample
WG = groundwater sample
WQ = water QC sample

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Project Name: BNSF Mission Wye	Laboratory: Pace Analytical of Minneapolis, MN
Project Reference: Groundwater Monitoring	Sample Matrix: Groundwater and Water QC
AECOM Project: 60333790	Sample Start Date: 12/2/2015
Validator/Date Validated: Anne Kakai 01/26/2016(completed)	Sample End Date: 12/2/2015
Secondary Review by: Steve Szocik	Secondary Review Date: 01/26/2016
Samples Analyzed: Refer to the Table of Samples Analyzed (page 3).	
Parameters Validated: Volatile Organic Compounds (VOCs) by SW-846 GC	
Laboratory Project IDs/Sample Delivery Group (SDG): 10332107	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	AK	Initials

Comments: Precision is the measure of variability of individual sample measurements. Field precision is determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published QC limits. Overall field and laboratory precision is acceptable since data does not require qualification and no data is rejected based on these measurements

Accuracy:	**X**	Acceptable		Unacceptable	AK	Initials

Comments: Field accuracy, a measure of the sampling bias, was determined by reviewing trip blank results for evidence of sample contamination stemming from sampling activities and/or sample transport/bottle contamination. Laboratory accuracy is a measure of the system bias, and is measured by evaluating laboratory control sample/laboratory control sample duplicate (LCS/LCSD), matrix spike/matrix spike duplicate (MS/MSD), and organic system monitoring compounds (surrogate and internal standard) percent recoveries (%Rs). LCS/LCSD %Rs, which demonstrated the overall performance of the analytical procedure, were compared to published or recommended EPA QC limits. MS/MSD %Rs, which provided information on sample matrix interferences, were compared to EPA published QC limits or laboratory control charted limits. System monitoring compound or surrogate recoveries, which measured system performance and efficiency during organic analysis, were compared to EPA published or laboratory QC limits. Some results were qualified because of concentrations less than the reporting limits (see item 6). Overall field and laboratory precision is acceptable since the majority of the data does not require qualification and no data is rejected based on these measurements. Accuracy measurements are reviewed in items 12, 14, 15, and 16.

Method Compliance:	**X**	Acceptable		Unacceptable	AK	Initials

Comments: For this sample set, method compliance was determined by evaluating sample integrity, holding time, and laboratory blanks against method specified requirements, while applying EPA data validation guidelines. Although some data require qualification based estimated results (see item 6), overall method compliance is acceptable since a majority of the data are unqualified and no data are rejected based on these measurements. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20 and 22.

Completeness:	**X**	Acceptable		Unacceptable	AK	Initials

Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and reporting limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and EQuIS electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23.

All of the reported data are usable, some with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

VALIDATION CRITERIA CHECK						
Data validation qualifiers assigned during this review: J estimated concentration The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary. **Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).**						
1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	AK	Initials
Explanation by laboratory: Comments: A few secondary source (SS) verification criteria associated with the LCS was noted to be outside QC acceptance criteria (addressed under item #18). All laboratory case narrative comments are included in the hardcopy (or .pdf) laboratory report. All assigned laboratory flags were also reviewed during the limited validation procedure. Data qualification, if any, related to the narrative comments and/or assigned laboratory flags contained in the analytical reports are discussed in the following sections.						
2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	AK	Initials
Comments: COC records from field to laboratory were complete. Custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt.						
3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	AK	Initials
Comments: All requested analyses, as designated on the supplied COC forms and supporting project documentation, were completed and reported by the laboratory.						
4. Were samples received in good condition and at the appropriate temperature?	**X**	Yes		No	AK	Initials
Comments: All samples were received intact and within acceptable cooler temperatures of 2-6°C as documented on the laboratory's sample receipt documentation.						
5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	AK	Initials
Comments: Reported methods met those requested on the original COC or are compliant with the requested analytes and matrix.						
6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	AK	Initials
Comments: Reported detection limits are achievable by the quoted methods, and are in compliance with the project requirements. **Sample results reported at concentrations ≥ the method detection limit (MDL) but < the limit of quantitation (LOQ)/Reporting Limit (RL) require J qualifiers to indicate estimated concentrations. The analyte cannot be accurately quantitated at this trace concentration level. Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).**						

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	AK	Initials
Comments: The reported target analytes are in compliance with the constituents identified on the COC.						
8. Were sample holding times met?	**X**	Yes		No	AK	Initials
Comments: Sample preparation/extraction and analytical holding times were met for all samples and analyses.						
9. Were correct concentration units reported?	**X**	Yes		No	AK	Initials
Comments: Correct concentration units were reported for all constituents.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	AK	Initials
Comments: Data validation qualifiers override any assigned laboratory data flags.						
11. Were laboratory blank samples free of target analyte contamination?	**X**	Yes		No	AK	Initials
Comments: Laboratory blank samples were free of target analyte contamination. Data qualification is not required.						
12. Were trip blank, field blank, and/or equipment rinse blank samples free of target analyte contamination?		Yes	**X**	No	AK	Initials
Comments: The field blank, equipment blank and trip blank samples were free of target analyte contamination with the exception of a trace detection of Toluene in the trip blank sample (0.19 ug/L). The toluene detection did not affect the associated investigative sample results because all were non-detect for toluene. Data qualification is not required.						
13. Were instrument calibrations within method or data validation control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, instrument calibrations were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that instrument calibrations met acceptance criteria. The laboratory's narrative did not identify any outliers.						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Surrogate %Rs for organic analyses were within laboratory control-charted QC limits (as allowed for SW-846 methods) for all project samples and associated laboratory QC samples.						
15. Were laboratory control sample recoveries within control limits?	**X**	Yes		No	AK	Initials
Comments: Submitted LCS %Rs were within laboratory control-charted QC limits for organic target analytes as allowed for SW-846 organic methods. Data qualification is not required.						
16. Were matrix spike recoveries and % RPDs within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: No project specific matrix spike/matrix spike duplicate (MS/MSD) analysis was performed in this SDG. A LCS/LCSD was analyzed and found to be within QC acceptance criteria. Based on this, there is no adverse effect to data quality and usability and data qualification is not required.						
17. Were serial dilution %Ds within control limits?	**NA**	Yes	**NA**	No	AK	Initials
Comments: *Serial Dilution %Ds: Not applicable for the methods reviewed.*						

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

18. Were organic system performance criteria met?		Yes	**X**	No	AK	Initials
Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers with the exception of the secondary source verification of acetone and tetrahydrofuran in the initial calibration in QC Batch: MSV/33999 for method 8260B. Only the LCS, MS, and MSD were associated to the second source outliers. The reported results for acetone and tetrahydrofuran were considered estimated for the LCS, MS and MSD. The secondary source verification used to analyze the associated investigative samples was within QC acceptance criteria. The percent recoveries (%R) for acetone and tetrahydrofuran were also within the %R limits, however since the referenced analytes are considered estimated in the LCS (reported MS and MSD are not related to the samples reported in this SDG), the associated samples within QC batch MSV/33999 were also qualified as estimated for LCS outlier because the observed recovery may have been affected by the calibration. **Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).**						
19. Were internal standards within method criteria for GC/MS sample analyses?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, organic system performance data were not supplied in analytical laboratory reports. The laboratory's project narrative was utilized to verify that organic system performance requirements were met. The laboratory's narrative did not identify any outliers; therefore, data qualification was not required.						
20. Were inorganic system performance criteria met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: For this level of limited data validation, inorganic system performance data were not applicable.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	AK	Initials

SDG	Primary Sample ID	Duplicate Sample ID	Sample Date
10332107	MW-3/12022015	MW-DUP/12022015	12/2/2015

Comments: The QC acceptance limits for water matrices is 0-30%. All field duplicate/source samples were groundwaters. Field duplicate RPDs were not calculated because results were undetected in both samples. Data qualification is not required.						
22. Were qualitative criteria for organic target analyte identification met?	**NA**	Yes	**NA**	No	AK	Initials
Comments: Not applicable for this level of limited data validation – chromatograms, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review. There were no analyte qualitative flags assigned by the laboratory.						
23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	AK	Initials

ANALYTICAL LIMITED DATA VALIDATION CHECKLIST

Comments: The EDD entries were resolved with the hardcopy data results and corrected as necessary. According to validation protocol, the hardcopy data report was accepted as the correct reference. Qualifiers and reason codes were added to the EDD files for all reportable data. The four EQuIS EDD files were formatted for upload once data validation secondary review was completed.

Additional edits made to the EDD files by the Database Manager prior to data upload are listed below.

Unique sys_loc_codes were assigned to all samples. In order to upload multiple SDGs under one EDD, SDG numbers were appended to all laboratory QC data and dates were appended to trip blank samples in order to keep them unique. Parent sample designations were made for all LCS/LCSD and field duplicate samples.

The result_comment field was updated from <PQL to <LOQ and the interpreted_qualifier field was updated accordingly.

A task_code field was assigned, “MWye_GW_Dec022015”. The QC_level and collection_quarter fields were verified as populated appropriately.

24. General Comments: The Analytical Data Validation Checklist is presented as pages 4-8. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, October 2013 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008), as applied to the reported methodology.

Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).

Table of Qualified Analytical Results
BNSF Mission Wye Groundwater and Water QC Samples
Pace Analytical of Minneapolis, MN
Laboratory SDG: 10332107
December 2015 Sampling

Table 2

SDG	Sample ID	Method	DF	Analyte	Conc	Unit	Qualifier	Reason Code
10332107	MW-9/12022015	8260B	1	Acetone	< 20.0	ug/L	UJ	LCS
10332107	MW-9/12022015	8260B	1	Tetrahydrofuran	< 10.0	ug/L	UJ	LCS
10332107	FB-01	8260B	1	Tetrahydrofuran	< 10.0	ug/L	UJ	LCS
10332107	FB-01	8260B	1	Acetone	< 20.0	ug/L	UJ	LCS
10332107	EB-01	8260B	1	Acetone	< 20.0	ug/L	UJ	LCS
10332107	EB-01	8260B	1	Tetrahydrofuran	< 10.0	ug/L	UJ	LCS
10332107	MW-4/12022015	8260B	1	Acetone	< 20.0	ug/L	UJ	LCS
10332107	MW-4/12022015	8260B	1	Tetrahydrofuran	< 10.0	ug/L	UJ	LCS
10332107	MW-4/12022015	8260B	1	Trichloroethene	0.26	ug/L	J	<LOQ
10332107	MW-DUP/12022015	8260B	1	Acetone	< 20.0	ug/L	UJ	LCS
10332107	MW-DUP/12022015	8260B	1	Tetrahydrofuran	< 10.0	ug/L	UJ	LCS
10332107	MW-3/12022015	8260B	1	Acetone	< 20.0	ug/L	UJ	LCS
10332107	MW-3/12022015	8260B	1	Tetrahydrofuran	< 10.0	ug/L	UJ	LCS
10332107	Trip Blank	8260B	1	Acetone	< 20.0	ug/L	UJ	LCS
10332107	Trip Blank	8260B	1	Tetrahydrofuran	< 10.0	ug/L	UJ	LCS
10332107	Trip Blank	8260B	1	Toluene	0.19	ug/L	J	<LOQ

Notes:
Conc – concentration
DF - dilution factor
ID - identification
SDG – sample delivery group

Reason Codes:

< LOQ - concentration reported is >/= the method detection limit but is < the limit of quantitation/reporting limit
LCS – laboratory control sample recovery outlier; evidence of laboratory contamination

Submitted to:
BNSF

Submitted by:
AECOM
Seattle, WA
April 26, 2016

Organic and Inorganic
Limited Data Validation Report

BNSF – Mission Wye - Livingston, Montana
Groundwater Monitoring Samples
Pace Analytical Laboratory data
March 2016

Prepared By Lucy Panteleeff
Chemist

Overview

The samples analyzed for BNSF – Mission Wye, Livingston, Montana, March 2016 groundwater monitoring sampling event are listed in the Table of Samples Analyzed (page 2). Limited data validation was performed on a total of 4 groundwater samples, 1 field blank, 1 equipment blank, and 1 trip blank sample.

Samples were analyzed by Pace Analytical laboratory located in Minneapolis, Minnesota. The reviewed analysis was volatile organic compounds by EPA Method 8260B.

The Analytical Data Validation Checklist is presented as pages 3-7. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) and *National Functional Guidelines for Inorganic Superfund Data Review*, USEPA OSRTI, document number EPA 540-R-013-001, August 2014 as applied to the reported methodology. Field duplicate relative percent difference (RPD) reviews and applicable control limits were taken from Montana Department of Environmental Qualities' Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Holding times
Method blank results
Organic surrogate recoveries
LCS, LCSD (blank spike, blank spike duplicate) results
MS, MSD (matrix spike, matrix spike duplicate) results
Laboratory duplicate (or spiked duplicate) results
Electronic data deliverables (EDDs) – EQuIS format

Data Validation Qualifiers Assigned During this Review

J Estimated concentration

UJ The analyte was not detected above the reported sample quantitation limit or was qualified as not detected due to blank contamination. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Assigned qualifiers are detailed in the Analytical Data Validation Checklist and are summarized in the Table of Qualified Analytical Results (pages 8).

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for all methods based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use with qualification.

Table of Samples Analyzed
BNSF – Somers
Groundwater Samples
Pace Analytical Laboratory Report 10341911
March 2016

Matrix	Sample ID	Sample Date	Sample Time	Laboratory ID
Water	MW-9/03152016	3/15/2016	16:14	10341911001
Water	FB-01/03152016	3/15/2016	16:05	10341911002
Water	EB-01/03152016	3/15/2016	16:25	10341911003
Water	MW-DUP/03152016 (Duplicate of MW-3/03152016)	3/15/2016	17:00	10341911004
Water	MW-4/03152016	3/15/2016	17:07	10341911005
Water	MW-3/03152016	3/15/2016	17:52	10341911006
Water	Trip Blank	3/15/2016	00:00	10341911007

The sample date suffix (/03152016) are included in this table for completeness, but will not be used in the discussions below.

ANALYTICAL DATA VALIDATION CHECKLIST

Project Name: BNSF Mission Wye	Laboratory: Pace Analytical Laboratory, Minneapolis, Minnesota
Project Reference: 2nd Quarter Groundwater Monitoring – March 2016	Sample Matrix: Groundwater samples
AECOM Project No.: 60436173.300	Sample Start Date: 3/15/2016
Validator/Date Validated: Lucy Panteleeff 4/26/16 (completed)	Sample End Date: 3/15/2016

Samples Analyzed: see Table of Samples Analyzed, BNSF Mission Wye, March 2016 Groundwater Monitoring Samples (page 2).

Parameters Reviewed –
Volatile Organic Compounds (VOC) by 8260B

Laboratory Project IDs/Sample Delivery Group (SDG): 10341911

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	LP	Initials

Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results to the parent sample results. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of field and laboratory duplicates for precision was done using the relative percent difference (RPD) for laboratory control sample/laboratory control sample duplicates, matrix spike/matrix spike duplicates, and/or laboratory duplicates, where applicable. The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published or laboratory control charted QC limits. No data required qualification based on these measurements (item 17), and overall field and laboratory precision are acceptable since a majority of the data are unqualified and no data are rejected. Precision measurements are reviewed in items 17 and 21.

Accuracy: (Laboratory only)	**X**	Acceptable		Unacceptable	LP	Initials

Comments: Field accuracy, a measure of the sampling bias, was determined by reviewing field blank and trip blank results for evidence of contamination stemming from sampling activities and/or transport/bottle contamination. Laboratory accuracy is a measure of the system bias, and was measured by evaluating laboratory control sample, matrix spike, and/or organic system monitoring compound (surrogate) percent recoveries (%Rs). LCS %Rs demonstrated the overall performance of the extraction/analysis. Matrix spike %Rs demonstrated the overall performance of the extraction/analysis, but also takes into consideration interferences from the sample matrix. System monitoring compound or surrogate recoveries measured system performance and efficiency. No data require qualification based on these measurements, and overall field and laboratory accuracy are acceptable. Accuracy measurements are reviewed in items 12, 14, 15, 16, and 20.

Method Compliance:	**X**	Acceptable		Unacceptable	LP	Initials

Comments: For this data set, method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. Although some data required qualification based on method compliance (items 6, 8, 11, 13, 19), overall method compliance is acceptable based on the data reported since a majority of the data are unqualified and no data are rejected. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20, and 22.

ANALYTICAL DATA VALIDATION CHECKLIST

Completeness:	X	Acceptable		Unacceptable	LP	Initials
Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and detection limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23. All of the reported data are usable with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.						
VALIDATION CRITERIA CHECK						
Data validation qualifiers assigned during this review: UJ - The analyte was not detected above the reported sample quantitation limit or was qualified as not detected due to blank contamination. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary. Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 8).						
1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	LP	Initials
Comments: All analytical problems were identified by the laboratory in the report cover letter. The laboratory noted that the report was revised to correct the sample identification for FB-01/03152016. Data qualification, if any, related to the laboratory comments and/or laboratory-assigned data flags are discussed in the following sections.						
2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	LP	Initials
Comments: The COC record from field to laboratory was complete and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. No discrepancies were found.						
3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	LP	Initials
Comments: All requested analyses as documented on the original COC were completed.						
4. Were samples received in good condition and at the appropriate temperature?	**x**	Yes		No	LP	Initials
Comments: Samples were received intact and in good condition with a recorded cooler temperature of 1.0°C.						
5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	LP	Initials
Comments: Reported methods met those requested on the COC or are compliant with the requested analytes and matrix.						

ANALYTICAL DATA VALIDATION CHECKLIST

6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	LP	Initials
Comments: Reported detection limits are achievable by the analytical methods described in the introduction to this report. VOCs by EPA Method 8260B **The results for trichloroethene in MW-4 and MW-9 were reported by the laboratory at concentrations between the method detection limits (MDLs) and the reporting limits and were qualified by the laboratory with 'J' flags. Laboratory 'J'-flagged results are considered estimated results. The analyte cannot be accurately quantitated at this trace concentration level.** Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 8).						
7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	LP	Initials
Comments: Only analytes applicable to the requested methods were reported.						
8. Were sample holding times met?	**X**	Yes		No	LP	Initials
Comments: Extraction and/or analytical holding times were met for all samples and analyses.						
9. Were correct concentration units reported?	**X**	Yes		No	LP	Initials
Comments: Correct concentration units were reported. All organic data was reported as ug/L.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	LP	Initials
Comments: Any laboratory-assigned flags were reviewed and evaluated during the limited validation process. Data validation qualifiers, if assigned, override any laboratory-assigned data flags.						
11. Were laboratory blank samples free of target analyte contamination?	**X**	Yes		No	LP	Initials
Comments: Laboratory blanks for VOCs were free of target analyte contamination.						
12. Were trip blank, and/or field blank samples free of target analyte contamination?		Yes	**X**	No	LP	Initials
Comments: The trip and/or field blanks for VOCs were free of target analyte contamination with the exception of acetone, 2-butanone, tetrahydrofuran, and toluene in FB-01 and EB-01. With the exception of 2-butanone, these analytes were reported at concentrations less than the MDLs and above the reporting limits. 2-Butanone was reported at a concentration above the reporting limit. As the results for these analytes were not detected in any of the associated samples, data were not qualified based on these field blanks results.						
13. Were instrument calibrations within method or data validation control limits?		Yes	**X**	No	LP	Initials
Comments: Not applicable for this level of limited data validation – Instrument calibration data were not supplied in the analytical laboratory reports but the laboratory noted that the continuing calibration verification for the VOC bromomethane was outside control limits, with a low bias. VOCs by 8260B **The results for bromomethane in FB-01, EB-01, MW-DUP, MW-4, MW-3, and the trip blank associated with this data set were qualified as estimated and flagged 'UJ' based on this continuing calibration outlier.**						

ANALYTICAL DATA VALIDATION CHECKLIST

14. Were surrogate recoveries within control limits?		Yes	**X**	No	LP	Initials
Comments: Surrogate percent recoveries (%Rs) were within method/laboratory QC limits for all project samples and associated QC samples with the exception of 4-bromofluorobenzene in a matrix spike performed on a sample from an unrelated project (135%). Data are not qualified based on this QC sample surrogate outlier.						
15. Were laboratory control sample recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: LCS %Rs were within method/laboratory QC limits.						
16. Were matrix spike recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: Matrix spike/matrix spike duplicates were performed using two samples from projects unrelated to the Mission Wye groundwater monitoring. One or more VOCs were outside the control limits; however, data were not qualified based on these MS/MSD outliers.						
17. Were duplicate RPDs and/or serial dilution %Ds within control limits?		Yes		No	LP	Initials
Comments: One or more MS/MSD RPDs exceeded the control limit of 30%. As noted in Section 16, the MS/MSDs were performed using samples from projects unrelated to Mission Wye; therefore, data were not qualified based on these laboratory duplicate RPD outliers.						
18. Were organic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Organic system performance data were not supplied in analytical laboratory reports and are therefore not included in this data review.						
19. Were internal standards within method criteria for GC/MS sample analyses?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – GC/MS internal standard data were not supplied in analytical laboratory reports.						
20. Were inorganic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation or for the reported methods.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	LP	Initials
Duplicate Sample No.	MW-DUP	Primary Sample No.	MW-3			
Comments: Field duplicate RPDs were within data validation QC limits of 0-30% for aqueous matrices, or RPDs were not applicable due to results that were not detected in one or both samples or for results less than 5 times the reporting limit.						
22. Were qualitative criteria for organic target analyte identification met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Chromatographs, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review.						

ANALYTICAL DATA VALIDATION CHECKLIST

23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	LP	Initials
Comments: During the limited validation procedure, 100% of the positive sample concentrations and 100% of the LOQ/RLs for project samples were compared to hardcopy laboratory reports. No discrepancies were noted. The data validator made sure that LOQ/RLs and MDLs (EDDs only) were entered into the correct EDD fields, and that correct method references were noted. The AECOM project manager was informed of all changes made to the EDD files via this Checklist. The EDD files, with any corrections made, were imported into the EQuIS project database by the data validator on 4/26/16.						
24. General Comments: Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) and National Functional Guidelines for Inorganic Superfund Data Review, USEPA OSRTI, document number EPA 540-R-013-001, August 2014 as applied to the reported methodology. Field duplicate Relative Percent Difference (RPD) reviews and applicable control limits were taken from the *EPA New England Environmental Data Review Supplement For Regional Data Review Elements and Superfund Specific Guidance/Procedures April 22, 2013,* document number EQADR-Supplement 0.						

Table of Qualified Analytical Results
BNSF - Mission Wye
March 2016 Groundwater Monitoring
Pace Analytical Laboratory Group 10341991

SDG	Sample ID	PACE ID	Method	Analyte	Laboratory Result	Units	Final Result	Reason Code
10341991	FB-01/03152016	10341991002	8260B	Bromomethane	0.36 U	ug/l	0.36 UJ	cv
10341991	EB-01/03152016	10341991003	8260B	Bromomethane	0.36 U	ug/l	0.36 UJ	cv
10341991	MW-DUP/031520	10341991004	8260B	Bromomethane	0.36 U	ug/l	0.36 UJ	cv
10341991	MW-4/03152016	10341991005	8260B	Bromomethane	0.36 U	ug/l	0.36 UJ	cv
10341991	MW-3/03152016	10341991006	8260B	Bromomethane	0.36 U	ug/l	0.36 UJ	cv
10341991	Trip Blank	10341991007	8260B	Bromomethane	0.36 U	ug/l	0.36 UJ	cv

cv - continuing calibration verification outlier

Submitted to:
BNSF

Submitted by:
AECOM
Seattle, WA
July 19, 2016

Organic
Limited Data Validation Report

BNSF – Mission Wye - Livingston, Montana
FS Pilot Study Quarterly Groundwater Monitoring Samples
Pace Analytical Laboratory data
June 2016

Prepared By Lucy Panteleeff
Chemist

Overview

The samples analyzed for BNSF – Mission Wye, Livingston, Montana, June 2016 FS Pilot Study quarterly groundwater monitoring sampling event are listed in the Table of Samples Analyzed (page 2). Limited data validation was performed on a total of 6 groundwater samples, 1 field blank, 1 equipment blank, and 1 trip blank sample.

Samples were analyzed by Pace Analytical laboratory located in Minneapolis, Minnesota. The reviewed analysis was volatile organic compounds by EPA Method 8260B.

The Analytical Data Validation Checklist is presented as pages 3-7. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate relative percent difference (RPD) reviews and applicable control limits were taken from Montana Department of Environmental Qualities' Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Holding times
Method, field, and trip blank results
Organic surrogate recoveries
LCS (blank spike) results
MS (matrix spike) results
Laboratory duplicate (or spiked duplicate) and field duplicate results
Electronic data deliverables (EDDs) – EQuIS format

Data Validation Qualifiers Assigned During this Review

U The analyte was detected above the reported sample method detection limit; however, the result was qualified as not detected due to blank contamination.

Assigned qualifiers are detailed in the Analytical Data Validation Checklist and are summarized in the Table of Qualified Analytical Results (pages 8).

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for all methods based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use with qualification.

Table of Samples Analyzed
BNSF – Mission Wye
FS Pilot Study Quarterly Groundwater Samples
Pace Analytical Laboratory Report 10354639
June 2016

Matrix	Sample ID	Sample Date	Sample Time	Laboratory ID
Water	FB-01/06302016	6/30/2016	11:15	10354639001
Water	MW-01/06302016	6/30/2016	11:25	10354639002
Water	MW-9/06302016	6/30/2016	13:02	10354639003
Water	MW-4/06302016	6/30/2016	15:00	10354639004
Water	EB/01/06302016	6/30/2016	15:05	10354639005
Water	MW-DUP/06302016 (Duplicate of MW-3/06302016)	6/30/2016	14:14	10354639006
Water	MW-3/06302016	6/30/2016	15:55	10354639007
Water	MW-22/06302016	6/30/2016	16:35	10354639008
Water	Trip Blank	6/30/2016	00:00	10354639009

The sample date suffix (/06302016) are included in this table for completeness, but will not be used in the discussions below.

ANALYTICAL DATA VALIDATION CHECKLIST

Project Name: BNSF Mission Wye	Laboratory: Pace Analytical Laboratory, Minneapolis, Minnesota
Project Reference: FS Pilot Study Groundwater Monitoring – June 2016	Sample Matrix: Groundwater samples
AECOM Project No.: 60508912.300	Sample Start Date: 6/30/2016
Validator/Date Validated: Lucy Panteleeff 7/22/16 Peer Reviewer/Date Reviewed: Jennifer B. Garner 7/22/16 (completed)	Sample End Date: 6/30/2016
Samples Analyzed: see Table of Samples Analyzed, BNSF Mission Wye, FS Pilot Study June 2016 Groundwater Monitoring Samples (page 2).	
Parameters Reviewed – Volatile Organic Compounds (VOC) by 8260B	
Laboratory Project IDs/Sample Delivery Group (SDG): 10354639	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	LP	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results to the parent sample results. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of field and laboratory duplicates for precision was done using the relative percent difference (RPD) for field and laboratory duplicates, where applicable. The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. RPD limits referenced EPA published or laboratory control charted QC limits. No data required qualification based on these measurements (item 17), and overall field and laboratory precision are acceptable since a majority of the data are unqualified and no data are rejected. Precision measurements are reviewed in items 17 and 21.						
Accuracy: (Laboratory only)	**X**	Acceptable		Unacceptable	LP	Initials
Comments: Field accuracy, a measure of the sampling bias, was determined by reviewing field blank and trip blank results for evidence of contamination stemming from sampling activities and/or transport/bottle contamination. Laboratory accuracy is a measure of the system bias, and was measured by evaluating laboratory control sample, matrix spike, and/or organic system monitoring compound (surrogate) percent recoveries (%Rs). LCS %Rs demonstrated the overall performance of the extraction/analysis. Matrix spike %Rs demonstrated the overall performance of the extraction/analysis, but also takes into consideration interferences from the sample matrix. System monitoring compound or surrogate recoveries measured system performance and efficiency. No data require qualification based on these measurements, and overall field and laboratory accuracy are acceptable. Accuracy measurements are reviewed in items 12, 14, 15, 16, and 20.						
Method Compliance:	**X**	Acceptable		Unacceptable	LP	Initials
Comments: For this data set, method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. Although some data required qualification based on method compliance (item 11), overall method compliance is acceptable based on the data reported since a majority of the data are unqualified and no data are rejected. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20, and 22.						

ANALYTICAL DATA VALIDATION CHECKLIST

Completeness:	X	Acceptable		Unacceptable	LP	Initials
Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and detection limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23. All of the reported data are usable with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.						
VALIDATION CRITERIA CHECK						
Data validation qualifiers assigned during this review: U - The analyte was not detected above the reported sample quantitation limit and was qualified as not detected due to blank contamination. The following comments identifying sample results requiring qualification are in bold type. The other comments are of interest, but qualification of the sample results is not necessary. Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 8).						
1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	LP	Initials
Comments: All analytical problems were identified by the laboratory in the report cover letter. The laboratory noted that the some analytes were detected in the method blank. Data qualification, if any, related to the laboratory comments and/or laboratory-assigned data flags are discussed in the following sections.						
2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	LP	Initials
Comments: The COC record from field to laboratory was complete and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. No discrepancies were found.						
3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	LP	Initials
Comments: All requested analyses as documented on the original COC were completed.						
4. Were samples received in good condition and at the appropriate temperature?	**x**	Yes		No	LP	Initials
Comments: Samples were received intact and in good condition with a recorded cooler temperature of 4.6°C.						
5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	LP	Initials
Comments: Reported methods met those requested on the COC or are compliant with the requested analytes and matrix.						

ANALYTICAL DATA VALIDATION CHECKLIST

6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	LP	Initials
Comments: Reported detection limits are achievable by EPA Method 8260B. <u>VOCs by EPA Method 8260B</u> **The results for several analytes were reported by the laboratory at concentrations between the method detection limits (MDLs) and the reporting limits and were qualified by the laboratory with 'J' flags. Laboratory 'J'-flagged results are considered estimated results. The analyte cannot be accurately quantitated at this trace concentration level.** Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 8).						
7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	LP	Initials
Comments: Only analytes applicable to the requested methods were reported.						
8. Were sample holding times met?	**X**	Yes		No	LP	Initials
Comments: Extraction and/or analytical holding times were met for all samples and analyses.						
9. Were correct concentration units reported?	**X**	Yes		No	LP	Initials
Comments: Correct concentration units were reported. All organic data was reported as ug/L.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	LP	Initials
Comments: Any laboratory-assigned flags were reviewed and evaluated during the limited validation process. Data validation qualifiers, if assigned, override any laboratory-assigned data flags.						
11. Were laboratory blank samples free of target analyte contamination?		Yes	**X**	No	LP	Initials
Comments: **Laboratory blanks for VOCs were free of target analyte contamination with the exceptions of acetone, 1,4-dichlorobenzene, 1,2-dichloroethane, methylene chloride, naphthalene, and 1,2,4-trimethylbenzene. These analytes were reported at concentrations less than the MDLs and above the reporting limits in the associated method blank. Using the *National Functional Guidelines for Superfund Organic Methods Data Review* (August 2014) criteria, results for these analytes were qualified as follows:** **The results for acetone in MW-9, EB/01, and the trip blank; 1,4-dichlorobenzene in MW-4; 1,2-dichloroethane in FB-01, MW-01, MW-9, MW-4, EB/01, MW-DUP, MW-3, MW-22, and the trip blank; methylene chloride in FB-01 and EB/01; and naphthalene and 1,2,4-trimethylbenzene in the trip blank were reported at concentrations between the MDLs and the reporting limits; therefore, the results for these analytes in these samples were qualified as not detected and flagged 'U' at the reporting limits.**						
12. Were trip blank, and/or field blank samples free of target analyte contamination?		Yes	**X**	No	LP	Initials
Comments: The trip and/or field blanks for VOCs were free of target analyte contamination with the exceptions of acetone, 1,2-dichloroethane, naphthalene, toluene, and 1,2,4-trimethylbenzene in the trip blank; 1,2-dichloroethane and methylene chloride in FB-1; and acetone, 1,2-dichloroethane, and methylene chloride in EB/01. With the exception of toluene, results for these analytes were qualified as not detected and flagged 'U' based on method blank contamination as described in Section 11, therefore; no further qualification for these analytes is necessary. As toluene was not detected in any of the associated samples, data were not qualified based on toluene contamination in the trip blank.						

ANALYTICAL DATA VALIDATION CHECKLIST

13. Were instrument calibrations within method or data validation control limits?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Instrument calibration data were not provided in the analytical laboratory reports and were not evaluated during this data review; however, the laboratory indicated in the case narrative that instrument calibrations were within method limits.						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: Surrogate percent recoveries (%Rs) were within method/laboratory QC limits for all project samples and associated QC samples.						
15. Were laboratory control sample recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: LCS %Rs were within method/laboratory QC limits.						
16. Were matrix spike recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: A matrix spike was performed using a sample from a project unrelated to the Mission Wye FS Pilot Study groundwater monitoring. Results were acceptable.						
17. Were duplicate RPDs and/or serial dilution %Ds within control limits?	**X**	Yes		No	LP	Initials
Comments: A duplicate was performed using a sample from a project unrelated to the Mission Wye FS Pilot Study groundwater monitoring. Results were comparable.						
18. Were organic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Organic system performance data were not supplied in analytical laboratory reports and are therefore not included in this data review.						
19. Were internal standards within method criteria for GC/MS sample analyses?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – GC/MS internal standard data were not provided in analytical laboratory reports and were not evaluated during this data review; however, the laboratory indicated in the case narrative that internal standards were with method criteria.						
20. Were inorganic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for the reported method.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	LP	Initials
Duplicate Sample No.	MW-DUP	Primary Sample No.	MW-3			
Comments: Field duplicate RPDs were within data validation QC limits of 0-30% for aqueous matrices, or RPDs were not applicable due to results that were not detected in one or both samples and/or for results less than 5 times the reporting limit.						
22. Were qualitative criteria for organic target analyte identification met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Chromatographs, library searches, and quantitation reports were not supplied in analytical laboratory reports and were therefore not included in this data review.						

ANALYTICAL DATA VALIDATION CHECKLIST

23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	LP	Initials
Comments: During the limited validation procedure, 100% of the positive sample concentrations and 100% of the LOQ/RLs for project samples were compared to hardcopy laboratory reports. No discrepancies were noted. The data validator made sure that LOQ/RLs and MDLs (EDDs only) were entered into the correct EDD fields, and that correct method references were noted. The AECOM project manager was informed of all changes made to the EDD files via this Checklist. The EDD files, with any corrections made, were imported into the EQuIS project database by the data validator on 8/1/16.						
24. General Comments: Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) and National Functional Guidelines for Inorganic Superfund Data Review, USEPA OSRTI, document number EPA 540-R-013-001, August 2014 as applied to the reported methodology. Field duplicate Relative Percent Difference (RPD) reviews and applicable control limits were taken from the *EPA New England Environmental Data Review Supplement For Regional Data Review Elements and Superfund Specific Guidance/Procedures April 22, 2013,* document number EQADR-Supplement 0.						

Table of Qualified Analytical Results
BNSF - Mission Wye
FS Pilot Study 2016 Groundwater Monitoring
Pace Analytical Laboratory Group 10354639

SDG	Sample ID	PACE ID	Method	Analyte	Method Detection Limit	Laboratory Reporting Limit	Laboratory Result	Units	Final Result	Reason Code
10354639	FB-01/06302016	10354639001	8260B	1,2-Dichloroethane	0.072	1.0	0.13 J	ug/l	1.0 U	bl
10354639	FB-01/06302016	10354639001	8260B	Methylene chloride	0.097	4.0	0.45 J	ug/l	4.0 U	bl
10354639	MW-01/06302016	10354639002	8260B	1,2-Dichloroethane	0.072	1.0	0.19 J	ug/l	1.0 U	bl
10354639	MW-9/06302016	10354639003	8260B	1,2-Dichloroethane	0.072	1.0	0.13 J	ug/l	1.0 U	bl
10354639	MW-9/06302016	10354639003	8260B	Acetone	0.64	20.0	0.96 J	ug/l	20.0 U	bl
10354639	MW-4/06302016	10354639004	8260B	1,2-Dichloroethane	0.072	1.0	0.12 J	ug/l	1.0 U	bl
10354639	MW-4/06302016	10354639004	8260B	1,4-Dichlorobenzene	0.081	1.0	0.34 J	ug/l	1.0 U	bl
10354639	EB/01/06302016	10354639005	8260B	1,2-Dichloroethane	0.072	1.0	0.16 J	ug/l	1.0 U	bl
10354639	EB/01/06302016	10354639005	8260B	Acetone	0.64	20.0	1.6 J	ug/l	20.0 U	bl
10354639	EB/01/06302016	10354639005	8260B	Methylene chloride	0.097	4.0	0.45 J	ug/l	4.0 U	bl
10354639	MW-DUP/06302016	10354639006	8260B	1,2-Dichloroethane	0.072	1.0	0.16 J	ug/l	1.0 U	bl
10354639	MW-3/06302016	10354639007	8260B	1,2-Dichloroethane	0.072	1.0	0.15 J	ug/l	1.0 U	bl
10354639	MW-22/06302016	10354639008	8260B	1,2-Dichloroethane	0.072	1.0	0.16 J	ug/l	1.0 U	bl
10354639	TRIP BLANK	10354639009	8260B	1,2,4-Trimethylbenzene	0.068	1.0	0.12 J	ug/l	1.0 U	bl
10354639	TRIP BLANK	10354639009	8260B	1,2-Dichloroethane	0.072	1.0	0.17 J	ug/l	1.0 U	bl
10354639	TRIP BLANK	10354639009	8260B	Acetone	0.64	20.0	1.5 J	ug/l	20.0 U	bl
10354639	TRIP BLANK	10354639009	8260B	Naphthalene	0.064	4.0	0.094 J	ug/l	4.0 U	bl

bl - laboratory blank contamination

J - result was reported between the method detection limit and the laboratory reporting limit.

U - laboratory result was qualified as not detected. See the associated Limited Data Validation Report for details.

Submitted to:
BNSF

Submitted by:
AECOM
Seattle, WA
August 3, 2016

Organic
Limited Data Validation Report

BNSF – Mission Wye - Livingston, Montana
2016 Annual Groundwater Monitoring
Pace Analytical Laboratory data
July 2016

Prepared By: Lucy Panteleeff, Chemist
Reviewed By: Jennifer B. Garner, Chemist

Overview

The samples analyzed for BNSF – Mission Wye, Livingston, Montana, July 2016 Annual Groundwater Monitoring sampling event are listed in the Table of Samples Analyzed (page 2). Limited data validation was performed on a total of 14 groundwater samples, one equipment blank, one field blank, and 2 trip blank samples.

Samples were analyzed by Pace Analytical laboratory located in Minneapolis, Minnesota. The reviewed analyses were volatile organic compounds by EPA Method 8260B and EPA Method 524.2.

The Analytical Data Validation Checklist is presented as pages 3-8. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate relative percent difference (RPD) reviews and applicable control limits were taken from Montana Department of Environmental Qualities' Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Holding times
Method, trip, equipment, and field blank results
Organic surrogate recoveries
LCS,LCSD (blank spike, blank spike duplicate) results
MS (matrix spike) results
Laboratory duplicate (or spiked duplicate) and field duplicate
Electronic data deliverables (EDDs) – EQuIS format

Laboratory and Data Validation Qualifiers

J The analyte was detected above the reported sample method detection limit. The result is an estimated value.

U The analyte was not detected above the reported sample method detection limit. In some cases, the analyte was detected above the reported sample method detection limit; however, the result was qualified as not detected at the laboratory reporting limit due to blank contamination.

UJ The analyte was not detected above the reported sample method detection limit. However, the reported method detection limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Assigned qualifiers are detailed in the Analytical Data Validation Checklist and are summarized in the Table of Qualified Analytical Results (page 9).

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for all methods based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use with qualification.

Table of Samples Analyzed
BNSF – Mission Wye
2016 Annual Groundwater Monitoring
Pace Analytical Laboratory Report 10354908
July 2016

Matrix	Sample ID	Sample Date	Sample Time	Laboratory ID
Water	MW-1	7/6/2016	10:30	10354908001
Water	MW-19	7/6/2016	12:40	10354908002
Water	MW-18	7/6/2016	15:10	10354908003
Water	MW-14	7/6/2016	15:58	10354908004
Water	MW-12	7/6/2016	16:42	10354908005
Water	Gravel Pit Well	7/6/2016	17:15	10354908006
Water	Gravel Pit Pond	7/7/2016	13:45	10354908007
Water	MW-9	7/7/2016	08:00	10354908008
Water	MW-32 (Equipment blank)	7/7/2016	08:20	10354908009
Water	MW-4	7/7/2016	09:00	10354908010
Water	MW-33 (Duplicate of MW-4)	7/7/2016	09:20	10354908011
Water	MW-30 (Field blank)	7/7/2016	10:30	10354908012
Water	MW-5	7/7/2016	10:35	10354908013
Water	MW-3	7/7/2016	11:28	10354908014
Water	MW-22	7/7/2016	12:02	10354908015
Water	MW-21	7/7/2016	12:44	10354908016
Water	Trip Blank	7/6/2016	00:00	10354908017
Water	Trip Blank	7/6/2016	00:00	10354908018

ANALYTICAL DATA VALIDATION CHECKLIST

Project Name: BNSF Mission Wye	Laboratory: Pace Analytical Laboratory, Minneapolis, Minnesota
Project Reference: Annual Groundwater Monitoring – July 2016	Sample Matrix: Groundwater samples
AECOM Project No.: 60484659.310	Sample Start Date: 7/6/2016
Validator/Date Validated: Lucy Panteleeff 8/3/16 Peer Reviewer/Date Reviewed: Jennifer B. Garner 8/3/16 (completed)	Sample End Date: 7/7/2016
Samples Analyzed: see Table of Samples Analyzed, BNSF Mission Wye, 2016 Annual Groundwater Monitoring (page 2).	
Parameters Reviewed: Volatile Organic Compounds (VOCs) by EPA Method 8260B VOCs by EPA Method 524.2	
Laboratory Project IDs/Sample Delivery Group (SDG): 10354908	

PRECISION, ACCURACY, METHOD COMPLIANCE, AND COMPLETENESS ASSESSMENT

Precision:	**X**	Acceptable		Unacceptable	LP	Initials
Comments: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results to the primary sample results. Laboratory precision was determined by examination of laboratory duplicate results. Evaluation of field and laboratory duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate sample results divided by the mean and expressed as a percent. RPD limits referenced EPA published or laboratory control charted QC limits. No data required qualification based on these measurements, and overall field and laboratory precision were acceptable. Precision measurements are discussed in items 17 and 21.						
Accuracy: (Laboratory only)	**X**	Acceptable		Unacceptable	LP	Initials
Comments: Field accuracy, a measure of the sampling bias, was determined by reviewing equipment rinse, field, and trip blank results for evidence of contamination stemming from sampling activities and/or transport/bottle contamination. Laboratory accuracy is a measure of the system bias, and was measured by evaluating laboratory control sample (LCS), laboratory control sample duplicate (LCSD), matrix spike (MS), and organic system monitoring compound (surrogate) percent recoveries (%Rs). LCS and LCSD %Rs demonstrated the overall performance of the extraction/analysis. MS %Rs provided information on sample matrix interferences. System monitoring compound or surrogate recoveries measured system performance and efficiency during organic analysis. The %Rs were compared to EPA published and/or laboratory control charted QC limits. Some data required qualification based on these measurements; however, overall field and laboratory accuracy were acceptable. Accuracy measurements are reviewed in items 12, 14, 15, 16, and 20.						
Method Compliance:	**X**	Acceptable		Unacceptable	LP	Initials
Comments: For this data set, method compliance was determined by evaluating sample integrity, holding time, reporting limits, and laboratory blanks against method specified requirements. Although some data required qualification based on method blank compliance (item 11), overall method compliance is acceptable based on the data reported since a majority of the data are unqualified and no data are rejected. Method compliance measurements are reviewed in items 4, 6, 8, 11, 13, 18, 19, 20, and 22.						

ANALYTICAL DATA VALIDATION CHECKLIST

Completeness:	X	Acceptable		Unacceptable	LP	Initials
Comments: Completeness is the overall ratio of the number of samples planned versus the number of samples with valid analyses. Review completeness goals were set at 90-100%. Determination of completeness included a review of chain of custody records, laboratory analytical methods, and detection limits. Completeness also included 100% review of the laboratory sample data results, QC summary reports, and electronic data deliverables (EDDs). Any EDD modifications were made as documented in item 23. All of the reported data are usable with qualification. Since no data are missing or rejected, completeness of the dataset is calculated to be 100% and is acceptable.						
VALIDATION CRITERIA CHECK						
Data validation qualifiers assigned by the laboratory and/or assigned during this review: J - The analyte was detected above the reported sample method detection limit. The result is an estimated value. U - The analyte was not detected above the reported sample method detection limit. In some cases, the analyte was detected above the reported sample method detection limit; however, the result was qualified as not detected at the laboratory reporting limit due to blank contamination. UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. The following comments identifying sample results requiring qualification are in **bold** type. Comments in *italics* are not applicable to this level of limited validation. The other comments are of interest, but qualification of the sample results is not necessary. Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).						
1. Did the laboratory identify any non-conformances related to the analytical results?	**X**	Yes		No	LP	Initials
Comments: All analytical problems were identified by the laboratory in the report cover letter. The laboratory noted that the some analytes were detected in the method blanks. The laboratory also noted percent difference outliers in the continuing calibration verification, as well as %R and/or RPDs outliers in the LCS/LCSDs and matrix spikes. Data qualification, if any, related to the laboratory comments and/or laboratory-assigned data flags are discussed in the following sections.						
2. Were sample Chain-of-Custody forms complete?	**X**	Yes		No	LP	Initials
Comments: The COC record from field to laboratory was complete and custody was maintained as evidenced by field and laboratory personnel signatures, dates, and times of receipt. No discrepancies were found.						
3. Were all the analyses requested for the samples on the COCs completed by the laboratory?	**X**	Yes		No	LP	Initials
Comments: All requested analyses as documented on the original COC were completed.						
4. Were samples received in good condition and at the appropriate temperature?	**x**	Yes		No	LP	Initials
Comments: Samples were received intact and in good condition with a recorded cooler temperature of 3.9°C.						

ANALYTICAL DATA VALIDATION CHECKLIST

5. Were the reported analytical methods in compliance with WP/QAPP, permit, or COC?	**X**	Yes		No	LP	Initials
Comments: Reported methods met those requested on the COC or are compliant with the requested analytes and matrix.						
6. Were detection limits in accordance with WP/QAPP, permit, or method?	**X**	Yes		No	LP	Initials
Comments: Reported detection limits are achievable by EPA Method 8260B or EPA Method 524.2. <u>VOCs by EPA Method 8260B</u> **The results for several analytes were reported by the laboratory at concentrations between the method detection limits (MDLs) and the reporting limits and were qualified by the laboratory with 'J' flags. Laboratory 'J'-flagged results are considered estimated results. The analyte cannot be accurately quantitated at this trace concentration level.** Refer to the Table of Qualified Analytical Results for a listing of the samples, analytes, and concentrations qualified (page 9).						
7. Do the laboratory reports include only those constituents requested to be reported for a specific analytical method?	**X**	Yes		No	LP	Initials
Comments: Only analytes applicable to the requested methods were reported.						
8. Were sample holding times met?	**X**	Yes		No	LP	Initials
Comments: Extraction and/or analytical holding times were met for all reported samples and analyses. <u>VOCs by EPA Method 8260B</u> The laboratory noted that the samples were re-extracted outside of holding time due to method blank contamination. Analytes detected in the initial method blank and in one or more associated samples were not detected in the re-analysis method blank or associated samples. The laboratory elected to not report the re-analysis results due to analytical holding time exceedances.						
9. Were correct concentration units reported?	**X**	Yes		No	LP	Initials
Comments: Correct concentration units were reported. All organic data was reported as ug/L.						
10. Were the reporting requirements for flagged data met?	**X**	Yes		No	LP	Initials
Comments: Any laboratory-assigned flags were reviewed and evaluated during the limited validation process. Data validation qualifiers, if assigned, override any laboratory-assigned data flags.						

ANALYTICAL DATA VALIDATION CHECKLIST

11. Were laboratory blank samples free of target analyte contamination?		Yes	**X**	No	LP	Initials
Comments: Laboratory blanks for VOCs were free of target analyte contamination with the exceptions of 1,2-dichloroethane, acetone, naphthalene, and trichloroethene in the method blank associated with sample analysis batch 425670 and 1,2-dichloroethane, 1,4-dichlorobenzene, hexachloro-1,3-butadiene, and naphthalene associated with the method blank in analysis batch 425672. These analytes were reported at concentrations above the MDLs and below the reporting limits in the associated method blanks. VOCs by EPA Method 8260B **The results for 1,2-dichloroethane in all the samples in this data set; acetone in MW-19 and MW-18; naphthalene in MW-1, MW-19, MW-18, MW-14, and the trip blank; and trichloroethene in MW-1 were reported at concentrations between the MDLs and the reporting limits. Using guidance from the *National Functional Guidelines for Superfund Organic Methods Data Review* (August 2014), the results for these analytes in these samples were qualified as not detected and flagged 'U' at the reporting limits.** The remaining results associated with these method blanks were either reported at concentrations significantly above the blank contamination or were reported as not detected; therefore, no further qualification based on these method blank results was required.						
12. Were trip blank, and/or field blank samples free of target analyte contamination?		Yes	**X**	No	LP	Initials
Comments: The trip and/or field blanks for VOCs were free of target analyte contamination with the exceptions of acetone, 1,2-dichloroethane, and naphthalene in the trip blank and acetone, chloroform, 1,2-dichloroethane, methylene chloride, and toluene in equipment blank and field blank. With the exception of toluene in the field blank, these analytes were reported at concentrations above the MDLs and below the reporting limits. The results for 1,2-dichloroethane and/or naphthalene in the associated samples were qualified as not detected and flagged 'U' based on method blank contamination as described in Section 11; therefore, no further qualification for these analytes was necessary. **VOCs by EPA Method 8260B** **The results for acetone in MW-3, Gravel Pit Pond, MW-30, MW-32, and the trip blank; chloroform in Gravel Pit Pond, MW-32, and MW-30; methylene chloride in MW-32 and MW-30; and toluene in MW-32 were reported at concentrations between the MDLs and the reporting limits. Using guidance from the *National Functional Guidelines for Superfund Organic Methods Data Review* (August 2014), the results for these analytes in these samples were qualified as not detected and flagged 'U' at the reporting limits.**						
13. Were instrument calibrations within method or data validation control limits?		Yes	**X**	No	LP	Initials
Comments: *Not applicable for this level of limited data validation – Instrument calibration data were not provided in the analytical laboratory reports and were not assessed during this data review; however, the laboratory indicated in the case narrative that the instrument calibrations and continuing calibrations were acceptable with the exception noted below*. VOCs by 524.2 **The laboratory noted the continuing calibration verification analyzed on July 18, 2016, was outside control limits, with a low bias, for the VOC bromomethane. The results for bromomethane in Gravel Pit Well and the trip blank associated with this analysis were qualified as estimated and flagged 'UJ' based on this continuing calibration outlier.**						
14. Were surrogate recoveries within control limits?	**X**	Yes		No	LP	Initials
Comments: Surrogate percent recoveries (%Rs) were within method/laboratory QC limits for all project samples and associated QC samples.						

ANALYTICAL DATA VALIDATION CHECKLIST

15. Were laboratory control sample/laboratory control sample duplicate recoveries within control limits?		Yes	**X**	No	LP	Initials
Comments: VOCs by 524.2 LCS/LCSD %Rs were within method/laboratory QC limits with the exception of bromomethane in the LCS analyzed on July 18, 2016. As the %R in the LCSD and the RPD for the LCS/LCSD pair were acceptable, data were not qualified for bromomethane based on the LCS result. VOCs by 8260 LCS and/or LCSD %Rs were within method/laboratory QC limits with the exception of tetrahydrofuran in the LCS analyzed on July 16, 2016, and associated with analysis batch 425672. As the %R in the LCSD and the RPD for the LCS/LCSD pair were acceptable, data were not qualified for tetrahydrofuran based on this LCS result.						
16. Were matrix spike recoveries within control limits?		Yes	**X**	No	LP	Initials
Comments: VOCs by 524.2 A matrix spike was performed using a sample from a project unrelated to the Mission Wye 2016 Annual Groundwater Monitoring project. One or more VOC %Rs were outside the control limits; however, data were not qualified based on these MS/MSD outliers. VOCs by 8260 Matrix spikes were performed using MW-12 and a sample from a project unrelated to the Mission Wye 2016 Annual Groundwater Monitoring project. Results were acceptable.						
17. Were duplicate RPDs and/or serial dilution %Ds within control limits?		Yes	**X**	No	LP	Initials
Comments: VOCs by 524.2 A laboratory duplicate was performed using a sample from a project unrelated to the Mission Wye 2016 Annual Groundwater Monitoring project. Results were comparable. LCS/LCSD RPDs were within the control limit of 20%. VOCs by 8260 Laboratory duplicates were performed using Gravel Pit Pond and a sample from a project unrelated to the Mission Wye 2016 Annual Groundwater Monitoring project. Results were comparable. LCS/LCSD RPDs were within the control limit of 20% with the exception of chloromethane in the LCS/LCSD analyzed on July 16, 2016 and associated with analysis batch 425672. As the %Rs in the LCS and LCSD were acceptable, data were not qualified for chloromethane based on the elevated RPD.						
18. Were organic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Organic system performance data were not provided in analytical laboratory reports and were not assessed during this data review.						
19. Were internal standards within method criteria for GC/MS sample analyses?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – GC/MS internal standard data were not provided in analytical laboratory reports and were not assessed during this data review; however, the laboratory indicated in the case narrative that internal standards were within method criteria.						

ANALYTICAL DATA VALIDATION CHECKLIST

20. Were inorganic system performance criteria met?		Yes		No	LP	Initials
Comments: Not applicable for the reported methods.						
21. Were blind field duplicates collected? If so, discuss the precision (RPD) of the results.	**X**	Yes		No	LP	Initials
Duplicate Sample No.	MW-33	Primary Sample No.	MW-4			
Comments: Field duplicate RPDs were not applicable due to results that were not detected in one or both samples and/or for results less than 5 times the reporting limits.						
22. Were qualitative criteria for organic target analyte identification met?		Yes		No	LP	Initials
Comments: Not applicable for this level of limited data validation – Chromatographs, library searches, and quantitation reports were not provided in analytical laboratory reports and were not assessed during this data review.						
23. Were 100% of the EDD concentrations and reporting limits compared to the hardcopy data reports?	**X**	Yes		No	LP	Initials
Comments: During the limited validation procedure, 100% of the positive sample concentrations and 100% of the LOQ/RLs for project samples were compared to hardcopy laboratory reports. No discrepancies were noted. The data validator made sure that LOQ/RLs and MDLs (EDDs only) were entered into the correct EDD fields, and that correct method references were noted. The AECOM project manager was informed of all changes made to the EDD files via this Checklist. The EDD files, with any corrections made, were imported into the EQuIS project database by the data validator on 8/11/16.						
24. General Comments: Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Superfund Organic Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, August 2014 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) and National Functional Guidelines for Inorganic Superfund Data Review, USEPA OSRTI, document number EPA 540-R-013-001, August 2014 as applied to the reported methodology. Field duplicate Relative Percent Difference (RPD) reviews and applicable control limits were taken from the *EPA New England Environmental Data Review Supplement For Regional Data Review Elements and Superfund Specific Guidance/Procedures April 22, 2013,* document number EQADR-Supplement 0.						

Table of Qualified Analytical Results
BNSF - Mission Wye
Annual 2016 Groundwater Monitoring
Pace Analytical Laboratory Group 10354908

SDG	Sample ID	PACE ID	Method	Analyte	Method Detection Limit	Laboratory Reporting Limit	Units	Laboratory Result	Final Result	Reason Code
10354908	MW-1_20160706	10354908001	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.11 J	1.0 U	bl
10354908	MW-1_20160706	10354908001	8260B	Naphthalene	0.064	4.0	ug/l	2.0 J	4.0 U	bl
10354908	MW-1_20160706	10354908001	8260B	Trichloroethene	0.051	0.40	ug/l	0.15 J	0.40 U	bl
10354908	MW-19_20160706	10354908002	8260B	Acetone	0.64	20.0	ug/l	1.8 J	20.0 U	bl
10354908	MW-19_20160706	10354908002	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.073 J	1.0 U	bl
10354908	MW-19_20160706	10354908002	8260B	Naphthalene	0.064	4.0	ug/l	0.84 J	4.0 U	bl
10354908	MW-18_20160706	10354908003	8260B	Acetone	0.64	20.0	ug/l	1.3 J	20.0	bl
10354908	MW-18_20160706	10354908003	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.12 J	1.0 U	bl
10354908	MW-18_20160706	10354908003	8260B	Naphthalene	0.064	4.0	ug/l	0.69 J	4.0 U	bl
10354908	MW-14_20160706	10354908004	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.11 J	1.0 U	bl
10354908	MW-14_20160706	10354908004	8260B	Naphthalene	0.064	4.0	ug/l	0.64 J	4.0 U	bl
10354908	MW-12_20160706	10354908005	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.096 J	1.0 U	bl
10354908	GRAVEL PIT WELL_20160706	10354908006	524.2	Bromomethane	0.32	4.0	ug/l	0.32 U	0.32 UJ	cv
10354908	GRAVEL PIT POND_20160707	10354908007	8260B	Acetone	0.64	20.0	ug/l	2.3 J	20.0 U	be
10354908	GRAVEL PIT POND_20160707	10354908007	8260B	Chloroform	0.21	1.0	ug/l	0.25 J	1.0 U	bf
10354908	GRAVEL PIT POND_20160707	10354908007	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.16 J	1.0 U	bl
10354908	MW-9_20160707	10354908008	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.14 J	1.0 U	bl
10354908	MW-32_20160707	10354908009	8260B	Acetone	0.64	20.0	ug/l	3.9 J	20.0 U	bf
10354908	MW-32_20160707	10354908009	8260B	Chloroform	0.21	1.0	ug/l	0.42 J	1.0 U	bf
10354908	MW-32_20160707	10354908009	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.084 J	1.0 U	bl
10354908	MW-32_20160707	10354908009	8260B	Methylene chloride	0.097	4.0	ug/l	0.36 J	4.0 U	bf
10354908	MW-32_20160707	10354908009	8260B	Toluene	0.059	1.0	ug/l	0.89 J	1.0 U	bf
10354908	MW-4_20160707	10354908010	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.094 J	1.0 U	bl
10354908	MW-33_20160707	10354908011	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.12 J	1.0 U	bl
10354908	MW-30_20160707	10354908012	8260B	Acetone	0.64	20.0	ug/l	3.1 J	20.0 U	be
10354908	MW-30_20160707	10354908012	8260B	Chloroform	0.21	1.0	ug/l	0.47 J	1.0 U	be
10354908	MW-30_20160707	10354908012	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.16 J	1.0 U	bl
10354908	MW-30_20160707	10354908012	8260B	Methylene chloride	0.097	4.0	ug/l	0.33 J	4.0 U	be
10354908	MW-5_20160707	10354908013	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.12 J	1.0 U	bl
10354908	MW-3_20160707	10354908014	8260B	Acetone	0.64	20.0	ug/l	2.2 J	20.0 U	be
10354908	MW-3_20160707	10354908014	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.15 J	1.0 U	bl
10354908	MW-22_20160707	10354908015	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.15 J	1.0 U	bl
10354908	MW-21_20160707	10354908016	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.13 J	1.0 U	bl
10354908	TRIP BLANK 1_20160706	10354908017	8260B	Acetone	0.64	20.0	ug/l	3.3 J	20.0 U	be
10354908	TRIP BLANK 1_20160706	10354908017	8260B	1,2-Dichloroethane	0.072	1.0	ug/l	0.11 J	1.0 U	bl
10354908	TRIP BLANK 1_20160706	10354908017	8260B	Naphthalene	0.064	4.0	ug/l	0.13 J	4.0 U	bl
10354908	TRIP BLANK 2_20160706	10354908018	524.2	Bromomethane	0.32	4.0	ug/l	0.32 U	0.32 UJ	cv

be - equipment blank contamination
bf - field blank contamination
bl - laboratory blank contamination
cv - calibration verification outlier
J - result was detected at a concentration between the method detection limit and the laboratory reporting limit. The result is an estimated value.
U - result was reported as not detected above the method detection limit by the laboratory or was qualified as not detected at the laboratory reporting limit based on blank contamination (see associated validation report for details).
UJ - the compound was not detected above the method detection limit. The method detection limit is an estimated value.

Submitted to:
BNSF

Submitted by:
AECOM
Seattle, WA
June 30, 2017

Organic
Limited Data Validation Report

BNSF – Mission Wye, Montana
2017 Groundwater Monitoring
Pace Analytical Laboratory Data
Energy Laboratory Data
June 2017

Prepared By Lucy Panteleeff, Chemist
Reviewed By Jennifer B. Garner, Chemist

ANALYTICAL DATA VALIDATION CHECKLIST

Overview

The samples analyzed for the BNSF – Mission Wye, Montana, June 2017 Groundwater Monitoring event are listed in the Table of Samples Analyzed (page 3). Limited data validation was performed on a total of 6 groundwater samples, 1 equipment blank, 1 field blank, and 1 trip blank sample.

All samples were analyzed by Pace Analytical laboratory located in Minneapolis, Minnesota and one split sample was analyzed by Energy Laboratory located in Helena, Montana for volatile organic compounds (VOCs) by EPA Method 8260B.

The Analytical Data Validation Checklist (updated by the Montana Department of Environmental Quality on November 4, 2016) is presented as pages 3-8. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Organic Superfund Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, January 2017 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate relative percent difference (RPD) reviews and applicable control limits were taken from Montana Department of Environmental Qualities' Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Holding times
Method blank, field blanks and trip blank results
Organic surrogate recoveries
LCS, LCSD (blank spike, blank spike duplicate) results
MS, MSD (matrix spike, matrix spike duplicate) results
Laboratory duplicate (or spiked duplicate) results
Electronic data deliverables (EDDs) – EQuIS format

Data Validation Qualifiers Assigned During this Review

J Estimated concentration

U Analytical result reported as detected by the laboratory was qualified as not detected based on blank contamination

UJ The analyte was not detected above the reported sample quantitation limit or was qualified as not detected due to blank contamination. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Assigned qualifiers are detailed in the Analytical Data Validation Checklist and are summarized in the Table of Qualified Analytical Results (pages 9-14).

ANALYTICAL DATA VALIDATION CHECKLIST

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for all methods based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use with qualification.

Table of Samples Analyzed
BNSF – Mission Wye
2017 Groundwater Monitoring
Pace Analytical Laboratory Report 10393046
June 2017

Matrix	Sample ID	Sample Date	Laboratory ID
Water	MW-01/06192017	6/19/2017	10393046001
Water	MW-04/06192017	6/19/2017	10393046002
Water	MW-03/06192017	6/19/2017	10393046003
Water	MW-DUP/06192017 (Duplicate of MW-03/06192017)	6/19/2017	10393046004
Water	MW-22/06192017	6/19/2017	10393046005
Water	MW-09/06192017	6/19/2017	10393046006
Water	EB-01/06192017	6/19/2017	10393046007
Water	FB-01/06192017	6/19/2017	10393046008
Water	Trip Blank	6/19/2017	10393046009

Note:
The sample date suffix (/06192017) is presented on this table for clarity; however, it will not be used in the discussions below.

Table of Samples Analyzed
BNSF – Mission Wye
2017 Groundwater Monitoring
Energy Laboratory Report H17060439
June 2017

Matrix	Sample ID	Sample Date	Laboratory ID
Water	MW-3	6/19/2017	H17060439-001
Water	Trip Blank	6/19/2017	H17060439-002

Montana DEQ - Remediation Division

Data Validation Summary Form (Version 1.2, Revised 11/4/16)

Please fill out the information below, using one form for each lab batch (one form can be used for multiple analytical methods). The form will grow and adjust, based on your responses. Please include a discussion regarding the sampling event in the report that is sent to DEQ with this form. For additional instructions, please click the Open Complete Instructions button.

Open Complete Instructions

Basic Questions

1. Site/Facility name	BNSF
2. Site code or facility ID (if applicable)	Mission Wye
3. Release ID (if applicable)	Not applicable
4. Project name	Mission Wye 2017 Annual Groundwater Monitoring
5. Name of DEQ-approved sampling plan	SVE System Operation, Maintenance, and Monitoring Plan
6. Date DEQ approved the sampling plan	5/1/2017 M/D/YY
7. Name of data validator	Lucy A. Panteleeff, Jennifer B. Garner (Peer Reviewer)
8. Phone	206-428-2277
9. Date validated	7/13/2017 M/D/YY

Field Collection Questions

10. Sample matrix	☐ Soil ☐ Sediment ☐ Surface water ☒ Groundwater ☐ Tap water ☐ Air (including soil gas) ☐ Other
11. Sample collection start date	6/19/2017 M/D/YY
12. Sample collection end date	6/19/2017 M/D/YY
13. Analytical methods used *Use Add Method button to list multiple methods. Enter any other methods in the field manually.*	Add Method / Delete Method Analytical Method(s) "E8260B Volatile Organic Compounds By Gas Chromatography

Laboratory-related Questions

14. Laboratory name and location	Pace Analytical Laboratory, Minneapolis, Minnesota Energy Laboratories, Helena, Montana (split sample)		
15. Laboratory project ID	10393046 and H17060439		
16. Does all data conform to analytical methods and data quality objectives specified for this project?	Yes ◉	No ○	Comments: The reported method met the requested method indicated on the chain of custody (COC) and was compliant with the requested analytes and matrix.
17. Were samples received in good condition and at appropriate temperature, chain-of-custody forms complete, and all samples analyzed within holding times?	Yes ○	No ◉	Comments: Samples were received intact and in good condition and all samples were analyzed within the method-specified holding times. Some sample vials contained headspace or vial labels were incomplete as described in Section 17b.

	Yes	No	Comments
17a. Were chain-of-custody forms complete?	●	○	The chain of custody was completed as required, including the proper signatures and dates.
17b. Were samples received in good condition, preserved, and at appropriate temperature (VOA no headspace, appropriate pH, temperature 4° C +/- 2° for most samples)?	○	●	Samples were received in good condition and properly preserved. Outliers are described below.

If no, explain

One or more vials for all samples in this laboratory group had headspace greater than 6 millimeters. Where possible, the laboratory used a vial with no headspace. MW-01, MW-04, FB-01, and the trip blank were analyzed from vials with headspace; therefore, the results for all VOCs in these samples were qualified as estimated and flagged 'J' or 'UJ' based on headspace in the sample vial.

The Energy Laboratories noted that the sample times for the split sample collected at MW-3 and the trip blank associated with this sample were not recorded on the sample labels. The laboratory logged the sample using the times recorded on the COC.

	Yes	No	Comments
17c. Were the samples analyzed within method-specified or technical holding times?	●	○	Samples were analyzed within the method-specified holding time.
18. Were all laboratory quality control procedures complied with and is data validated without qualifiers? Note: non-QA/QC related U and J flags do not require additional qualification in this section.	○	●	Data were qualified based on headspace and field blank contamination, as described in Sections 17b and 28a.
18a. Were all calibration verification results within acceptable limits?	○	●	Not applicable for this level of limited data validation; however, the laboratory noted CCV outliers in the case narrative and sample results were qualified as described below.

If no, explain

The percent differences (%Ds) for acetone, bromomethane, and chloroethane were outside the method limits of +/- 20% (high) in the CCV analyzed on June 23, 2017. Bromomethane and chloroethane were not detected in the associated samples; therefore, data were not qualified for bromomethane and chloroethane based on these CCV results. Results for acetone reported as detected in the associated samples were qualified as not detected and flagged 'U' at the reporting limit based on field blank contamination; therefore, no further qualification was necessary (Section 28a).

The %Ds for bromomethane and chloroethane were outside the method limits of +/- 20% (high) in the CCV analyzed on June 27, 2017. Bromomethane and chloroethane were not detected in the associated samples; therefore, data were not qualified for bromomethane and chloroethane based on these CCV results.

	Yes	No	Comments
18b. Were laboratory blank samples free of contamination?	○	●	Laboratory blanks were free of contamination except as described below.

If no, explain

Methylene chloride (0.31 ug/L) was detected in the method blank analyzed on June 27, 2017, at a concentration less than the laboratory reporting limit, but above the method detection limit (MDL). Methylene chloride was not detected in the samples associated with this method blank; therefore, the results for methylene chloride were not qualified based on this method blank result.

	Yes	No	Comments
18c. Are the percent recoveries and relative percent differences of matrix spike and matrix spike duplicates within quality control limits?	○	●	The percent recoveries and relative percent differences (RPDs) of matrix spikes and matrix spike duplicates (MS/MSDs) were acceptable except as described below.

If no, explain

MS/MSDs were performed on two samples from a project unrelated to Mission Wye Annual Goundwater Monitoring. One or more percent recoveries in the MSs and MSDs and/or relative percent differences for the MS/MSD pairs were outside the control limits. Data were not qualified based on an MS/MSD performed on samples from an unrelated projects.

	Yes	No	Comments
18d. Are the control samples the same matrix as the samples, and prepared the same as associated samples?	●	○	Quality control samples were performed using an aqueous matrix.
18e. Were laboratory control samples and laboratory control sample duplicate percent recoveries and relative percent differences within laboratory control limits?	○	●	LCS/LCSD percent recoveries and RPDs were acceptable except as described below.

If no, explain

The percent recoveries for acetone (154%) and chloroethane (141%) in the LCS analyzed by Pace Analytical Laboratory on June 23, 2017, exceeded the control limits of 75-133% and 63-137%, respectively. Chloroethane was not detected in the associated samples; therefore, no data were qualified for chloroethane based on this LCS result. The results for acetone in the associated samples were qualified as not detected and flagged 'U' based on field blank contamination as described in Section 28a, therefore, no further qualification based on the LCS recovery was necessary.

The percent recoveries for bromomethane in the LCSD (162%), and chloroethane (158% and 151%, respectively) and dichlorodifluoromethane (130% and 134%, respectively) in the LCS/LCSD and the RPD for bromomethane (51%) in the LCS/LCSD pair analyzed by Pace Analytical Laboratory on June 27, 2017, exceeded the control limits of 30-150%, 63-137%, 75-125%, and 20%, respectively. Bromomethane, chloroethane, and dichlorodifluoromethane were not detected in the samples associated with this LCS/LCSD pair; therefore, no data were qualified for these analytes based on these LCS/LCSD results.

The percent recovery for dichlorodifluoromethane (152%) in the LCS analyzed on June 21, 2017, by Energy Laboratories exceeded the control limits of 57-143%. As dichlorodifluoromethane was not detected in the associated samples, data were not qualified based on this LCS result.

	Yes	No	Comments
18f. Were surrogate recoveries within laboratory quality control limits?	●	○	Surrogates recoveries were within control limits.
18g. Were the laboratory duplicate relative percent differences within data validation quality control limits?	○	●	Laboratory duplicates were not performed in association with this analysis. Precision was assessed using the LCS/LCSD and/or the field duplicate results.

If no, explain

Laboratory duplicates were not performed in association with this analysis.

	Yes	No	Comments
19. Were the total number of lab method blanks at least 5% of the total number of samples, or as required by the method?	●	○	Method blanks were performed at the required frequency.
20. Were the total number of lab matrix spike samples prepared at least 5% of the total number of samples, or as required by the method?	●	○	A matrix spike sample was prepared as required by the method.

21

Add Sample	Lab ID	Field Sample ID	Comments
Delete Sample	Not applicable	Not applicable	Not applicable

	Yes	No	Comments
22. Is the total number of laboratory control samples at least 5% of the total number of samples?	●	○	Laboratory control samples were prepared as required by the methods.

Consultant/Validator Questions

	Yes	No	Comments
23. Are the detection limits appropriate for the project (i.e. at or below screening levels)?	●	○	One or more sample results were flagged 'J' by Pace Analytical Laboratory to indicate that the concentration was less than the laboratory reporting limit but above the MDL. Laboratory J-flagged results are considered estimated results unless qualified as not detected and flagged 'U' based on blank contamination as described in Sections 18, 28, and 28a. As the results are between the MDLs and the reporting limits, there are greater levels of uncertainty associated with the numerical results. Pace Analytical Laboratory noted that the internal standard area counts for acetone-d6 in MW-01 (48.70%) and MW-04 (48.44%) was less the control limits of 50-200%. The results for the associated analytes, acetone and tetrahydrofuran, were qualified due to headspace in the sample vial as describe in Section 17b ; therefore, no further qualification based on the internal standards was necessary.
24. Are the reported units appropriate for the sample matrix (i.e. water results in ug/L, not mg/kg)?	●	○	Correct concentration units were reported. All VOC results were reported as ug/L.
25. Do the analytical methods comply with project requirements (e.g. in the SAP, work plan, or QAPP)?	●	○	The reported method met project requirements.
26. Do the laboratory reports include all constituents requested to be analyzed on the chain-of-custody or under the sampling plan or other applicable document?	●	○	Only analytes applicable to the requested method were reported.
27. Is the number of sample blanks (e.g. equipment, trip, or field blanks) equal to at least 10% of the total number of samples, or as otherwise required?	●	○	One equipment blank, one field blank, and one trip blank were submitted in association with these samples.
28. Are field blanks free from contamination, duplicates collected as required, and field duplicate percent differences within data validation quality control limits?	○	●	The field duplicate RPDs were within data validation control limits of 50% for analytes reported at concentrations greater than five times the reporting limits. Field blank outliers are discussed in Section 28a.
28a. Were all blank samples free of analyte contamination?	○	●	The equipment blank, field blank, and trip blank were free of contamination except as described below.

If no, explain

Chloroform (0.62 ug/L) was detected in the equipment blank analyzed by Pace Analytical Laboratory at a concentration less than the laboratory reporting limit but above the MDL. As chloroform was not detected in the associated samples, data were not qualified based on this equipment blank result.

Chloroform (0.89 ug/L) and acetone (18.2 ug/L) were detected in the field blank analyzed by Pace Analytical Laboratory at concentrations less than the laboratory reporting limits but above the MDLs. As chloroform was not detected in the associated samples, data were not qualified based on this equipment blank result. The result for acetone in the field blank was reported at a concentration less than the reporting limit, was qualified as not detected, and was flagged 'U' based on the trip blank; therefore, no qualifiers were assigned based on this field blank result.

Acetone (2.1 ug/L) was detected in the trip blank analyzed by Pace Analytical Laboratory at a concentration less than the laboratory reporting limit but above the MDL. The results for acetone in MW-01, MW-04, MW-03, and the field blank were reported at concentrations less than the reporting limits, were qualified as not detected, and were flagged 'U' at the reporting limits based on this trip blank result.

	Yes	No	Comments
28b. Were field duplicates collected as required?	●	○	A field duplicate was submitted for MW-03 and identified as MW-DUP. The field duplicate was analyzed only by Pace Analytical Laboratory
28c. Are field duplicate relative percent differences within data validation quality control limits?	●	○	The field duplicate was within data validation control limits of 50% for analytes reported at concentrations greater than five time the reporting limits.

29. Please provide an Excel or CSV file to the DEQ project manager (via e-mail or CD) that lists all samples evaluated in this summary and lists any qualified data.
Please use the following format:

Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Example 48310-2.31E	Example GW-1	R	Sample dropped in lab and unrecoverable
Example 48310-2.32D	Example GW-2		

Please use the following format for qualifiers. See EPA's National Functional Guidelines for more information on qualifiers for unique samples such as dioxins.

Qualifier	Explanation
C	Pesticide and Arochlor results confirmed with GC/MS
J-	Estimated value, may be biased low
J	Analyte identified, but concentration is estimated
J+	Estimated value, may be biased high
NJ	Tentatively identified compound
R	Sample result rejected
U	Analyte analyzed for, but not detected above quantitation limit
UJ	Analyte not detected above CRQL, but CRQL may be inaccurate
X	Pesticide and Arochlor results attempted using GC/MS, but unsuccessful

If you wish to manually enter qualified sample results, please use the table below.

Add Sample	Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Delete Sample	MW-03	MW-DUP	none	Results were acceptable.

		Comments
30. What is the percent completeness (samples planned versus valid samples collected)?	100%	The data reported in this laboratory group, as qualified, are considered to be usable for meeting project objectives. No data were rejected; therefore, the percent completeness is 100%.
31. Was the completeness goal met?	Yes ● No ○	Completeness of this data set was 100%
32. Other general comments or observations?		

Split Samples

		Comments
33. Did DEQ collect split samples?	Yes ● No ○	MW-3 was collected as a split sample by Department of Environmental Qualitly (DEQ) and submitted to Energy Laboratories.

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Table 1
Summary of Qualifiers Assigned to Sample Results
BNSF- Mission Wye
June 2017 Groundwater Monitoring

SDG	Sample ID	Pace ID	Method	Analyte	Method Detection Limit	Laboratory Reporting Limit	Laboratory Result	Units	Final Result	Reason Code
10393046	MW-01/06192017	10393046001	8260B	1,1,1,2-Tetrachloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,1,1-Trichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,1,2,2-Tetrachloroethane	0.22	1.0	0.22 U	ug/l	0.22 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,1,2-Trichloro-1,2,2-trifluoroethane	0.32	1.0	0.32 U	ug/l	0.32 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,1,2-Trichloroethane	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,1-Dichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,1-Dichloroethene	0.28	1.0	0.28 U	ug/l	0.28 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,1-Dichloropropene	0.23	1.0	0.23 U	ug/l	0.23 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,2,3-Trichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,2,3-Trichloropropane	0.28	4.0	0.28 U	ug/l	0.28 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,2,4-Trichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,2,4-Trimethylbenzene	0.18	1.0	0.18 U	ug/l	0.18 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,2-Dibromo-3-chloropropane	0.60	4.0	0.60 U	ug/l	0.60 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,2-Dibromoethane	0.20	1.0	0.20 U	ug/l	0.20 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,2-Dichlorobenzene	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,2-Dichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,2-Dichloropropane	0.22	4.0	0.22 U	ug/l	0.22 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,3,5-Trimethylbenzene	0.27	1.0	0.27 U	ug/l	0.27 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,3-Dichlorobenzene	0.12	1.0	0.12 U	ug/l	0.12 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,3-Dichloropropane	0.096	1.0	0.096 U	ug/l	0.096 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	1,4-Dichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	2,2-Dichloropropane	0.13	4.0	0.13 U	ug/l	0.13 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	2-Butanone	1.1	5.0	1.1 U	ug/l	1.1 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	2-Chlorotoluene	0.30	1.0	0.30 U	ug/l	0.30 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	4-Chlorotoluene	0.26	1.0	0.26 U	ug/l	0.26 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	4-Isopropyltoluene	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	4-Methyl-2-pentanone	0.43	5.0	0.43 U	ug/l	0.43 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Acetone	2.0	20.0	17.7 J,IS,C0	ug/l	20.0 UJ	hs,bf
10393046	MW-01/06192017	10393046001	8260B	Allyl chloride	0.25	4.0	0.25 U	ug/l	0.25 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Benzene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Bromobenzene	0.34	1.0	0.34 U	ug/l	0.34 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Bromochloromethane	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Bromodichloromethane	0.24	1.0	0.24 U	ug/l	0.24 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Bromoform	0.27	4.0	0.27 U	ug/l	0.27 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Bromomethane	0.44	4.0	0.44 U	ug/l	0.44 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Carbon tetrachloride	0.20	1.0	0.20 U	ug/l	0.20 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Chlorobenzene	0.11	1.0	0.11 U	ug/l	0.11 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Chloroethane	0.34	4.0	0.34 U	ug/l	0.34 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Chloroform	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Chloromethane	0.25	4.0	0.25 U	ug/l	0.25 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	cis-1,2-Dichloroethene	0.12	1.0	0.12 U	ug/l	0.12 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	cis-1,3-Dichloropropene	0.15	4.0	0.15 U	ug/l	0.15 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Dibromochloromethane	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Dibromomethane	0.19	4.0	0.19 U	ug/l	0.19 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Dichlorodifluoromethane	0.23	4.0	0.23 U	ug/l	0.23 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Diethyl ether (Ethyl ether)	0.19	4.0	0.19 U	ug/l	0.19 UJ	hs

Table 1
Summary of Qualifiers Assigned to Sample Results
BNSF- Mission Wye
June 2017 Groundwater Monitoring

SDG	Sample ID	Pace ID	Method	Analyte	Method Detection Limit	Laboratory Reporting Limit	Laboratory Result	Units	Final Result	Reason Code
10393046	MW-01/06192017	10393046001	8260B	Ethylbenzene	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Hexachlorobutadiene	0.18	1.0	0.18 U	ug/l	0.18 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Isopropylbenzene	0.25	1.0	0.25 U	ug/l	0.25 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Methyl tert-butyl ether	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Methylene chloride	0.29	4.0	0.29 U	ug/l	0.29 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Naphthalene	0.20	4.0	0.20 U	ug/l	0.20 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	n-Butylbenzene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	n-Propylbenzene	0.23	1.0	0.23 U	ug/l	0.23 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	sec-Butylbenzene	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Styrene	0.29	1.0	0.29 U	ug/l	0.29 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	tert-Butylbenzene	0.22	1.0	0.22 U	ug/l	0.22 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Tetrachloroethene	0.25	1.0	0.25 U	ug/l	0.25 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Tetrahydrofuran	1.5	10.0	1.5 U,IS	ug/l	1.5 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Toluene	0.14	1.0	0.14 U	ug/l	0.14 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	trans-1,2-Dichloroethene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	trans-1,3-Dichloropropene	0.15	4.0	0.15 U	ug/l	0.15 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Trichloroethene	0.052	0.40	0.052 U	ug/l	0.052 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Trichlorofluoromethane	0.33	4.0	0.33 U	ug/l	0.33 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Vinyl chloride	0.069	0.20	0.069 U	ug/l	0.069 UJ	hs
10393046	MW-01/06192017	10393046001	8260B	Xylenes, total	0.32	3.0	0.32 U	ug/l	0.32 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,1,1,2-Tetrachloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,1,1-Trichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,1,2,2-Tetrachloroethane	0.22	1.0	0.22 U	ug/l	0.22 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,1,2-Trichloro-1,2,2-trifluoroethane	0.32	1.0	0.32 U	ug/l	0.32 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,1,2-Trichloroethane	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,1-Dichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,1-Dichloroethene	0.28	1.0	0.28 U	ug/l	0.28 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,1-Dichloropropene	0.23	1.0	0.23 U	ug/l	0.23 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,2,3-Trichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,2,3-Trichloropropane	0.28	4.0	0.28 U	ug/l	0.28 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,2,4-Trichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,2,4-Trimethylbenzene	0.18	1.0	0.18 U	ug/l	0.18 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,2-Dibromo-3-chloropropane	0.60	4.0	0.60 U	ug/l	0.60 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,2-Dibromoethane	0.20	1.0	0.20 U	ug/l	0.20 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,2-Dichlorobenzene	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,2-Dichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,2-Dichloropropane	0.22	4.0	0.22 U	ug/l	0.22 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,3,5-Trimethylbenzene	0.27	1.0	0.27 U	ug/l	0.27 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,3-Dichlorobenzene	0.12	1.0	0.12 U	ug/l	0.12 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,3-Dichloropropane	0.096	1.0	0.096 U	ug/l	0.096 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	1,4-Dichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	2,2-Dichloropropane	0.13	4.0	0.13 U	ug/l	0.13 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	2-Butanone	1.1	5.0	1.1 U	ug/l	1.1 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	2-Chlorotoluene	0.30	1.0	0.30 U	ug/l	0.30 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	4-Chlorotoluene	0.26	1.0	0.26 U	ug/l	0.26 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	4-Isopropyltoluene	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	4-Methyl-2-pentanone	0.43	5.0	0.43 U	ug/l	0.43 UJ	hs

Table 1
Summary of Qualifiers Assigned to Sample Results
BNSF- Mission Wye
June 2017 Groundwater Monitoring

SDG	Sample ID	Pace ID	Method	Analyte	Method Detection Limit	Laboratory Reporting Limit	Laboratory Result	Units	Final Result	Reason Code
10393046	MW-04/06192017	10393046002	8260B	Acetone	2.0	20.0	21.2 IS,C0	ug/l	21.2 UJ	hs,bf
10393046	MW-04/06192017	10393046002	8260B	Allyl chloride	0.25	4.0	0.25 U	ug/l	0.25 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Benzene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Bromobenzene	0.34	1.0	0.34 U	ug/l	0.34 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Bromochloromethane	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Bromodichloromethane	0.24	1.0	0.24 U	ug/l	0.24 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Bromoform	0.27	4.0	0.27 U	ug/l	0.27 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Bromomethane	0.44	4.0	0.44 U	ug/l	0.44 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Carbon tetrachloride	0.20	1.0	0.20 U	ug/l	0.20 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Chlorobenzene	0.11	1.0	0.11 U	ug/l	0.11 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Chloroethane	0.34	4.0	0.34 U	ug/l	0.34 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Chloroform	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Chloromethane	0.25	4.0	0.25 U	ug/l	0.25 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	cis-1,2-Dichloroethene	0.12	1.0	0.12 U	ug/l	0.12 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	cis-1,3-Dichloropropene	0.15	4.0	0.15 U	ug/l	0.15 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Dibromochloromethane	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Dibromomethane	0.19	4.0	0.19 U	ug/l	0.19 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Dichlorodifluoromethane	0.23	4.0	0.23 U	ug/l	0.23 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Diethyl ether (Ethyl ether)	0.19	4.0	0.19 U	ug/l	0.19 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Ethylbenzene	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Hexachlorobutadiene	0.18	1.0	0.18 U	ug/l	0.18 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Isopropylbenzene	0.25	1.0	0.25 U	ug/l	0.25 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Methyl tert-butyl ether	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Methylene chloride	0.29	4.0	0.29 U	ug/l	0.29 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Naphthalene	0.20	4.0	0.20 U	ug/l	0.20 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	n-Butylbenzene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	n-Propylbenzene	0.23	1.0	0.23 U	ug/l	0.23 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	sec-Butylbenzene	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Styrene	0.29	1.0	0.29 U	ug/l	0.29 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	tert-Butylbenzene	0.22	1.0	0.22 U	ug/l	0.22 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Tetrachloroethene	0.25	1.0	0.25 U	ug/l	0.25 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Tetrahydrofuran	1.5	10.0	1.5 U,IS	ug/l	1.5 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Toluene	0.14	1.0	0.14 U	ug/l	0.14 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	trans-1,2-Dichloroethene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	trans-1,3-Dichloropropene	0.15	4.0	0.15 U	ug/l	0.15 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Trichloroethene	0.052	0.40	0.48	ug/l	0.48 J	hs
10393046	MW-04/06192017	10393046002	8260B	Trichlorofluoromethane	0.33	4.0	0.33 U	ug/l	0.33 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Vinyl chloride	0.069	0.20	0.069 U	ug/l	0.069 UJ	hs
10393046	MW-04/06192017	10393046002	8260B	Xylenes, total	0.32	3.0	0.32 U	ug/l	0.32 UJ	hs
10393046	MW-03/06192017	10393046003	8260B	Acetone	2.0	20.0	7.0 J,CH,L1	ug/l	20.0 U	bf
10393046	FB-01/06192017	10393046008	8260B	1,1,1,2-Tetrachloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,1,1-Trichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,1,2,2-Tetrachloroethane	0.22	1.0	0.22 U	ug/l	0.22 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,1,2-Trichloro-1,2,2-trifluoroethane	0.32	1.0	0.32 U	ug/l	0.32 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,1,2-Trichloroethane	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,1-Dichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs

Table 1
Summary of Qualifiers Assigned to Sample Results
BNSF- Mission Wye
June 2017 Groundwater Monitoring

SDG	Sample ID	Pace ID	Method	Analyte	Method Detection Limit	Laboratory Reporting Limit	Laboratory Result	Units	Final Result	Reason Code
10393046	FB-01/06192017	10393046008	8260B	1,1-Dichloroethene	0.28	1.0	0.28 U	ug/l	0.28 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,1-Dichloropropene	0.23	1.0	0.23 U	ug/l	0.23 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,2,3-Trichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,2,3-Trichloropropane	0.28	4.0	0.28 U	ug/l	0.28 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,2,4-Trichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,2,4-Trimethylbenzene	0.18	1.0	0.18 U	ug/l	0.18 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,2-Dibromo-3-chloropropane	0.60	4.0	0.60 U	ug/l	0.60 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,2-Dibromoethane	0.20	1.0	0.20 U	ug/l	0.20 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,2-Dichlorobenzene	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,2-Dichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,2-Dichloropropane	0.22	4.0	0.22 U	ug/l	0.22 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,3,5-Trimethylbenzene	0.27	1.0	0.27 U	ug/l	0.27 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,3-Dichlorobenzene	0.12	1.0	0.12 U	ug/l	0.12 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,3-Dichloropropane	0.096	1.0	0.096 U	ug/l	0.096 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	1,4-Dichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	2,2-Dichloropropane	0.13	4.0	0.13 U	ug/l	0.13 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	2-Butanone	1.1	5.0	1.1 U	ug/l	1.1 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	2-Chlorotoluene	0.30	1.0	0.30 U	ug/l	0.30 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	4-Chlorotoluene	0.26	1.0	0.26 U	ug/l	0.26 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	4-Isopropyltoluene	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	4-Methyl-2-pentanone	0.43	5.0	0.43 U	ug/l	0.43 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Acetone	2.0	20.0	18.2 J,CH,L1	ug/l	20.0 UJ	hs,bf
10393046	FB-01/06192017	10393046008	8260B	Allyl chloride	0.25	4.0	0.25 U	ug/l	0.25 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Benzene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Bromobenzene	0.34	1.0	0.34 U	ug/l	0.34 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Bromochloromethane	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Bromodichloromethane	0.24	1.0	0.24 U	ug/l	0.24 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Bromoform	0.27	4.0	0.27 U	ug/l	0.27 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Bromomethane	0.44	4.0	0.44 U	ug/l	0.44 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Carbon tetrachloride	0.20	1.0	0.20 U	ug/l	0.20 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Chlorobenzene	0.11	1.0	0.11 U	ug/l	0.11 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Chloroethane	0.34	4.0	0.34 U,L3	ug/l	0.34 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Chloroform	0.21	1.0	0.89 J	ug/l	0.89 J	hs
10393046	FB-01/06192017	10393046008	8260B	Chloromethane	0.25	4.0	0.25 U	ug/l	0.25 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	cis-1,2-Dichloroethene	0.12	1.0	0.12 U	ug/l	0.12 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	cis-1,3-Dichloropropene	0.15	4.0	0.15 U	ug/l	0.15 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Dibromochloromethane	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Dibromomethane	0.19	4.0	0.19 U	ug/l	0.19 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Dichlorodifluoromethane	0.23	4.0	0.23 U	ug/l	0.23 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Diethyl ether (Ethyl ether)	0.19	4.0	0.19 U	ug/l	0.19 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Ethylbenzene	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Hexachlorobutadiene	0.18	1.0	0.18 U	ug/l	0.18 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Isopropylbenzene	0.25	1.0	0.25 U	ug/l	0.25 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Methyl tert-butyl ether	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Methylene chloride	0.29	4.0	0.29 U	ug/l	0.29 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Naphthalene	0.20	4.0	0.20 U	ug/l	0.20 UJ	hs

Table 1
Summary of Qualifiers Assigned to Sample Results
BNSF- Mission Wye
June 2017 Groundwater Monitoring

SDG	Sample ID	Pace ID	Method	Analyte	Method Detection Limit	Laboratory Reporting Limit	Laboratory Result	Units	Final Result	Reason Code
10393046	FB-01/06192017	10393046008	8260B	n-Butylbenzene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	n-Propylbenzene	0.23	1.0	0.23 U	ug/l	0.23 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	sec-Butylbenzene	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Styrene	0.29	1.0	0.29 U	ug/l	0.29 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	tert-Butylbenzene	0.22	1.0	0.22 U	ug/l	0.22 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Tetrachloroethene	0.25	1.0	0.25 U	ug/l	0.25 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Tetrahydrofuran	1.5	10.0	1.5 U	ug/l	1.5 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Toluene	0.14	1.0	0.14 U	ug/l	0.14 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	trans-1,2-Dichloroethene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	trans-1,3-Dichloropropene	0.15	4.0	0.15 U	ug/l	0.15 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Trichloroethene	0.052	0.40	0.052 U	ug/l	0.052 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Trichlorofluoromethane	0.33	4.0	0.33 U	ug/l	0.33 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Vinyl chloride	0.069	0.20	0.069 U	ug/l	0.069 UJ	hs
10393046	FB-01/06192017	10393046008	8260B	Xylenes, total	0.32	3.0	0.32 U	ug/l	0.32 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,1,1,2-Tetrachloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,1,1-Trichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,1,2,2-Tetrachloroethane	0.22	1.0	0.22 U	ug/l	0.22 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,1,2-Trichloro-1,2,2-trifluoroethane	0.32	1.0	0.32 U	ug/l	0.32 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,1,2-Trichloroethane	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,1-Dichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,1-Dichloroethene	0.28	1.0	0.28 U	ug/l	0.28 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,1-Dichloropropene	0.23	1.0	0.23 U	ug/l	0.23 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,2,3-Trichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,2,3-Trichloropropane	0.28	4.0	0.28 U	ug/l	0.28 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,2,4-Trichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,2,4-Trimethylbenzene	0.18	1.0	0.18 U	ug/l	0.18 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,2-Dibromo-3-chloropropane	0.60	4.0	0.60 U	ug/l	0.60 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,2-Dibromoethane	0.20	1.0	0.20 U	ug/l	0.20 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,2-Dichlorobenzene	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,2-Dichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,2-Dichloropropane	0.22	4.0	0.22 U	ug/l	0.22 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,3,5-Trimethylbenzene	0.27	1.0	0.27 U	ug/l	0.27 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,3-Dichlorobenzene	0.12	1.0	0.12 U	ug/l	0.12 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,3-Dichloropropane	0.096	1.0	0.096 U	ug/l	0.096 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	1,4-Dichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	2,2-Dichloropropane	0.13	4.0	0.13 U	ug/l	0.13 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	2-Butanone	1.1	5.0	1.1 U	ug/l	1.1 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	2-Chlorotoluene	0.30	1.0	0.30 U	ug/l	0.30 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	4-Chlorotoluene	0.26	1.0	0.26 U	ug/l	0.26 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	4-Isopropyltoluene	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	4-Methyl-2-pentanone	0.43	5.0	0.43 U	ug/l	0.43 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Acetone	2.0	20.0	2.1 J,CH,L1	ug/l	20.0 UJ	hs,bf
10393046	TRIP BLANK/06192017	10393046009	8260B	Allyl chloride	0.25	4.0	0.25 U	ug/l	0.25 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Benzene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Bromobenzene	0.34	1.0	0.34 U	ug/l	0.34 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Bromochloromethane	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Bromodichloromethane	0.24	1.0	0.24 U	ug/l	0.24 UJ	hs

Table 1
Summary of Qualifiers Assigned to Sample Results
BNSF- Mission Wye
June 2017 Groundwater Monitoring

SDG	Sample ID	Pace ID	Method	Analyte	Method Detection Limit	Laboratory Reporting Limit	Laboratory Result	Units	Final Result	Reason Code
10393046	TRIP BLANK/06192017	10393046009	8260B	Bromoform	0.27	4.0	0.27 U	ug/l	0.27 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Bromomethane	0.44	4.0	0.44 U	ug/l	0.44 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Carbon tetrachloride	0.20	1.0	0.20 U	ug/l	0.20 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Chlorobenzene	0.11	1.0	0.11 U	ug/l	0.11 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Chloroethane	0.34	4.0	0.34 U,L3	ug/l	0.34 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Chloroform	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Chloromethane	0.25	4.0	0.25 U	ug/l	0.25 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	cis-1,2-Dichloroethene	0.12	1.0	0.12 U	ug/l	0.12 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	cis-1,3-Dichloropropene	0.15	4.0	0.15 U	ug/l	0.15 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Dibromochloromethane	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Dibromomethane	0.19	4.0	0.19 U	ug/l	0.19 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Dichlorodifluoromethane	0.23	4.0	0.23 U	ug/l	0.23 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Diethyl ether (Ethyl ether)	0.19	4.0	0.19 U	ug/l	0.19 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Ethylbenzene	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Hexachlorobutadiene	0.18	1.0	0.18 U	ug/l	0.18 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Isopropylbenzene	0.25	1.0	0.25 U	ug/l	0.25 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Methyl tert-butyl ether	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Methylene chloride	0.29	4.0	0.29 U	ug/l	0.29 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Naphthalene	0.20	4.0	0.20 U	ug/l	0.20 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	n-Butylbenzene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	n-Propylbenzene	0.23	1.0	0.23 U	ug/l	0.23 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	sec-Butylbenzene	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Styrene	0.29	1.0	0.29 U	ug/l	0.29 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	tert-Butylbenzene	0.22	1.0	0.22 U	ug/l	0.22 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Tetrachloroethene	0.25	1.0	0.25 U	ug/l	0.25 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Tetrahydrofuran	1.5	10.0	1.5 U	ug/l	1.5 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Toluene	0.14	1.0	0.14 U	ug/l	0.14 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	trans-1,2-Dichloroethene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	trans-1,3-Dichloropropene	0.15	4.0	0.15 U	ug/l	0.15 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Trichloroethene	0.052	0.40	0.052 U	ug/l	0.052 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Trichlorofluoromethane	0.33	4.0	0.33 U	ug/l	0.33 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Vinyl chloride	0.069	0.20	0.069 U	ug/l	0.069 UJ	hs
10393046	TRIP BLANK/06192017	10393046009	8260B	Xylenes, total	0.32	3.0	0.32 U	ug/l	0.32 UJ	hs

Notes:
U - Compound was analyzed for, but not detected above the method detection limit (MDL) or reporting limit shown.
UJ - Compound was analyzed for, but not detected above the MDL or reporting limit shown. The MDL or reporting limit are estimated values.
ug/L - microgram per liter
hs - headspace present in sample vial
bf - field blank
J - estimated value
IS - internal standard
C0 - result confirmed by second analysis
L3 - laboratory control sample (high)
CH - continuing calibration verification (high)
L1 - laboratory control sample (high)

Attachment 3

ROI Field Sheets

AECOM

Project Name: BNSF - Mission Wye

Location: Livingston, MT

Date: 9-30-2015

Field Personnel: CG / WC

Vapor Extraction Well ID: SVE 1-8 (ALL)

Step Test/Constant Rate Test (circle one)

Vacuum Applied (in. H_2O): -8.5 in Hg

Startup Time: —

Shutdown Time: —

Full system ~~Individual Extraction Point~~					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~ Hg)	VOC (ppm)	~~Temp. (°F)~~	~~Air Flow (cfm)~~	VOC (ppm)	~~Temp. (°F)~~
8:00		130	2.5	70.9	7.5	2.0				190	0		2.0	85°	0	0.0			0.0	
~~9:05~~																				

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: Post manifold, Pre-Knockout

Sorbent Tube = 0.5 ppm

AECOM

Project Name: | **Location:**

Date: 9-30-15 | **Field Personnel:**

Vapor Extraction Well ID: SVE 1-8 (ALL) Second Round | **Step Test/Constant Rate Test** (circle one)

Vacuum Applied (~~in. H_2O~~): -9.0 in Hg | **Startup Time:** | **Shutdown Time:**

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
11:48		106	0	86°	9.0	0				210°	0		0	100°	0	0			0	

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye **Location:** Livingston, MT

Date: 9-30-2015 **Field Personnel:** WC / CG

Vapor Extraction Well ID: SVE 1 (only) **Step Test/Constant Rate Test** (circle one)

Vacuum Applied (~~in. H_2O~~): -11.0 in Hg **Startup Time:** — **Shutdown Time:** —

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. H_2O)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. H_2O)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
905		25.0	1.3	71°	-11.0	1.1				205°	-0-		0.2	80°	-0-	0.3			0.5	

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye **Location:** Livingston, MT

Date: 9-30-2015 **Field Personnel:** CG

Vapor Extraction Well ID: SVE-1 **Step Test/Constant Rate Test** (circle one)

Vacuum Applied (in. H_2O): ① -8 in H_2O ② -10 in Hg **Startup Time:** **Shutdown Time:**

	Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
	Time	Vacuum (in. ~~H_2O~~)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
①	1500		105.8	—	—																
②	1555		88																		

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: ① Rotameter and solenoid portion of piping removed
② Piping replaced w/ straight, 1-inch PVC.

AECOM

Project Name: | **Location:**

Date: | **Field Personnel:**

Vapor Extraction Well ID: SVE 2 only | **Step Test/Constant Rate Test** (circle one)

Vacuum Applied (in. H_2O): -11.5 | **Startup Time:** | **Shutdown Time:**

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. H_2O)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. H_2O)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
09:38		36	6.7	72°	-11.5	4.6				80°	0		0.6	185°	0	0.0			0.0	

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: | **Location:**

Date: | **Field Personnel:**

Vapor Extraction Well ID: SVE 3 only | **Step Test/Constant Rate Test** (circle one)

Vacuum Applied (~~in. H_2O~~): -9.5 in Hg | **Startup Time:** | **Shutdown Time:**

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~Hg~~ H_2O)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~Hg~~ H_2O)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
0957		57	3.6	72°	~~[illegible]~~ -9.5	1.7				180	0		0.4	85°	0	0			0	

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name:

Location:

Date:

Field Personnel:

Vapor Extraction Well ID: SVE 4 only

Step Test/Constant Rate Test (circle one)

Vacuum Applied (~~in. H_2O~~): -9.5 in Hg

Startup Time:

Shutdown Time:

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~H_2O~~)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
10:15		21.0	0	73°	-9.5	0				225°	0		0	85°	0	0			0	

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: **Location:**

Date: **Field Personnel:**

Vapor Extraction Well ID: SVE 5 only **Step Test/Constant Rate Test** (circle one)

Vacuum Applied ~~(in. H_2O)~~: -9.5 in Hg **Startup Time:** **Shutdown Time:**

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~H_2O~~)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure ~~(in. H_2O)~~	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure ~~(in. H_2O)~~	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
		55	0	75°	9.5	0				185°	0		0	90°	0	0			0	

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: | **Location:**

Date: | **Field Personnel:**

Vapor Extraction Well ID: SVE 6 (only) | **Step Test/Constant Rate Test** (circle one)

Vacuum Applied (in. H_2O): | **Startup Time:** | **Shutdown Time:**

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~Hg~~ H_2O)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~Hg~~ H_2O)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~Hg~~ H_2O)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~Hg~~ H_2O)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
11:13		20	0	81°	70.0	0				210°	0		0	95°	0	0			0	

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF Mission Wye **Location:** Livingston, MT

Date: 9-30-2015 **Field Personnel:** CG

Vapor Extraction Well ID: SVE-6 **Step Test/Constant Rate Test** (circle one)

Vacuum Applied (~~in. H_2O~~): ① (-12 in Hg) ② (-10 in Hg) **Startup Time:** **Shutdown Time:**

	Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
	Time	Vacuum (in. ~~Hg~~ H_2O)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~Hg~~ H_2O)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~Hg~~ H_2O)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~Hg~~ H_2O)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
①	1512		50																		
②	1510	~~15~~	35																		

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: ① Dilution valve closed, all vacuum to SVE-6.
② Dilution valve opened so vacuum is ~10 in Hg to SVE-6

AECOM

Project Name: | **Location:**

Date: | **Field Personnel:**

Vapor Extraction Well ID: SVE 7 only | **Step Test/Constant Rate Test** (circle one)

Vacuum Applied (~~in. H_2O~~): -10.0 in Hg | **Startup Time:** | **Shutdown Time:**

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~Hg~~ H_2O)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~Hg~~ H_2O)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
11:36		35	0	87°	-10.0	0				175°	0		0	190°	0	0			0	

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye

Location: Livingston, MT

Date: 9-30-2015

Field Personnel: CG/WC

Vapor Extraction Well ID: SVE-7

Step Test/Constant Rate Test (circle one)

Vacuum Applied ~~(in. H_2O)~~ ~12 in Hg

Startup Time:

Shutdown Time:

	Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
	Time	Vacuum (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~ psig)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~ psig)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
(1)	1417		35																		
(2)	1423		103.1																		

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: (1) Disconnected influent piping at start of manifold, running vapors through rotameter, solenoid, etc.

(2) Disconnected rotameter and solenoid portion of manifold, etc.

AECOM

Project Name:

Location:

Date:

Field Personnel:

Vapor Extraction Well ID: SVE 8 (only)

Step Test/Constant Rate Test (circle one)

Vacuum Applied ~~(in. H_2O)~~ -9.0 in Hg

Startup Time:

Shutdown Time:

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
		26	0	83°	-9.0	0				160°	0		0	90°	0	0			0	

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name:	BNSF - Mission Wye	Location:	Livingston, MT
Date:	9-30-2015	Field Personnel:	CG / WC
Vapor Extraction Well ID:	All	Test Type (Step, Constant Rate, etc.):	Constant Rate

Vacuum Applied (~~in. H_2O~~):	~7.5 inHg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
VMP-1S	0845	0.00										
VMP-1D	0845	0.00										
VMP-5	0850	0.00										
VMP-4	0853	0.07										
VMP-3	0855	0.00										
VMP-2S	0856	0.00										
VMP-2D	0858	0.00										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: System vacuum is a maximum of -7.5 inHg with dilution valve closed

AECOM

Project Name: BUSF Mission Wye	Location: Livingston, MT
Date: 9-30-2015	Field Personnel: EG / WC
Vapor Extraction Well ID: All	Test Type (Step, Constant Rate, etc.): Constant Rate

Vacuum Applied ~~(in. H_2O)~~:	-9.0 inHg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-1 wellhead	1152	<0.01										
SVE-2 wellhead	1155	0.26										
SVE-3 wellhead	1157	0.14										
SVE-4 wellhead	1159	1.5										
SVE-8 wellhead	1201	0.60										
SVE-5 wellhead	1203	0.85										
SVE-6 wellhead	1205	1.00										
SVE-7 wellhead	1207	0.30										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: All SVE wells wide open. Dilution air valve closed. Maximum system vacuum = -9.0 inHg

AECOM

Project Name:	RUSF - Mission Lake	Location:	Livingston, MT
Date:	9-3-2015	Field Personnel:	SG/JC
Vapor Extraction Well ID:	SVE-1	Test Type (Step, Constant Rate, etc.):	

Vacuum Applied (in. H_2O):	-10 inHg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-1 wellhead	1605	-3.0										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: Manifold piping w/ solenoid and rotameter replaced w/ straight PVC (1-inch).

AECOM

Project Name:	BNSF - Mission Wye	Location:	Livingston, MT
Date:	9-30-2015	Field Personnel:	CG / LC
Vapor Extraction Well ID:	SVE-1	Test Type (Step, Constant Rate, etc.):	Constant Rate

Vacuum Applied (~~in. H_2O~~):	-10 inHg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-1 wellhead	0909	0.02										
SVE-2 wellhead	0912	0.00										
VMP-1S	0913	0.00										
VMP-1D	0914	0.00										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: Dilution valve opened to keep system vacuum at -10 inHg

AECOM

Project Name:	BNSF - Mission Wye	Location:	Livingston, MT
Date:	9-30-2015	Field Personnel:	CG / WC
Vapor Extraction Well ID:	SVE-2	Test Type (Step, Constant Rate, etc.):	

Vacuum Applied (in. H_2O):	-10 inHg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-2 wellhead	0932	0.31										
SVE-3 wellhead	0935	0.00										
VMP-1S	0936	0.00										
VMP-1D	0938	0.00										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: Dilution valve opened to keep system vacuum at -10 inHg.

AECOM

Project Name:	BNSF - Mission Wye	Location:	Livingston, MT
Date:	9-30-2015	Field Personnel:	CG / WC
Vapor Extraction Well ID:	SVE-3	Test Type (Step, Constant Rate, etc.):	Constant Rate

Vacuum Applied (in. H_2O):	-10 in Hg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-3 wellhead	1000	0.12										
VMP-15	1002	0.00										
VMP-17	1004	0.00										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: Dilution air valve opened to keep system vacuum at -10 in Hg.

AECOM

Project Name: BNSF - Mission Wye		**Location:** Livingston, MT	
Date: 9-30-2015		**Field Personnel:** OCG/WC	
Vapor Extraction Well ID: SVE-4		**Test Type (Step, Constant Rate, etc.):** Constant Rate	
Vacuum Applied (~~in H_2O~~):	-9.5 inHg		

Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-4 wellhead	1012	2.0										
VMP-5	1015	0.00										
SVE-8 wellhead	1018	0.00										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: Dilution air valve cracked open to keep system vacuum at a steady -9.5 inHg.

AECOM

Project Name:	RNSF - Mission Wye	**Location:**	Livingston, MT
Date:	9-30-2015	**Field Personnel:**	JCG / LJC
Vapor Extraction Well ID:	SVE-5	**Test Type (Step, Constant Rate, etc.):**	Constant Rate
Vacuum Applied (~~in. H_2O~~):	-10 inHg		

Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-5 wellhead	1030	1.0										
~~MPZ-24~~ PZ-4	1033	0.02										
MW-10	1037	0.01										
VMP-5	1040	0.00										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: Dilution air valve opened to keep system vacuum at -10 inHg.

AECOM

Project Name:	BNSF-Mission Wye	Location:	Livingston, MT
Date:	9-30-2015	Field Personnel:	CG/WC
Vapor Extraction Well ID:	SVE-6	Test Type (Step, Constant Rate, etc.):	Constant Rate

Vacuum Applied ~~(in. H_2O)~~:	-10 inHg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-6 wellhead	1115	1.0										
VMP-4	1119	0.01										
VMP-3	1122	0.00										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: Dilution air valve opened to keep system vacuum at -10 inHg.

AECOM

Project Name:	BNSF - Mission Wye	Location:	Livingston, MT
Date:	9-30-2015	Field Personnel:	CG/WC
Vapor Extraction Well ID:	SVE-7	Test Type (Step, Constant Rate, etc.):	Constant rate

Vacuum Applied (in. H_2O):	~10 in Hg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-7 wellhead	1141	0.28										
VMP-3	1136	0.00										
VMP-2S	1138	0.00										
VMP-2D	1140	0.00										
MW-21	1142	0.00										
MW-22	1144	0.00										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: Dilution valve opened to keep system vacuum at -10 in Hg vacuum.

AECOM

Project Name: BNSF- Mission Wye	**Location:** Livingston, MT
Date: 9-30-2015	**Field Personnel:** YG/WC
Vapor Extraction Well ID: SVE-8	**Test Type (Step, Constant Rate, etc.):** Constant Rate

Vacuum Applied ~~(in. H_2O)~~:	-10 ~~in. H_2O~~ inHg											
Monitoring Point	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**
SVE-8 wellhead	1102	~~0.50~~ 0.65										
VMP-1S	1107	0.00										
VMP-1D	1105	0.00										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: Dilution air valve opened to keep system vacuum at -10 inHg

AECOM

Project Name: BNSF - Mission Wye

Location: Livingston, MT

Date: 10-2-2015

Field Personnel: CG

Vapor Extraction Well ID: CVE-1

Step Test/Constant Rate Test (circle one)

Vacuum Applied (~~in. H_2O~~): -7.5 in Hg

Startup Time:

Shutdown Time:

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
	-7.5	>300	—	76.4	-7.5	—	—	—	—	170	0	—	—	86	0	—	—	—	—	—

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: RVSF - Mission Wye	Location: Livingston, MT
Date: 10-2-2015	Field Personnel: CG
Vapor Extraction Well ID: SVE-1	Test Type (Step, Constant Rate etc.):

Vacuum Applied (~~in. H_2O~~):	-7.5 in Hg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-1 wellhead		-50 in H_2O										
SVE-2 wellhead		0.00										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye

Location: Livingston, MT

Date: 10-2-2015

Field Personnel: CG

Vapor Extraction Well ID: SVE-2

Step Test/Constant Rate Test (circle one)

Vacuum Applied (~~in. H_2O~~): -7.5 in Hg

Startup Time: —

Shutdown Time: —

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
	-7.5	>300	—	77.2	-7.5	—	~~100~~	—	—	~~90~~ 160	0	—	—	90	0	—	—	—	—	—

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye	Location: Livingston, MT
Date: 10-2-2015	Field Personnel: CG
Vapor Extraction Well ID: SVE-2	Test Type (Step, Constant Rate, etc.):

Vacuum Applied (~~in. H_2O~~):		in Hg										
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-2 Wellhead		-15.0										
SVE-3 wellhead		0.00										
SVE-1 wellhead		0.00										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: RUSF - Mission Wye

Location: Livingston, MT

Date: 10-2-2015

Field Personnel: CG

Vapor Extraction Well ID: SVE-3

Step Test/Constant Rate Test (circle one)

Vacuum Applied (~~in. H_2O~~): -7.0 in Hg

Startup Time: —

Shutdown Time: —

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
	-7.0	>300	—	77	-7.0	—	—	—	—	160	0	—	—	90	0	—	—	—	—	—

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BUSF - Mission Wye		**Location:** Livingston, MT	
Date: 10-2-2015		**Field Personnel:** CB	
Vapor Extraction Well ID: SVE-3		**Test Type (Step, Constant Rate, etc.):**	
Vacuum Applied (in. H_2O):	-7.0 inHg		

Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-3 wellhead		-10.0										
VMP-1S		-0.33										
VMP-1D		-0.39										
SVE-2 wellhead		-0.02										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye

Location: Livingston, MT

Date: 10-2-2015

Field Personnel: CG

Vapor Extraction Well ID: SVE-4

Step Test/Constant Rate Test (circle one)

Vacuum Applied (~~in. H_2O~~): -6.5 in Hg

Startup Time:

Shutdown Time:

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~H_2O~~)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
	-6.5	>300	—	76.2	-6.5	—	—	—	—	155	0	—	—	90	0	—	—	—	—	—

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name:	BNSF - Mission Wye	**Location:**	Livingston, MT
Date:	10-2-2015	**Field Personnel:**	CG
Vapor Extraction Well ID:	SVE-4	**Test Type (Step, Constant Rate, etc.):**	

Vacuum Applied (~~in. H_2O~~):		-6.5 inHg										
Monitoring Point	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**
VMP-5		-0.27										
SVE-4 wellhead		-20.0										
SVE-3 wellhead		-0.08										
VMP-15		0.00										
VMP-1D		-0.02										
SVE-8 wellhead		-0.04										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF Mission Wye **Location:** Livingston, MT

Date: 10-2-2015 **Field Personnel:** CG

Vapor Extraction Well ID: SVE-5 **Step Test/Constant Rate Test** (circle one)

Vacuum Applied (~~in. H_2O~~): -6.5 in Hg **Startup Time:** **Shutdown Time:**

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
	-6.5	>300	—	76.5	-6.5	—	—	—		165	0	—	—	87	0	—	—	—		

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name:	BNSF - Mission Wye	**Location:**	Livingston, MT
Date:	10-2-2015	**Field Personnel:**	CG
Vapor Extraction Well ID:	SVE-5	**Test Type (Step, Constant Rate, etc.):**	

Vacuum Applied (~~in. H_2O~~):	-6.5 inHg											
Monitoring Point	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**
SVE-5 well head		-12.5										
MW-10		-0.525										
PZ-4		-0.65										
VMP-5		-0.11										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye

Location: Livingston, MT

Date: 10-2-2015

Field Personnel: CG

Vapor Extraction Well ID: SVE-6

Step Test/Constant Rate Test (circle one)

Vacuum Applied ~~(in. H_2O)~~: -7.0 in Hg

Startup Time:

Shutdown Time:

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~ psi)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~ psi)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
	—	>300	—	76.7	-7.0	—	—	—	—	170	0	—	—	90	0	—	—	—	—	—

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: Flow post-manifold = >300 cfm

AECOM

Project Name:	BNSF Mission Wye	**Location:**	Livingston, MT
Date:	10-2-2015	**Field Personnel:**	CG
Vapor Extraction Well ID:	SVE-6	**Test Type (Step, Constant Rate, etc.):**	
Vacuum Applied (~~in. H_2O~~):	-7.0 in Hg		

Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
VMP-4		-0.55										
VMP-3		-0.14										
VMP-2S		-0.01										
VMP-2D		-0.01										
SVE-6 wellhead		-12.5										
SVE-5 wellhead		-0.11										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye **Location:** Mission Wye - Livingston, MT

Date: 10-2-2015 **Field Personnel:** CG

Vapor Extraction Well ID: SVE-7 **Step Test/Constant Rate Test** (circle one)

Vacuum Applied (~~in. H_2O~~): (in Hg) : -7.0 **Startup Time:** **Shutdown Time:**

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~H_2O~~)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (~~in. H_2O~~)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (~~in. H_2O~~)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
	5	>300	—	70.7	~~140~~ 188 -7.0	—	71.2	—	—	140	0	—	—	85	0	—	—	—	—	—

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments: Flow after manifold = 188 cfm

AECOM

Project Name: BNSF- Mission Wye	**Location:** Livingston, MT
Date: 10-2-2015	**Field Personnel:** [illegible]
Vapor Extraction Well ID: SVE7	**Test Type (Step, Constant Rate, etc.):**
Vacuum Applied (~~in. H_2O~~): -7.0 in Hg	

Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-7 wellhead		-12.5										
MW-22		-0.26										
MW-21		-0.00										
VMP-2D		-0.15										
VMP-2S		-0.025										
VMP-3		-0.17										
VMP-4		-0.08										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye

Location: Livingston, MT

Date: 10-2-2015

Field Personnel: CG

Vapor Extraction Well ID: SVE-8

Step Test/Constant Rate Test (circle one)

Vacuum Applied (~~in. H_2O~~): -7.0 in Hg

Startup Time:

Shutdown Time:

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
	-7.0	>300	–	77.2	-7.0	–	–	–	–	160	0	~~0.25~~	–	90	0	–	–	~~0~~	–	–

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name:	BNSF - Mission Wye	**Location:**	Livingston, MT
Date:	10-2-2015	**Field Personnel:**	CG
Vapor Extraction Well ID:	SVE-8	**Test Type (Step, Constant Rate, etc.):**	
Vacuum Applied (in. H_2O):	-7.0 in Hg		

Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-8 wellhead		-10.0										
SVE-5 wellhead		-0.04										
VMP-1S		-0.02										
VMP-1D		-0.04										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye **Location:** Livingston, MT

Date: 10-2-2015 **Field Personnel:** CG / NK

Vapor Extraction Well ID: All **Step Test/Constant Rate Test** (circle one)

Vacuum Applied (~~in. H_2O~~): ~~[illegible]~~ -1.5 in Hg **Startup Time:** **Shutdown Time:**

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. ~~H_2O~~ Hg)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. ~~H_2O~~ Hg)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. ~~H_2O~~)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. ~~H_2O~~)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
	-1.5	~300	—	55.4	-1.5	—	—	—	—	105	0	—	—	65	0	—	—	—	—	—

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name:	BUSF - Mission Wye	**Location:**	Livingston, MT
Date:	10-2-2015	**Field Personnel:**	CG/AK
Vapor Extraction Well ID:	41	**Test Type (Step, Constant Rate, etc.):**	

Vacuum Applied (~~in. H_2O~~):	-1.5 inHg											
Monitoring Point	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**
SVE-1 wellhead		-0.525										
SVE-2 wellhead		-1.5										
SVE-3 wellhead		-1.0										
SVE-4 wellhead		~~2.0~~ -2.5										
SVE-5 wellhead		-1.5										
SVE-6 wellhead		-1.75										
SVE-7 wellhead		-1.5										
SVE-8 wellhead		-1.0										
MW-21		0.00										
MW-22		-0.02										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

VMP-1S	-0.05	
VMP-1D	-0.10	
VMP-5	-0.08	
VMP-4	-0.13	
VMP-3	-0.02	
VMP-2S	0.00	
VMP-2D	-0.02	

AECOM

Project Name: BNSF - Mission Wye **Location:** Livingston, MT

Date: 10-2-2015 **Field Personnel:**

Vapor Extraction Well ID: SVE-6 & SVE-7 **Step Test/Constant Rate Test** (circle one)

Vacuum Applied (~~in. H_2O~~): -5.5 inHg **Startup Time:** **Shutdown Time:**

Individual Extraction Point					Pre-Blower/Post-Knock Out			Post-Blower/Pre-Air Cooler			Post-Air Cooler/Pre-Treatment				Mid-Treatment			Exhaust/Post-Treatment		
Time	Vacuum (in. Hg ~~in. H_2O~~)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Vacuum (in. Hg ~~in. H_2O~~)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	Temp. (°F)	Pressure (in. H_2O)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)	Pressure (in. H_2O)	VOC (ppm)	Temp. (°F)	Air Flow (cfm)	VOC (ppm)	Temp. (°F)
	-5.5	7300 / 5300	—	77	-5.5	—	—	—	—	145	0	—	—	90	0	—	—	—	—	—

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name:	BUSF Mission Wye	**Location:**	Livingston, MT
Date:	10-2-2015	**Field Personnel:**	JCG
Vapor Extraction Well ID:	SVE-6 and SVE-7	**Test Type (Step, Constant Rate, etc.):**	

Vacuum Applied ~~(in. H_2O)~~:		inHg										
Monitoring Point	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**	**Time**	**Vacuum (in. H_2O)**	**(% diff)**
SVE-6 wellhead		~~[illegible]~~ -9.0										
SVE-7 wellhead		-7.25										
SVE-5 wellhead		-0.07										
VMP-4		-0.50										
VMP-3		-0.22										
VMP-2S		-0.04										
VMP-2D		-0.12										
MW-21		-0.20										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye	Location: Mission Wye - Livingston, MT
Date: 3-21-2017	Field Personnel: CG / JC
Vapor Extraction Well ID: All Running	Test Type (Step, Constant Rate, etc.): Constant Rate

Vacuum Applied (in. ~~H_2O~~ Hg):	1.5											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
VMP-5		0.12										
SVE-5		1.75										
PZ-4		0.2										
MW-10		0.12										
SVE-6		1.5										
VMP-4		0.1										
VMP-3		0.01										
VMP-2D		0.01										
MW-3		0.01										
SVE-7		0.60*										

Notes:

in. H_2O - Inches of water
cfm - Cubic feet per minute
VOC - Volatile organic compounds
ppm - Parts per million
°F - Degrees Fahrenheit
NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye	Location: Livingston, MT
Date: 3-21-2017	Field Personnel: CG / JC
Vapor Extraction Well ID: All	Test Type (Step, Constant Rate, etc.): Constant Rate

Vacuum Applied (in. H_2O):	-1.5 in Hg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-4		-2.5										
SVE-8		-1.5										
VMP-1D		-0.15										
SVE-3		-1.0										
SVE-2		-1.25										
SVE-1		-0.6										

Notes:

In. H_2O - Inches of water
cfm - Cubic feet per minute
VOC - Volatile organic compounds
ppm - Parts per million
°F - Degrees Fahrenheit
NM - Not measured

Comments:

AECOM

Project Name:	BNSF - Mission Wye	Location:	Livingston, MT
Date:	3-21-2017	Field Personnel:	CG / SC
Vapor Extraction Well ID:	SVE-3	Test Type (Step, Constant Rate, etc.):	Constant Rate

Vacuum Applied (in. H_2O):	-4.0 inHg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-3		-6.0										
SVE-2		-2.5										
SVE-8		-0.42										
VMP-1D		-0.3										
SVE-4		-1.0										

Notes:

in. H_2O - Inches of water
cfm - Cubic feet per minute
VOC - Volatile organic compounds
ppm - Parts per million
°F - Degrees Fahrenheit
NM - Not measured

Comments:

AECOM

Project Name:	BNSF - Mission Wye	Location:	Livingston, MT
Date:	3-21-2017	Field Personnel:	CG/JC
Vapor Extraction Well ID:	SVE-4	Test Type (Step, Constant Rate, etc.):	Constant Rate

Vacuum Applied (in. H_2O):	-3.5 in Hg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-4		-13.5										
SVE-3		-0.14										
SVE-8		0.4										
SVE-5		0.55										
VMP-5		~~2.5~~ -0.25										

Notes:

in. H_2O - Inches of water
cfm - Cubic feet per minute
VOC - Volatile organic compounds
ppm - Parts per million
°F - Degrees Fahrenheit
NM - Not measured

Comments:

AECOM

Project Name:	BUSF - Mission Wye	Location:	Livingston, MT
Date:	3-21-2017	Field Personnel:	CG / JC
Vapor Extraction Well ID:	SVE-5	Test Type (Step, Constant Rate, etc.):	Constant Rate

Vacuum Applied (in. H_2O):	-3.8 in Hg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-4		-0.325										
SVE-8		-0.40										
SVE-5		-9.0										
PZ-4		-0.40										
MW-10		-0.30										
SVE-6		-0.40										

Notes:

in. H_2O - Inches of water
cfm - Cubic feet per minute
VOC - Volatile organic compounds
ppm - Parts per million
°F - Degrees Fahrenheit
NM - Not measured

Comments:

AECOM

Project Name:	BNSF - Mission Wye	Location:	Livingston, MT
Date:	3-21-2017	Field Personnel:	CRG / JC
Vapor Extraction Well ID:	SVE-6	Test Type (Step, Constant Rate, etc.):	Constant Rate

Vacuum Applied (in. H_2O):	-4.75 inHg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-6		-10.0										
SVE-5		-0.30										
PZ-4		-0.15										
MW-10		-0.15										
VMP-4		-0.375										
VMP-3		-0.15										
SVE-7		-0.80										
MW-3		-0.10										

Notes:

in. H_2O - Inches of water
cfm - Cubic feet per minute
VOC - Volatile organic compounds
ppm - Parts per million
°F - Degrees Fahrenheit
NM - Not measured

Comments:

AECOM

Project Name:	BNSF - Mission Wye	Location:	Mission Wye - Livingston, MT
Date:	3-21-2017	Field Personnel:	CG/JC
Vapor Extraction Well ID:	SVE-7	Test Type (Step, Constant Rate, etc.):	Constant Rate

Vacuum Applied (in. H_2O):	-6.25 inHg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
MW-3		-0.14										
SVE-7		-9.5										
VMP-3		-0.125										
VMP-4		-0.02										

Notes:

in. H_2O - Inches of water
cfm - Cubic feet per minute
VOC - Volatile organic compounds
ppm - Parts per million
°F - Degrees Fahrenheit
NM - Not measured

Comments:

AECOM

Project Name:	BNSF - Mission Wye	Location:	Livingston, MT
Date:	3-21-2017	Field Personnel:	CG / JC
Vapor Extraction Well ID:	SVE-8	Test Type (Step, Constant Rate, etc.):	Constant Rate

Vacuum Applied (in. H_2O):	-5.0 inHg											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-6		-0.05										
SVE-5		-0.01										
SVE-8		-10.0										
SVE-4		-0.1										

Notes:

in. H_2O - Inches of water
cfm - Cubic feet per minute
VOC - Volatile organic compounds
ppm - Parts per million
°F - Degrees Fahrenheit
NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye	Location: Livingston MT
Date: 06/19/2017	Field Personnel: Brad Ruff / Brent Brumfield
Vapor Extraction Well ID: SVE-1	Test Type (Step, Constant Rate, etc.): Constant Rate
Vacuum Applied (~~in. H_2O~~): IN/Hg 7.5	

Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-1	1800	4.00										
SVE-2	1800	0.70										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye
Date: 06/19/2017
Vapor Extraction Well ID: SVE 2
Vacuum Applied (~~in. H_2O~~): IN/HG 7.5

Location: Livinston MT
Field Personnel: Brent Brumfield / Brad Ruff
Test Type (Step, Constant Rate, etc.): Constant Rate

Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-1	1810	0.25										
SVE-2	1810	11.00										
SVE-3	1810	0.75										

Notes:

in. H_2O - Inches of water
cfm - Cubic feet per minute
VOC - Volatile organic compounds
ppm - Parts per million
°F - Degrees Fahrenheit
NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye	Location: Livingston MT
Date: 06/15/2017	Field Personnel: Brad Ruff / Brumfield
Vapor Extraction Well ID: SVE-3	Test Type (Step, Constant Rate, etc.): Constant Rate
Vacuum Applied ~~(in. H_2O)~~: IN/Hg 7.0	

Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-2	1820	0.45										
SVE-3	1820	9.00										
SVE-4	1820	2.00										
SVE-8	1820	0.50										
VMP-1D	1820	0.40										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye
Date: 06/19/2017
Vapor Extraction Well ID: SVE-4
Vacuum Applied (~~in. H_2O~~): IN/HG 7.0

Location: Livingston MT
Field Personnel: Brent Brumfield / Brad Ruff
Test Type (Step, Constant Rate, etc.): Constant Rate

Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-3	1830	0.50										
SVE-4	1830	22.00										
SVE-8	1830	0.55										
VMP-1D	1830	0.10										
VMP-5	1830	0.10										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye	Location: Livingston MT
Date: 06/15/2017	Field Personnel: Brent Brumfield / Brad Ruff
Vapor Extraction Well ID: SVE-5	Test Type (Step, Constant Rate, etc.): Constant Rate
Vacuum Applied (~~in. H_2O~~): IN/HG · 7.0	

Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-5	1840	9.50										
MW-10	1840	0.75										
PZ-4	1840	0.75										
VMP-5	1840	0.10										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye
Date: 06/19/2017
Location: Livingston MT
Vapor Extraction Well ID: SVE-6
Field Personnel: Brad Ruff / Brent Brumfield
Vacuum Applied (~~in. H_2O~~): IN/HG 7.5
Test Type (Step, Constant Rate, etc.): Constant Rate

Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
SVE-5	1845	0.40										
MW-10	1845	0.10										
PZ-4	1845	0.10										
SVE-6	1845	15.00										
VMP-2D	1845	0.05										
VMP-3	1845	0.10										
VMP-4	1845	0.40										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF-Mission Wye
Location: Livingston MT
Date: 06/19/2017
Field Personnel: Brent Brumfield / Brad Ruff
Vapor Extraction Well ID: SVE-7
Test Type (Step, Constant Rate, etc.): Constant Rate

Vacuum Applied (~~in. H_2O~~):	IW/HG 7.5											
Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
VMP-2D	1900	0.10										
MW-22	1900	0.10										
SVE-7	1900	3.00										
VMP-3	1900	0.05										
VMP-4	1900	0.10										

Notes:

in. H_2O - Inches of water

cfm - Cubic feet per minute

VOC - Volatile organic compounds

ppm - Parts per million

°F - Degrees Fahrenheit

NM - Not measured

Comments:

AECOM

Project Name: BNSF - Mission Wye
Date: 06/19/2017
Vapor Extraction Well ID: SVE - 8
Location: Livingston MT
Field Personnel: Brent Brumfield / Brad Ruff
Test Type (Step, Constant Rate, etc.): Constant Rate
Vacuum Applied (~~in. H_2O~~): IN/HG 7

Monitoring Point	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)	Time	Vacuum (in. H_2O)	(% diff)
MW-4	1910	0.00										
SVE-4	1910	2.25										
SVE-5	1910	0.30										
SVE-8	1910	9.50										

Notes:

in. H_2O - Inches of water
cfm - Cubic feet per minute
VOC - Volatile organic compounds
ppm - Parts per million
°F - Degrees Fahrenheit
NM - Not measured

Comments:

July 2016 Groundwater Elevation Data, Mission Wye Site, Livingston, Montana

Well Number	Measuring Pt. Elevation (Ft-MSL) (1)	Screened Interval From Top of Casing	2015		2016		2017	
			Depth to Water (feet)	Total Depth (feet)	Depth to Water (feet)	Total Depth (feet)	Depth to Water (feet)	Total Depth (feet)
PZ-1	4408.95		9.97	10.84	11.39	22.58	7.50	22.58
PZ-2	4411.45		15.58	16.13	16.76	27.85	13.90	27.85
PZ-3	4415.87		17.11	18.19	18.39	29.21	14.45	29.21
PZ-4	4413.95		16.99	17.86	18.59	28.52	15.10	28.52
PZ-5	4400.15		6.34	6.84	7.40	11.61	5.07	11.61
PZ-6/MW-12	4412.24	12' - 32'	18.45	18.99	19.59	34.43	—	—
MW-1	4417.03	10' - 25'	16.06	17.2	17.84	24.41	12.72	12.72
MW-2	4408.22		11.8	12.51	13.13	23.54	9.93	~~9.9~~ 23.54
MW-3	4412.05	10' - 25'	15.58	16.36	17.09	26.89	13.75	26.89
MW-4	4413.76	12' - 27'	16.28	17.19	17.94	29.04	14.08	29.04
MW-5	4413.44	12.5' - 27.5'	16.70	17.52	18.25	28.64	14.81	28.64
MW-6	4407.5		12.3	12.87	14.44	24.81	10.71	24.81
MW-7	4400.08		4.93	5.54	6.16	9.53	3.38	9.53
MW-8	4400.56		6.70	7.19	7.78	11.91	5.42	11.91
MW-9	4400.69	5' - 20'	6.76	7.26	7.89	18.83	5.50	18.83
MW-10	4413.92		16.91	17.8	18.54	29.24	14.93	29.24
MW-11	4413.50		15.12	16.39	17.16	28.95	12.73	28.95
MW-14	4412.29	12' - 32'	18.87	19.36	19.95	34.68	—	—
MW-17	4395.86		10.43	10.63	11.15	23.72	—	—
MW-18	4403.67	25' - 30'	16.74	17.05	17.55	32.47	—	—
MW-19	4399.96	19' - 24'	18.81	19.03	19.46	26.98	—	—
MW-21	4412.57	34' - 39'	16.47	17.25	18.01	41.24	14.69	41.24
MW-22	4412.39	12' - 22'	16.19	16.98	17.7	23.38	14.38	23.38
SW-3	4401.30		NM	NM	NM	NM	—	—

Notes:

(1) Measurement at black mark or at top of PVC on north side of casing.
ft-MSL - feet relative to mean sea level
NM - Not measured.
MW-1 is marked as MW-1A in the field. The well label will be corrected in 2013.

Appendix E

2017 Annual Groundwater Monitoring Summary

2017 Annual Groundwater Monitoring Summary

This Groundwater Monitoring summary supplements information provided in the Feasibility Study (FS) Report and is not intended to be a stand-alone document.

1.0 Current Groundwater Monitoring

Groundwater monitoring activities were conducted by AECOM Technical Services, Inc. (AECOM) on behalf of BNSF Railway Company (BNSF) in July 2017 per the requirements outlined in the current groundwater monitoring plan (GMP) titled *Groundwater Sampling Plan* (RETEC 2007). Additional groundwater monitoring activities associated with the Soil Vapor Extraction (SVE) were conducted in June of 2017 to comply with the performance monitoring schedule for the FS/SVE Pilot Test Work Plan. Additionally, it allowed for the evaluation of groundwater COC concentrations in two consecutive monitoring events, spaced a month apart. A summary of the groundwater monitoring activities at the site since 1991 is detailed in Section 2.3 of the FS Report.

1.1 Groundwater Elevations and Groundwater Flow

As described in the GMP (RETEC 2007), the potentiometric surface monitoring network consisted of the following:

- 17 monitoring wells (wells MW-1 through MW-11, MW-14, MW-17 through MW- 19, and MW-21 through MW-22); and
- 6 piezometers (piezometers PZ-1 through PZ-6).

Groundwater levels were measured on July 12 and 13, 2017 from monitoring wells and piezometers by lowering an oil/water interface probe in the well. The depths to groundwater and the total well depth were measured from the north side of the top of the inner polyvinyl chloride well casing, unless otherwise marked on the well casing. Groundwater level measurements were used to calculate the depth at which water would be purged from the well and to determine the groundwater elevations, flow direction, and gradient.

Groundwater elevation data obtained during the July 2017 sampling event are summarized in **Table E-1** and are presented with potentiometric surface contours on **Figure 4** of the FS Report. The groundwater flow direction during the July 2017 monitoring event, also shown on **Figure 4** of the FS Report**,** was to the northeast, consistent with previous events. The hydraulic gradient was determined to be 0.0040 feet per foot (ft/ft) between wells MW-1 and MW-9, comparable to the gradient calculated during the July 2016 sampling event (0.0035 ft/ft). A gradient of 0.0032 ft/ft was calculated east of the property between wells MW-14 and MW-19, comparable to the gradient calculated in 2016 (0.0030 ft/ft).

During the July 2017 monitoring event, the depth to water ranged from approximately 2.66 to 15.80 feet below ground surface (bgs) (**Table E-1**). Groundwater elevations measured during the month of July demonstrated a decreasing trend between July 1997 and July 2002. An increasing trend in groundwater elevations was observed between 2008 and 2011. Groundwater elevations recorded between 2002 and 2008 and between 2012 and 2016 did not show a consistent trend. Groundwater elevations recorded in July 2017 increased overall by an average of 2.6 feet from those recorded in July 2016. Historical groundwater elevation data are shown in **Attachment 1** and the trends can be seen on **Figures E-1** and **E-2**.

A well inventory was prepared prior to the July 2017 groundwater sampling event and was submitted under separate cover to Montana Department of Environmental Quality (MDEQ) on June 14, 2017 (AECOM 2017). The monitoring well network did not change from the previous year. According to the Montana Bureau of Mines and Geology Groundwater Information Center website database, no new wells were identified.

1.2 Groundwater Quality

This section of the summary presents the groundwater sample collection procedures and laboratory analytical results of the samples collected in June and July 2017. Groundwater quality sampling was conducted in accordance with the 2007 GMP (RETEC 2007). Information collected through groundwater monitoring, including changes in concentrations of chemicals in groundwater and seasonal variations in the water table, has been used to assess the effectiveness of interim remediation activities and to assess remedial technologies proposed in the FS Report.

The volatile organic compound (VOC) groundwater monitoring well network consisted of 11 of the 17 monitoring wells (MW-1, MW-3, MW-4, MW-5, MW-9, MW-12, MW-14, MW-18, MW-19, MW-21, and MW-22), as shown on **Figure 4** of the FS Report. Per the 2007 GMP, monitoring well MW-1 was sampled to observe the background groundwater quality; monitoring wells MW-3, MW-4, and MW-5 represent former source area wells; monitoring wells MW-9, MW-12, MW-14, MW-18, MW-19, MW-21, and MW-22 represent downgradient groundwater quality wells. The Harris Stock Well, the Gravel Pit Well, and surface water from the Gravel Pit Pond also were sampled as part of the downgradient sampling network.

1.2.1 Sample Collection

Monitoring wells and piezometers were inspected for labels, visibility, and concrete pad integrity, according to the specifications outlined in the 2007 GMP (RETEC 2007). The wells and piezometers passed inspection prior to groundwater sampling. There were no signs of vandalism to the wells, including no obvious odor or visible sign of groundwater contamination. At the time of sampling, the Gravel Pit Well had a hose attached to the hydrant that could not be removed. Water from the well was flushed through the hose for a minimum of five minutes prior to sampling.

Each well was unlocked and depth to groundwater was measured using a decontaminated oil/water interface probe. The groundwater level and total depth of the well were measured and used to determine the length of the water column. A decontaminated, low-flow bladder pump was then lowered into the well to a depth approximately half-way into the water column within the screened interval of the well. Before collecting groundwater samples, each well was purged following low-flow sampling guidance and field parameters were monitored in a flow through cell. Measurements for pH, temperature, conductivity, dissolved oxygen (DO), oxidation/reduction potential (ORP), and physical appearance of the water were recorded on the sampling log once approximately every three to four minutes. No field parameters, including surface or groundwater elevation, were collected at the Harris Stock Well, the Gravel Pit Well, or for the surface water sample at the Gravel Pit Pond.

Groundwater sampling field forms for each well are included in **Attachment 2**. A groundwater sample was collected when field measurements of temperature, pH, and conductivity stabilized, which was indicated to have occurred when the change between successive readings met the acceptance criteria per the 2007 GMP (also defined on the groundwater sampling logs). The final field measurements taken at each well represent the groundwater collected for laboratory analysis.

At the time of sampling, the sample containers were labeled appropriately and filled directly from the bladder pump's discharge tubing. Care was taken to not touch the sample container with the tubing. The number of containers and preservatives for the samples collected are identified in **Table E-2**. Samples that required preservatives were preserved in the field at the time of sample collection. After

collection, samples were properly packaged, placed in a cooler with ice, and prepared for shipment to the analytical laboratory.

MDEQ collected confirmation split samples at monitoring wells MW-3, MW-9, and MW-14 concurrent with the annual monitoring event. AECOM and MDEQ alternated filling containers during sample collection in an effort to obtain comparable samples.

1.2.2 Analytical Program

Parameters sampled in 2017 included VOCs by the U.S. Environmental Protection Agency (USEPA) Methods 8260 (for BNSF wells and the Gravel Pit Pond surface water sample) or 524.2 (for the Harris Stock Well and the Gravel Pit Well) per the 2007 GMP. These analytical methods are consistent with past monitoring events and both methods meet the required reporting limits provided in the May 2017 Circular DEQ-7, “Montana Numeric Water Quality Standards, Human Health Standards for Groundwater” (DEQ-7 Standards) (MDEQ 2017a). MDEQ approved continued analysis by these methods in an email dated June 27, 2017 (MDEQ 2017b).

Table E-2 presents the analytical and field parameters collected during the groundwater monitoring conducted July 12 and 13, 2017. The 2014 HHRA Amendment identified tetrachloroethene (PCE) and trichloroethene (TCE) as the only compounds of concern (COCs) in groundwater (AECOM 2014). Natural attenuation (NA) parameters have been evaluated in past monitoring events; however, in a January 6, 2014 letter, MDEQ agreed with discontinuing collection and analysis of NA parameters during annual groundwater monitoring events (MDEQ 2014).

The analyses were conducted in accordance with USEPA guidelines contained in the *Quality Assurance Project Plan* (QAPP) (RETEC 1996). Groundwater samples were analyzed by Pace Analytical Services, Inc. of Minneapolis, Minnesota. MDEQ split samples were analyzed by Energy Laboratories of Helena, Montana. Copies of the chain-of-custody forms are included with the laboratory reports in **Attachment 3**. Analytical results are compared against May 2017 DEQ-7 Standards (MDEQ 2017a).

1.2.3 Analytical Results – Volatile Organic Compounds

A total of 14 locations were sampled for VOCs in July 2017: monitoring wells MW-1, MW-3, MW-4, MW-5, MW-9, MW-12, MW-14, MW-18, MW-19, MW-21, MW-22, the Harris Stock Well, the Gravel Pit Pond, and the Gravel Pit Well. Groundwater sample results are summarized in **Table E-3** (including data obtained from MDEQ split samples), and laboratory analytical and data validation reports for the July 2017 groundwater samples are included in **Attachment 3**. A summary of the July 2017 results is provided below:

- Results for samples collected in July 2017 were below the DEQ-7 Standards for all constituents.
- PCE and/or TCE were detected in ten of the 14 locations above laboratory reporting or method detection limits (MDLs).
  - PCE was detected at concentrations above the method reporting limit in MW-3 (including the duplicate sample and the MDEQ split sample), MW-4, and MW-9 (including the MDEQ split sample). Estimated concentrations below the method reporting limit also were reported in MW-5, MW-12, MW-14 (including the MDEQ split sample), MW-18, MW-22, and the Harris Stock Well.
  - TCE was detected at concentrations above the method reporting limit in MW-4, MW-5, MW-12, and MW-19. Estimated concentrations below the method reporting limit also were reported in MW-3 (including the duplicate sample and the MDEQ split sample), MW-9 (including the MDEQ split sample), the MDEQ split sample at MW-14 (TCE was not detected in the BNSF sample), MW-18, and the Harris Stock Well.
- Samples collected from background well MW-1 and downgradient locations MW-21, the Gravel Pit Pond, and the Gravel Pit Well were below the method detection limit for both PCE and TCE.

- In addition to PCE and TCE, other detected VOCs included acetone, cis-1,2-dichloroethene (cis-DCE), 1,2-dichloropropane, and 1,3,5-trimethylbenzene. These compounds were detected in the downgradient Gravel Pit Pond (acetone), the MDEQ split sample at former source area well MW-3 (cis-DCE), the original sample at downgradient well MW-14 (1,2-dichloropropane), and the downgradient Gravel Pit Well (1,3,5-trimethylbenzene) at estimated concentrations below the reporting limit.
- Groundwater samples were collected from two nested wells, MW-21 and MW-22, installed to evaluate the presence of VOC stratification. The shallower well (MW-22) had an estimated PCE concentration of 0.94 micrograms per liter (µg/L). No compounds were detected above the MDL in the deeper well, MW-21.

A total of five monitoring wells were sampled for VOCs in June 2017 (MW-1, MW-3, MW-4, MW-9, and MW-22). A summary of the June 2017 results is provided below:

- Results for samples collected in June 2017 were below the DEQ-7 Standards for all constituents in all five monitoring wells sampled
- PCE and/or TCE were detected in ten of the 14 locations above laboratory reporting or method detection limits (MDLs).
  - PCE was detected at concentrations above the method reporting limit in MW-3. Estimated concentrations below the method reporting limit also were reported in duplicate sample for MW-3.
  - TCE was detected at concentrations above the method reporting limit in MW-4. Estimated concentrations below the method reporting limit also were reported in MW-22.

Reported PCE and TCE concentrations in groundwater decreased during and following interim remediation activities that were completed in 2000. **Figures E-1** and **E-2** present historical concentrations of PCE and TCE in groundwater collected from a subset of wells. **Tables 1** and **2** in **Attachment 4** include historical PCE and TCE concentrations in monitoring wells MW-1, MW-3, MW-4, MW-5, MW-9, MW-12, MW-14, MW-18, and MW-19. The remaining tables in **Attachment 4** (titled **Table 3**) present annual analytical data summary tables from 1998 through 2017 and include additional sampled wells and surface locations as well as additional parameters.

Below is a summary of historical PCE and TCE concentrations:

- Concentrations of PCE and TCE have been below DEQ-7 groundwater standards in background well MW-1 since installation in 1992.
- Concentrations of PCE in MW-4 have been consistently below the DEQ-7 groundwater standard since 2009, with the exception of a PCE concentration reported at 5.3 µg/L in 2012.
- PCE concentrations in MW-5 have been consistently below the DEQ-7 groundwater standard since 2005.
- Following interim remediation activities in 2000, concentrations of TCE have consistently been below their respective DEQ-7 groundwater standard in source area monitoring wells MW-4 and MW-5, with the exception of concentrations reported during the 2000 and 2002 sampling events.
- Although reported PCE concentrations, and to a lesser extent TCE concentrations, in monitoring well MW-3 have generally been above DEQ-7 groundwater standards; concentrations generally decreased following interim remediation activities completed in June 2000 and SVE operations starting 2015 and are now less than the DEQ-7 standard (see **Figure E-1**).
- TCE concentrations in monitoring well MW-3 have been below the DEQ-7 groundwater standard since 2012 with the exception of a TCE concentration reported at 5.3 µg/L in 2013.
- Concentrations of TCE and PCE in wells MW-12 and MW-19 have been below DEQ-7 groundwater standards since the wells were installed.

- As shown in **Figure E-2**, concentrations of TCE and PCE in MW-18 have decreased to below DEQ-7 groundwater standards during and following completion of interim remediation activities conducted between 1996 and 2000.
- Concentrations of TCE and PCE in well MW-9 have been below DEQ-7 groundwater standards since 2007 and 2009, respectively, with the exception of PCE during the 2011 (8.6 µg/L) and 2015 (5.2 µg/L) sampling events.

Figures E-3 and **E-4** present PCE and TCE concentrations in groundwater for the July 2017 sampling event. At the request of MDEQ, a dash-and-query isopleth is shown in **Figure E3** to show the estimated extent of concentrations in groundwater that exceed the DEQ-7 Required Reporting Value (RRV) of 0.7 µg/L. The RRV is the laboratory reporting limit selected by MDEQ that is sufficient to meet the most stringent water quality standard and is a calculation based on a study of MDLs provided by a number of laboratories (MDEQ 2012). The dash-and-query isopleth to the RRV replaced the isopleth for detected COCs above half the DEQ-7 Standards that was included the 2007 GMP, as approved by MDEQ (MDEQ 2013). Sample results for PCE and TCE were below the DEQ-7 groundwater standard of 5 µg/L; therefore, no isopleths for DEQ-7 exceedances are shown on **Figure E-3** or **E-4**. **Figures E-5** and **E-6** show the distribution of PCE and TCE, respectively, in July 2016 and July 2017 at the groundwater standard of 5 µg/L.

1.2.4 QA/QC Analytical Laboratory Data Review

The data quality objective for the Mission Wye data is to achieve accuracy and completeness of data collected. The quality assurance/quality control (QA/QC) review determined that the sampling and laboratory analysis met QAPP criteria.

Data presented in **Table E-3** have been amended with data qualifiers based on data validation results presented in **Attachment 3**. Data qualifiers assigned to analytical results from samples collected in July 2017 included the following:

J The analyte was reported at concentrations greater than (>) the method detection limit but less than (<) the limit of quantitation/reporting limit and was qualified by the laboratory to indicate estimated concentrations because the analyte cannot be accurately quantitated at this trace concentration level.

U The analytical result reported as detected by the laboratory was qualified as not detected due to blank contamination.

UJ The analyte was not detected above the reported sample quantitation limit or was qualified as not detected due to blank contamination. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

The data verification report and laboratory analytical report from samples collected July 12 and 13, 2017 are included in **Attachment 3**. The analytical report included the laboratory QA sample results and the accuracy and precision calculations for the evaluation of laboratory control samples, laboratory control sample duplicates, matrix spike samples, and matrix spike duplicate samples. The information provided in the laboratory reports was compiled and reviewed to evaluate the usability of the analytical data reported. AECOM personnel conducted an evaluation of the laboratory analytical data obtained for the July 2017 groundwater sampling event for compliance with quality control criteria established by standard analytical methods. Data results and quality control compliance were evaluated based on validation criteria set forth in USEPA and MDEQ guidelines (USEPA 2017 and 2008; MDEQ 2010). This evaluation is summarized in the data verification report.

QC samples included one duplicate sample, one field blank, one equipment blank, and two trip blanks (including the MDEQ trip blank). During the July 2017 sampling event, a duplicate sample was collected from well MW-3. The duplicate was labeled MW-33 on the chain-of-custody form so that the corresponding sample could not be identified (i.e., a “blind” duplicate). A field blank (MW-30) was prepared at well MW-1 by pouring laboratory-provided deionized water into a sample container. An

equipment blank (MW-32) was prepared after sampling well MW-1 by pouring laboratory-provided deionized water through a new bladder and across the decontaminated bladder pump into a sample container. One laboratory-prepared trip blank was included with the sample shipment. One laboratory-prepared trip blank was included with the MDEQ sample shipment. Compounds detected in the blank samples, as well as associated assigned qualifiers, are discussed in the following section. **Table E-3** includes the QC sample results for the duplicate sample, the field blank, equipment blank, and trip blanks. **Attachment 3** includes the laboratory report, which shows the detected results as well as the lab reporting limit and MDLs obtained.

1.2.4.1 QA/QC Analytical Laboratory Data Review

Qualifiers assigned to the analytical results are summarized below:

- The vials for the trip blank associated with the laboratory group 1095793 had headspace greater than 6 millimeters. The results for all VOCs in the trip blank were qualified as estimated and flagged “J” or “UJ.”
- The percent differences for bromomethane and chloroethane in continuing calibration verification were outside the method limits. The results for bromomethane and chloroethane in the associated samples were qualified as estimated and flagged “UJ”. TCE and PCE results in samples associated with Mission Wye were not affected.
- The following VOCs were detected in the laboratory method blank associated with VOC analysis by USEPA Method 8260: acetone, and diethyl ether at estimated concentrations above the MDLs and below the reporting limits. Diethyl ether was not detected in the associated samples. Qualifiers were assigned to the results for acetone in the associated samples, as appropriate. TCE and PCE were not detected in the method blank analyzed at the laboratory and results in samples associated with Mission Wye were not affected.
- Naphthalene was detected in the method blank associated with VOC analysis by USEPA Method 524.2 at an estimated concentration above the MDL and below the reporting limit. Naphthalene was not detected in the associated samples. TCE and PCE were not detected in the method blank analyzed at the laboratory and results in samples associated with Mission Wye were not affected.
- The percent recoveries for chloroethane, dichlorofluoromethane, and trichlorofluoromethane in the laboratory control sample were below the control limits of 63 to 137 percent, 75 to 125 percent, and 71 to 125 percent, respectively. The results for chloroethane were qualified in the associated samples based on the continuing calibration verification result and no further qualifications based on the laboratory control sample were required for this analyte. The dichlorofluoromethane and trichlorofluoromethane in the associated samples were qualified as estimated and flagged “UJ”. TCE and PCE results in samples associated with Mission Wye were not affected.
- VOCs including 1,2-dichloroethane, acetone, and/or chloroform were reported in the field and equipment blanks. The results for 1,2-dichloroethane and acetone in the associated samples were qualified as not detected and flagged “U” based on method and/or equipment blank contamination. Chloroform was not detected in the associated samples; therefore, additional qualification was required. TCE and PCE results in samples associated with Mission Wye were not affected.
- The trip blank associated with samples analyzed using Method 8260 contained a detected concentration of methylene chloride. Methylene chloride was not detected in the samples associated with this trip blank; therefore, no data were qualified based on this trip blank result.
- A matrix spike/matrix spike duplicate (MS/MSD) by USEPA Method 8260B was performed by Pace using groundwater collected from MW-18. The percent recoveries for 1,2-dibromoethane in the MS (72 percent) and tetrahydrofuran in the MSD (156 percent), and the relative percent difference for chloromethane (34 percent) were outside of the control limits of 75 to 131 percent, 53 to 153 percent, and 30 percent, respectively. However, as two of the three quality control

parameters (MS, MSD, and/or RPD) were acceptable for each of these compounds, data were not qualified.

- A second MS/MSD by USEPA Method 8260B also was performed by Pace using a sample unrelated to the Mission Wye annual groundwater event. The percent recovery for tetrahydrofuran in the MSD (164 percent) exceeded the control limits of 53 to 153 percent; however, data were not qualified based on this exceedance because the results were obtained from non-project samples.
- An MS/MSD by USEPA Method 8260B was performed by Energy Laboratories using groundwater collected from MW-3. Results were acceptable.
- An MS/MSD by USEPA Method 524.2 was performed by Pace using groundwater collected from the Gravel Pit Well. Results were acceptable.
- One or more sample results were flagged “J” by the laboratory to indicate that the concentrations were less than the laboratory reporting limits but above the MDLs. Laboratory J-flagged results are considered estimated results unless qualified as not detected and flagged “U” based on method blank detections described above.
- A field duplicate was submitted for MW-3 and identified as MW-33. The field duplicate Relative Percent Differences (RPDs) were within data validation control limits of 30 percent for analytes reported at concentrations greater than five times the reporting limits.
- The state of Minnesota requires laboratories to verify that the reporting limit level in the initial calibration is within + or - 40% of the true value when evaluated against the ical. If it is outside of the 40% criteria, the laboratory then must elevate the RL to the next passing calibration point. When this happens the data is flagged as MN. The intent of this criteria, which is often tighter than method criteria, is to be sure calibrations accurately represent data at the reporting limit level. The MN flag in the laboratory report was associated with an acetone detect in the method blank. The MN flag was only associated with QC data. The acetone hit in the method blank was below the action limits set by the Montana DEQ.

1.2.4.2 Data Usability Summary

The usability of the analytical data was evaluated by the consideration of data precision, accuracy, method compliance and completeness as described below. Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the dataset were determined to be acceptable for all methods based on the data reported. No data were missing or rejected. All reported data were suitable for the intended use with qualification.

Precision: Precision is the measure of variability of individual sample measurements. Field precision was determined by comparison of field duplicate sample results. Laboratory precision was determined by examination of laboratory duplicate results (i.e., laboratory control sample duplicates and/or matrix spike duplicates) and field duplicate results.

Accuracy: Field accuracy, a measure of the sampling bias, was determined by reviewing trip blank, field blank, and equipment rinse blank results for evidence of sample contamination stemming from field activities or sample transport. Laboratory accuracy is a measure of the system bias and was measured by evaluating laboratory control sample/laboratory control sample duplicate, matrix spike/matrix spike duplicate, and organic system monitoring compounds (surrogate) percent recoveries.

Method Compliance: Method compliance was determined by evaluating sample integrity, holding times, reporting limits, and laboratory blanks against method specified requirements, while applying USEPA data validation guidelines.

Completeness: Completeness is the overall ratio of the number of samples planned versus the number of samples with verified analyses. Completeness goals are set at 90 to 100 percent. Determination of completeness included a review of chain-of-custody records, laboratory analytical methods and detection limits, laboratory case narratives, and project requirements. Completeness

also included 100 percent review of the laboratory sample data results, QC summary reports, and electronic data deliverables.

A total of 14 locations are included in the annual sampling program (**Table E-2**). Completeness based on the number of samples collected is 100 percent and is acceptable since no data was missing or rejected. Data received from the laboratory are useable with qualification.

Overall Assessment: Precision, accuracy, method compliance, and completeness of the data set have been determined to be acceptable, based on the data submitted. The data are suitable for their intended use with qualification.

2.0 Summary

Groundwater monitoring has been conducted at BNSF Mission Wye for 25 years. This document was prepared to summarize the groundwater sampling data collected during the most recent groundwater sampling event conducted in July 2017 at the time that the first draft of this FS Report was submitted. The July 2017 groundwater event was the 17th consecutive monitoring event since the completion of source removal interim remediation activities in 2000. Effectiveness of the interim remediation activities has been demonstrated by monitoring the reduction in COC concentrations in groundwater, as summarized below.

- All groundwater sample results from July 2017 were below their respective DEQ-7 standards.
- Interim remedial actions implemented in 2000 were effective in reducing COC concentrations in groundwater, evidenced by the decrease in PCE and TCE concentration in wells MW-3 and MW-4. For example, the average PCE concentration in MW-3 in the three years prior to completion of interim remedial activities in 2000 (1997 through 1999) was 689.7 µg/L and the average PCE concentration in the same well the last three years (2015 through 2017) was 26.2 µg/L, a decrease of over one order of magnitude.
- COC concentrations in groundwater samples have been consistently below DEQ-7 groundwater standards since 2009 in the majority of sampled locations; exceedances of the DEQ-7 standards for PCE and TCE have been limited since 2009 to wells MW-3, MW-4, MW-9, and MW-22 (**Attachment 4**). In 2017 PCE and TCE were below DEQ-7 standards in all wells.
- Prior to 2017 groundwater with COC concentrations greater than DEQ-7 standards was limited in aerial extent (**Figures E-3** and **E-4**) and indicated the remaining residual mass with elevated VOC concentrations was likely located upgradient from MW-3. PCE concentrations in groundwater decreased with distance from the source area (demonstrated through PCE and TCE concentrations in MW-3, MW-9 and MW-18, as discussed in Section 1.2.3 and demonstrated in **Figure 5** of the FS Report).
- Prior to 2017, groundwater with COC concentrations greater than DEQ-7 standards has been limited in vertical extent as demonstrated through groundwater results at nested wells MW-21 and MW-22 (**Table 3** in **Attachment 4**). Deep zone well MW-21 has shown consistently lower concentrations of COCs than the accompanying shallow wells MW-3 and MW-22, indicating groundwater impacts were limited to the shallow alluvial aquifer.
- Based on data collected historically, elevated PCE and TCE concentrations, prior to 2017, in groundwater have been observed seasonally when the groundwater elevation rises. This suggests the remaining residual COC mass was located in the smear zone, which is only saturated during high groundwater during the summer months.
    - The highest PCE concentration reported in MW-3 since completion of interim remedial activities in 2000 (260 µg/L reported in July 2011) occurred when the groundwater elevation also was the highest level observed since 2000. The groundwater elevation in MW-3 during the July 2017 monitoring event was the highest that has been recorded since 2011 and was within approximately one-foot of the 2011 groundwater elevation (**Figure 7** of the FS Report). The PCE concentration in MW-3 during the July 2017 event (4.7 µg/L) was almost two orders of magnitude below the July 2011 PCE concentration (260 µg/L).
    - The PCE concentration in MW-3 during the July 2016 monitoring event (6.4 µg/L) was only slightly higher than the concentration during the July 2017 event (4.7 µg/L) although the groundwater elevation measured in MW-3 in 2016 was approximately three feet lower than the elevation in 2017.

  - This data shows that the higher groundwater elevations observed in July 2017 did not result in a significant increase in the PCE concentration.

- The SVE pilot test initiated in 2015 indicated that SVE was effective at reducing the remaining COC mass potentially located in the smear zone discussed in the preceding bullets. This has been demonstrated by the reduction of the PCE concentration of one order of magnitude in MW-3 (from 67.4 µg/L in July 2015 to 6.4 µg/L in July 2016) and to concentrations below DEQ-7 standards during this 2017 sampling event (4.7 µg/L at MW-3) and at all other sampled locations.
  - The ability of the SVE system to remove PCE and TCE source mass is quantified through the mass removal calculations presented in Section 5.3.1 of the FS Report. Although the overall mass of PCE removed (30.48 pounds) and TCE (3.94 pounds) by the SVE pilot test is relatively low, it demonstrates that there is a low quantity of residual PCE and TCE source mass in the subsurface at Mission Wye.
  - The observed system flow rate was less during the months with higher groundwater (approximately 200 cubic feet per meter (cfm) versus greater than 300 cfm). In general, due to the reduced flow rate, the mass removal rate calculated during the time period with higher groundwater also was lower than that during periods with lower groundwater. The average PCE removal rate during June and July 2016 (representing high groundwater) was approximately 0.03 pound per day, while the average PCE removal rate from September 2015 through May 2016 was approximately 0.10 pound per day. However, based on the removal rates from September 2016 through May 2017 (0.013 pound per day) versus June 2017 through July 2017 (0.015 pound per day), the reduced removal rate is likely more of a function of a reduced residual mass in the subsurface in addition to groundwater fluctuations.

3.0 Future Activities

Future activities will be determined in the Record of Decision (ROD) that will be issued by MDEQ following public comment on the Proposed Plan. The implementation of the selected remedy, including any required groundwater monitoring, will be outlined in the Remedial Design.

4.0 References

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5.0 List of Attachments

Tables

Table E-1 July 2017 Groundwater Elevation Data

Table E-2 July 2017 Sample Analysis Summary

Table E-3 July 2017 Groundwater Analytical Summary – VOCs

Figures

Figure E-1 Historical Groundwater Concentrations (PCE, TCE, and DCE) and Elevations – Wells MW-1, MW-3, MW-4, and MW-5

Figure E-2 Historical Groundwater Concentrations (PCE, TCE, and DCE) and Elevations – Wells MW-9, MW-12, MW-18, and MW-19

Figure E-3 Estimated Extent of PCE Concentrations in Groundwater July 2017

Figure E-4 Estimated Extent of TCE Concentrations in Groundwater July 2017

Figure E-5 Comparison of Estimated Extent of PCE Distribution in Groundwater July 2016 and 2017

Figure E-6 Comparison of Estimated Extent of TCE Distribution in Groundwater July 2016 and 2017

Attachments

Attachment 1 Historical Groundwater Level Data

Attachment 2 Groundwater Sampling Field Forms and Notes

Attachment 3 Groundwater Laboratory Data and QA/QC Report

Attachment 4 Historical Groundwater Sample Result Summary

Tables

Table E-1 July 2017 Groundwater Elevation Data
BNSF Mission Wye, Livingston, Montana

Well Number	From Top of Casing (TOC)			From Ground Surface		Water Elevation 7/12/17-7/13/17 (ft-AMSL)
	Measuring Point Elevation (ft-AMSL) [1]	Depth to Water 7/12/17-7/13/17 (feet)	Total Well Depth (feet)	Ground Surface Elevation (ft-AMSL) [2]	Depth to Water 7/12/17-7/13/17 (feet)	
PZ-1	4408.95	8.65	22.46	4,406.71	6.41	4400.30
PZ-2	4411.45	14.34	27.72	4,409.56	12.45	4397.11
PZ-3	4415.87	16.92	30.09	4,414.47	15.52	4398.95
PZ-4	4413.95	15.87	28.41	4,411.96	13.88	4398.08
PZ-5	4400.15	5.20	11.35	4,398.24	3.29	4394.95
PZ-6/MW-12	4412.24	17.48	34.3	4,410.56	15.80	4394.76
MW-1	4417.03	14.62	24.25	4,414.89	12.48	4402.41
MW-2	4408.22	10.62	23.41	4,405.94	8.34	4397.60
MW-3	4412.05	14.45	26.77	4,410.34	12.74	4397.60
MW-4	4413.76	15.11	28.90	4,412.41	13.76	4398.65
MW-5	4413.44	16.60	28.36	4,412.19	15.35	4396.84
MW-6	4407.5	11.13	24.70	4405.56	9.19	4396.37
MW-7	4400.08	3.80	9.4	4,398.94	2.66	4396.28
MW-8	4400.56	5.55	11.63	4,398.73	3.72	4395.01
MW-9	4400.69	5.65	22.44	4,398.71	3.67	4395.04
MW-10	4413.92	15.80	29.09	4,411.96	13.84	4398.12
MW-11	4413.50	14.11	28.79	4411.98	12.59	4399.39
MW-14	4412.29	17.81	34.44	4,410.07	15.59	4394.48
MW-17	4395.86	9.26	23.59	4393.4	6.80	4386.60
MW-18	4403.67	15.45	32.34	4401.2	12.98	4388.22
MW-19	4399.96	17.75	26.87	4397.9	15.69	4382.21
MW-21	4412.57	15.38	41.10	4410.4	13.21	4397.19
MW-22	4412.39	15.10	23.38	4410.3	13.01	4397.29

Notes:

1 = Measurement at black mark or at top of PVC on north side of casing.

2 = Measurement at top of concrete pad.

ft-AMSL = feet above mean sea level.

Table E-2 July 2017 Sample Analysis Summary
BNSF Mission Wye, Livingston, Montana

Parameter	Volatile Organic Compounds	Volatile Organic Compounds	Field Analysis[1]
Method	EPA Method 8260B	EPA Method 524.2	YSI 556 MPS Meter
Sample Container	Three 40 mL vials	Three 40 mL vials	Flow Through Cell
Preservative	Hydrochloric Acid	Ascorbic and Hydrochloric Acid	NA
Well Location			
MW-1	x		x
MW-3	x		x
MW-4	x		x
MW-5	x		x
MW-9	x		x
MW-12	x		x
MW-14	x		x
MW-18	x		x
MW-19	x		x
MW-21	x		x
MW-22	x		x
Gravel Pit Well *		x	NM
Gravel Pit Pond *	x		NM
Harris Stock Well **		x	NM
Field Duplicate[2]	x		NA
Field Blank[3]	x		NA
Equipment Blank[4]	x		NA

Notes:

* = Indicates sample locations were added to sampling network per MDEQ request in May 2003.

** = Indicates sample location added to sampling network per MDEQ request in July 2003.

[1] = Field analysis consisted of pH, reduction/oxidation potential, temperature, specific conductivity, dissolved oxygen, and physical appearance.

[2] = Field duplicate sample collected from MW-3 (labeled MW-33)

[3] = Field blank sample collected by pouring distilled water into the sample container (labeled MW-30).

[4] = Equipment blank sample collected by pouring distilled water across a decontaminated bladder pump into a sample container (labeled MW-32).

mL = milliliter

NA = Not applicable.

NM = Not measured.

Table E-3 July 2017 Groundwater Analytical Summary - VOCs
BNSF Mission Wye, Livingston, Montana

Location ID Sample Date USEPA Analytical Method[1]	DEQ-7 Groundwater Standard	MW-1 7/12/2017 8260B	MW-3 7/12/2017 8260B	MW-3 Dup MW-33 7/12/2017 8260B	MW-4 7/12/2017 8260B	MW-5 7/12/2017 8260B	MW-9 7/12/2017 8260B	MW-12 7/13/2017 8260B	MW-14 7/12/2017 8260B	MW-18 7/13/2017 8260B	MW-19 7/13/2017 8260B	MW-21 7/13/2017 8260B	MW-22 7/13/2017 8260B	Harris Stock Well 7/13/2017 524.2	Gravel Pit Pond 7/13/2017 8260B	Gravel Pit Well 7/13/2017 524.2	Field Blank MW-30 7/12/2017 8260B	Equip. Blank MW-32 7/12/2017 8260B	Trip Blank TB 7/12/2017 8260B
Constituents of Concern (µg/L)																			
Tetrachloroethene (PCE)	5	< 0.25	4.7	4.3	1.1	0.75 J	1.1	0.80 J	0.85 J	0.83 J	< 0.25	< 0.25	0.94 J	0.22 J	< 0.25	< 0.12	< 0.25	< 0.25	< 0.25
Trichloroethene (TCE)	5	< 0.052	0.35 J	0.35 J	0.48	0.64	0.27 J	0.77	< 0.052	0.29 J	0.40	< 0.052	< 0.052	0.36 J	< 0.052	< 0.044	< 0.052	< 0.052	< 0.052
Additional Detected VOCs (µg/L)																			
1,2-Dichloroethane	4	< 0.17	< 0.17	< 0.17	1.0 U	1.0 U	< 0.17	< 0.17	1.0 U	1.0 U	< 0.17	< 0.17	1.0 U	< 0.092	< 0.17	< 0.092	0.19 J	0.22 J	< 0.17
Acetone	NSE	< 2.0	20 U	20 U	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	NA	2.6 J	NA	20 U	20 U	< 2.0
Chloroform	70	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.10	< 0.21	< 0.10	0.86 J	0.74 J	< 0.21
cis-1,2-Dichloroethene (DCE)	70	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.085	< 0.12	< 0.085	< 0.12	< 0.12	< 0.12
1,2-Dichloropropane	5	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	0.58 J	< 0.22	< 0.22	< 0.22	< 0.22	< 0.084	< 0.22	< 0.084	< 0.22	< 0.22	< 0.22
Methylene chloride	5	< 0.29	< 0.29	< 0.29	< 0.29	< 0.29	< 0.29	< 0.29	< 0.29	< 0.29	< 0.29	< 0.29	< 0.29	< 0.20	< 0.29	< 0.20	< 0.29	< 0.29	0.69 J
1,3,5-Trimethylbenzene	NSE	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.078	< 0.27	0.12 J	< 0.27	< 0.27	< 0.27
MDEQ Split Sample Results[2]																			
Constituents of Concern (µg/L)																			
PCE	5	--	4.5	--	--	--	0.53	--	0.38 J	--	--	--	--	--	--	--	--	--	< 0.50
TCE	5	--	0.36 J	--	--	--	0.25 J	--	0.17 J	--	--	--	--	--	--	--	--	--	< 0.50
Additional Detected VOCs (µg/L)																			
1,2-Dichloroethane	4	--	< 0.50	--	--	--	< 0.50	--	< 0.50	--	--	--	--	--	--	--	--	--	< 0.50
Acetone	NSE	--	NA	--	--	--	NA	--	NA	--	--	--	--	--	--	--	--	--	NA
Chloroform	70	--	< 0.50	--	--	--	< 0.50	--	< 0.50	--	--	--	--	--	--	--	--	--	< 0.50
cis-DCE	70	--	0.10 J	--	--	--	< 0.50	--	< 0.50	--	--	--	--	--	--	--	--	--	< 0.50
1,2-Dichloropropane	5	--	< 0.50	--	--	--	< 0.50	--	< 0.50	--	--	--	--	--	--	--	--	--	< 0.50
Methylene chloride	5	--	< 0.50	--	--	--	< 0.50	--	< 0.50	--	--	--	--	--	--	--	--	--	< 0.50 J
1,3,5-Trimethylbenzene	NSE	--	NA	--	--	--	NA	--	NA	--	--	--	--	--	--	--	--	--	NA

Notes:

DEQ-7 Groundwater Standard was obtained from *Circular DEQ-7 Montana Numeric Water Quality Standards* , Human Health Standards for Groundwater, May 2017.

All DEQ-7 groundwater standard exceedances have been bolded.

Non-detect data is shown less than the method detection limit (MDL).

[1] = VOCs analyzed by EPA Method 8260 with the exception of the Gravel Pit Well and Trip Blank-2, which were analyzed by EPA Method 524.2.

[2] = MDEQ split samples reported non-detect data less than the reporting limit (RL).

< = analyte not detected above the MDL.

µg/L= micrograms per liter.

J = The analyte was detected above the reported sample method detection limit (MDL). The result was "J" flagged by the laboratory to indicate an estimated value.

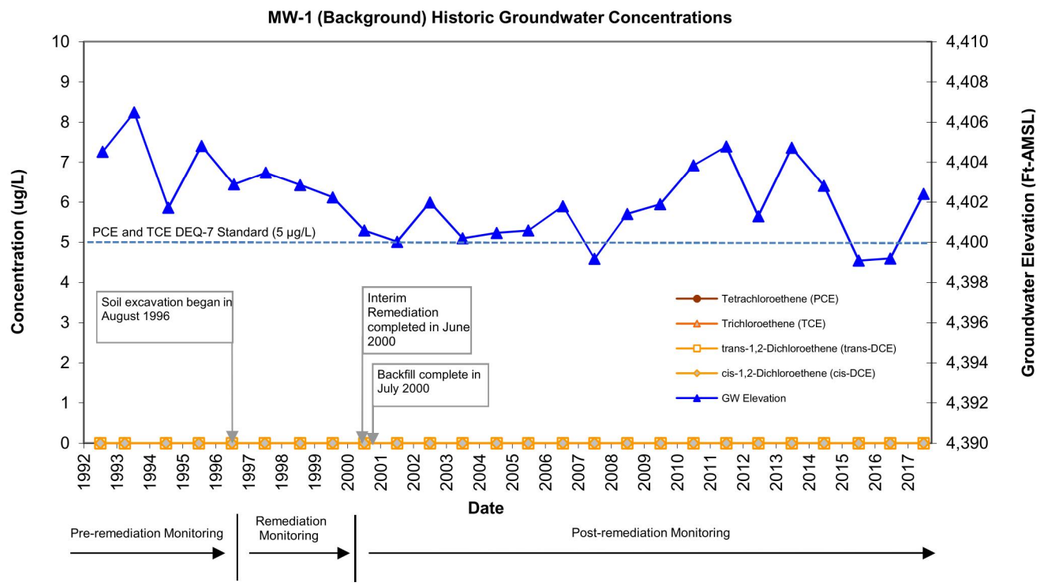
NA = Not analyzed.

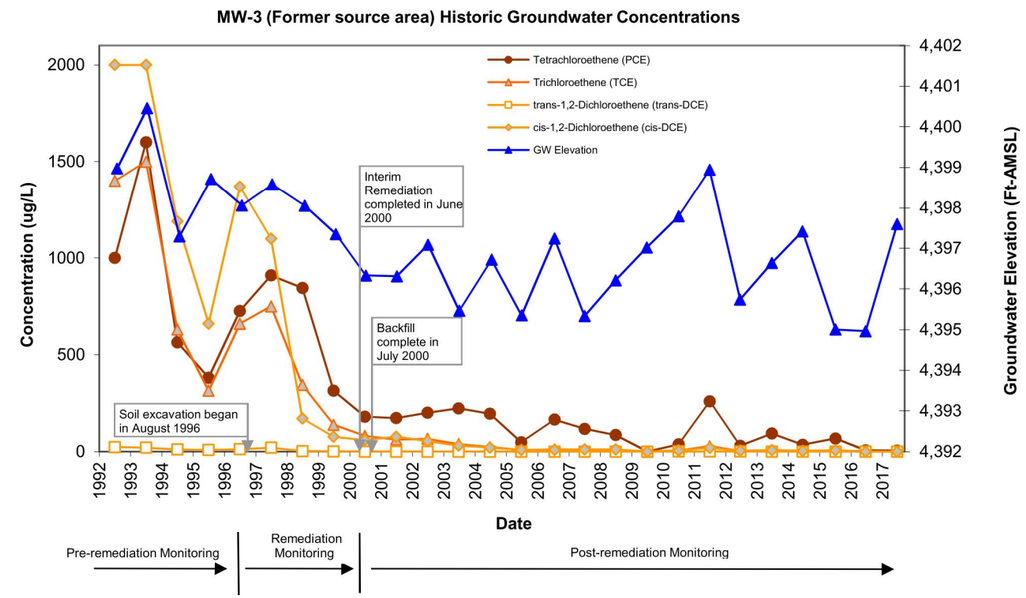
NSE = no DEQ-7 standard established.

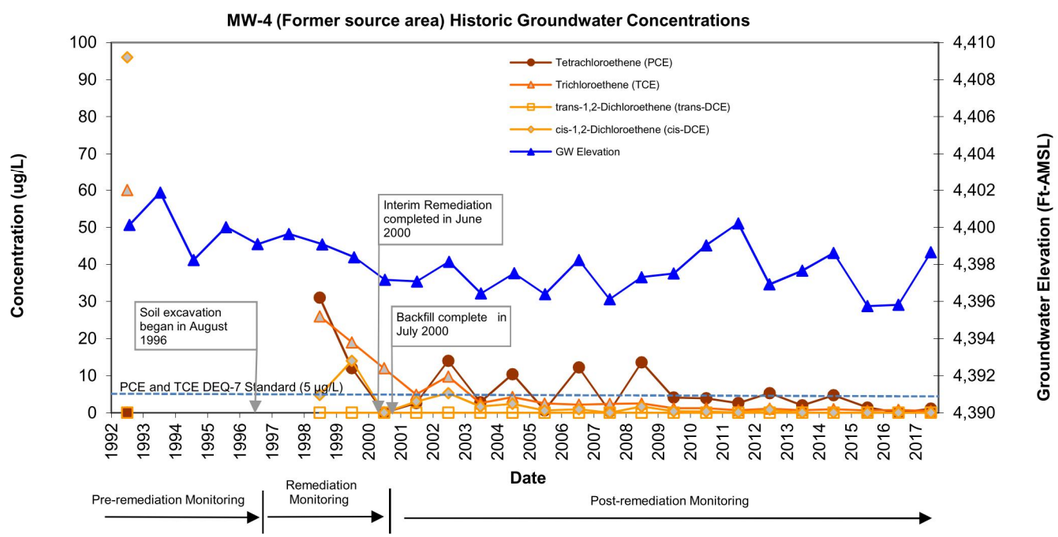
U = The analyte was not detected above the reported sample MDL. In some cases, the analyte was detected above the reported sampled MDL; however, the result was qualified as not detected at the laboratory reporting limit due to blank contamination.

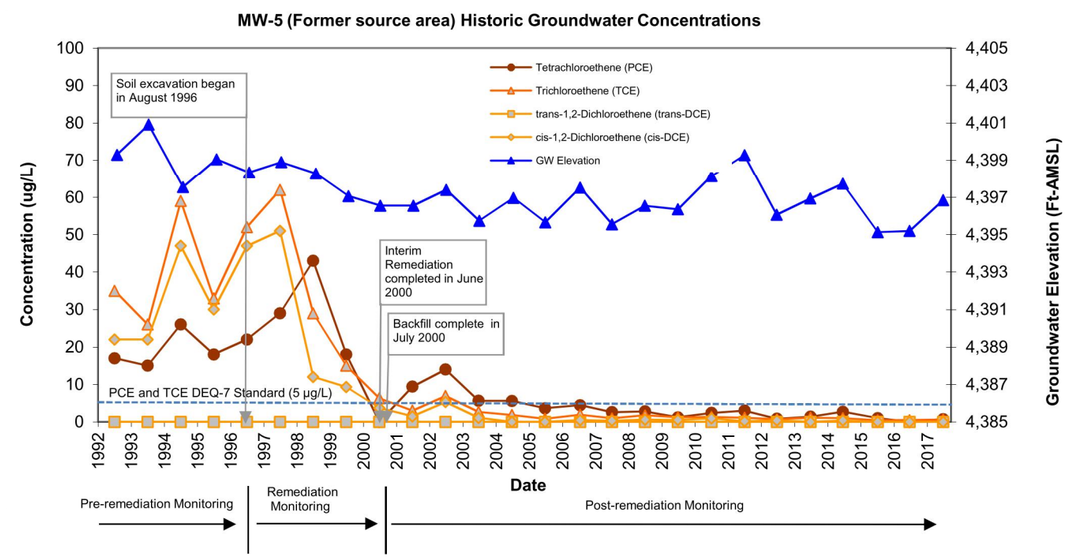
VOC = volatile organic compound.

Figures









DEQ-7 GROUNDWATER STANDARDS

Tetrachloroethene (PCE) = 5.0 µg/L
Trichloroethene (TCE) = 5.0 µg/L
trans-1,2-Dichlorothene (DCE) = 100 µg/L
cis-1,2-Dichloroethene (DCE) = 70 µg/L

AECOM

Figure: E-1

HISTORICAL GROUNDWATER CONCENTRATIONS (PCE, TCE, AND DCE) AND ELEVATIONS WELLS MW-1, MW-3, MW-4, AND MW-5

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: 08/31/17

Project Management Initials: Designer:E.S.S. Checked:_____ Approved:_____ ANSI B 11" x 17"

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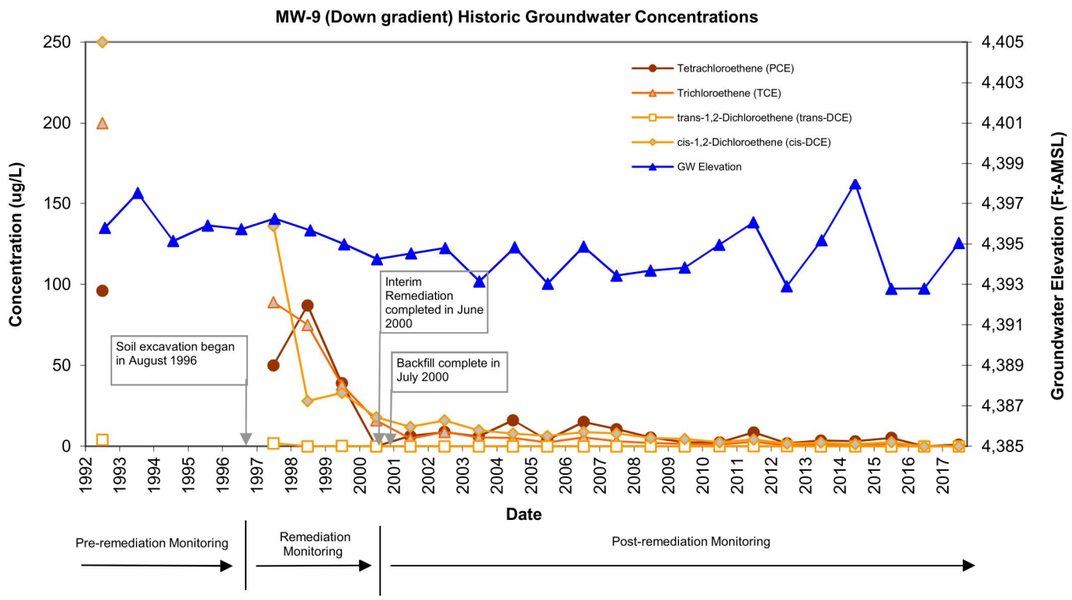

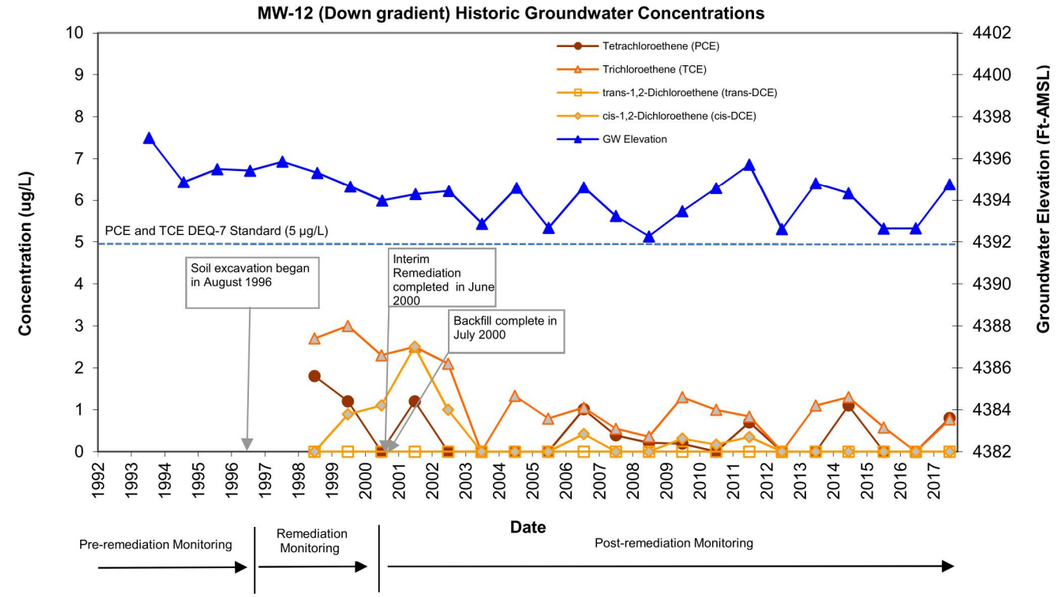

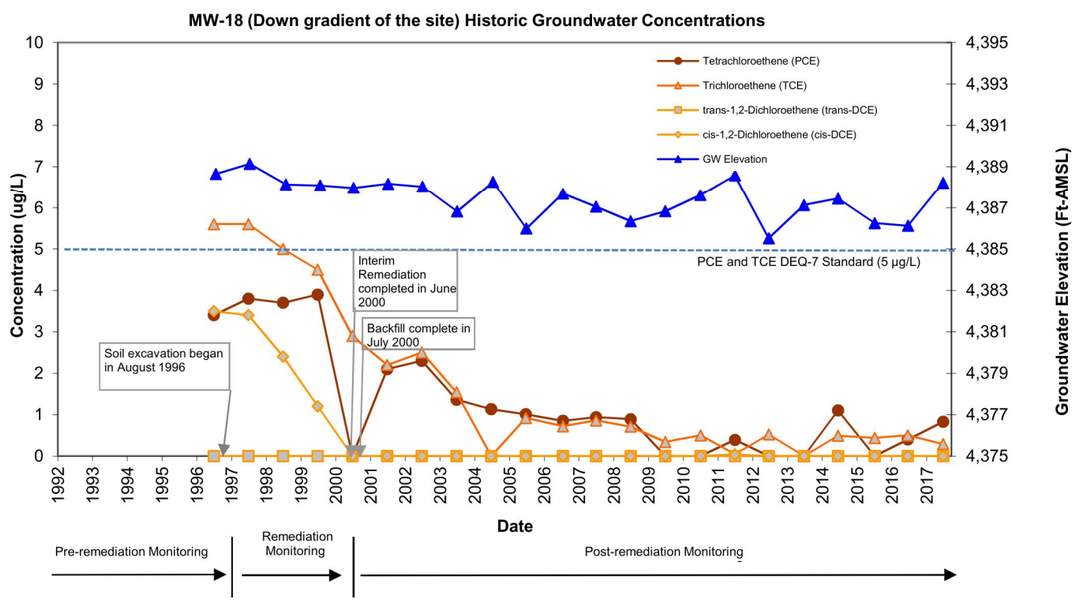

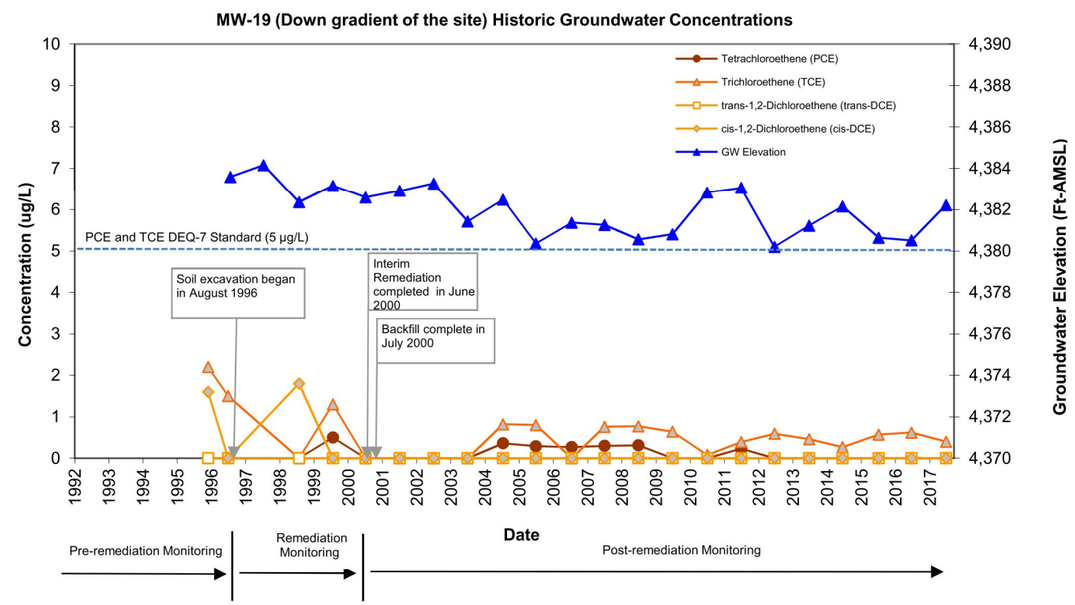

DEQ-7 GROUNDWATER STANDARDS

Tetrachloroethene (PCE) = 5.0 µg/L
Trichloroethene (TCE) = 5.0 µg/L
trans-1,2-Dichlorothene (DCE) = 100 µg/L
cis-1,2-Dichloroethene (DCE) = 70 µg/L

AECOM

Figure: E-2

HISTORICAL GROUNDWATER CONCENTRATIONS (PCE, TCE, AND DCE) AND ELEVATIONS WELLS MW-9, MW-12, MW-18, AND MW-19

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: 08/31/17

Project Management Initials: Designer:E.S.S. Checked:_____ Approved:_____ ANSI B 11" x 17"

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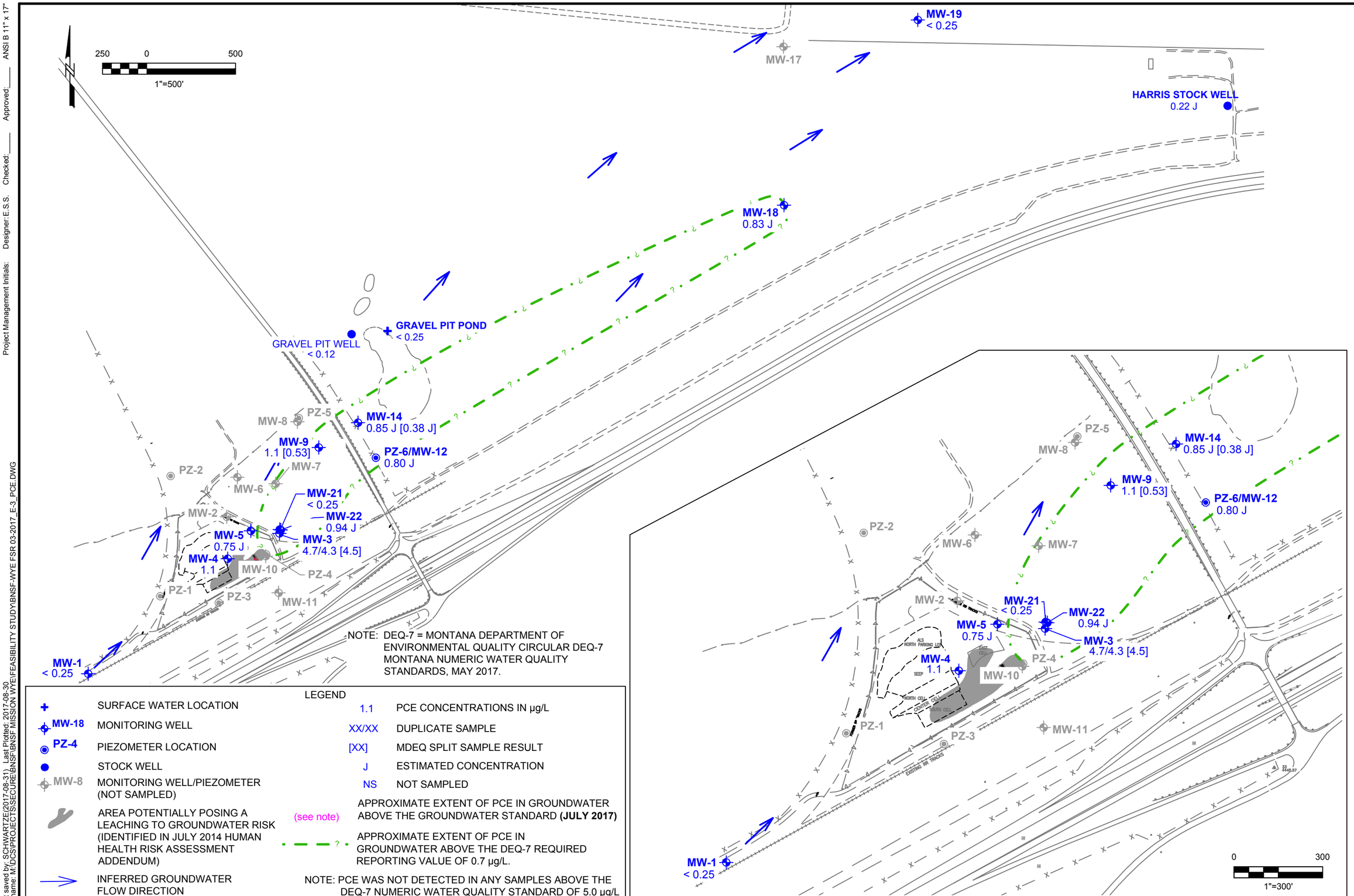

AECOM

Figure: E-3

ESTIMATED EXTENT OF PCE CONCENTRATIONS IN GROUNDWATER JULY 2017

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: 08/31/17

Project Management Initials: Designer: E.S.S. Checked:____ Approved:____ ANSI B 11" x 17"

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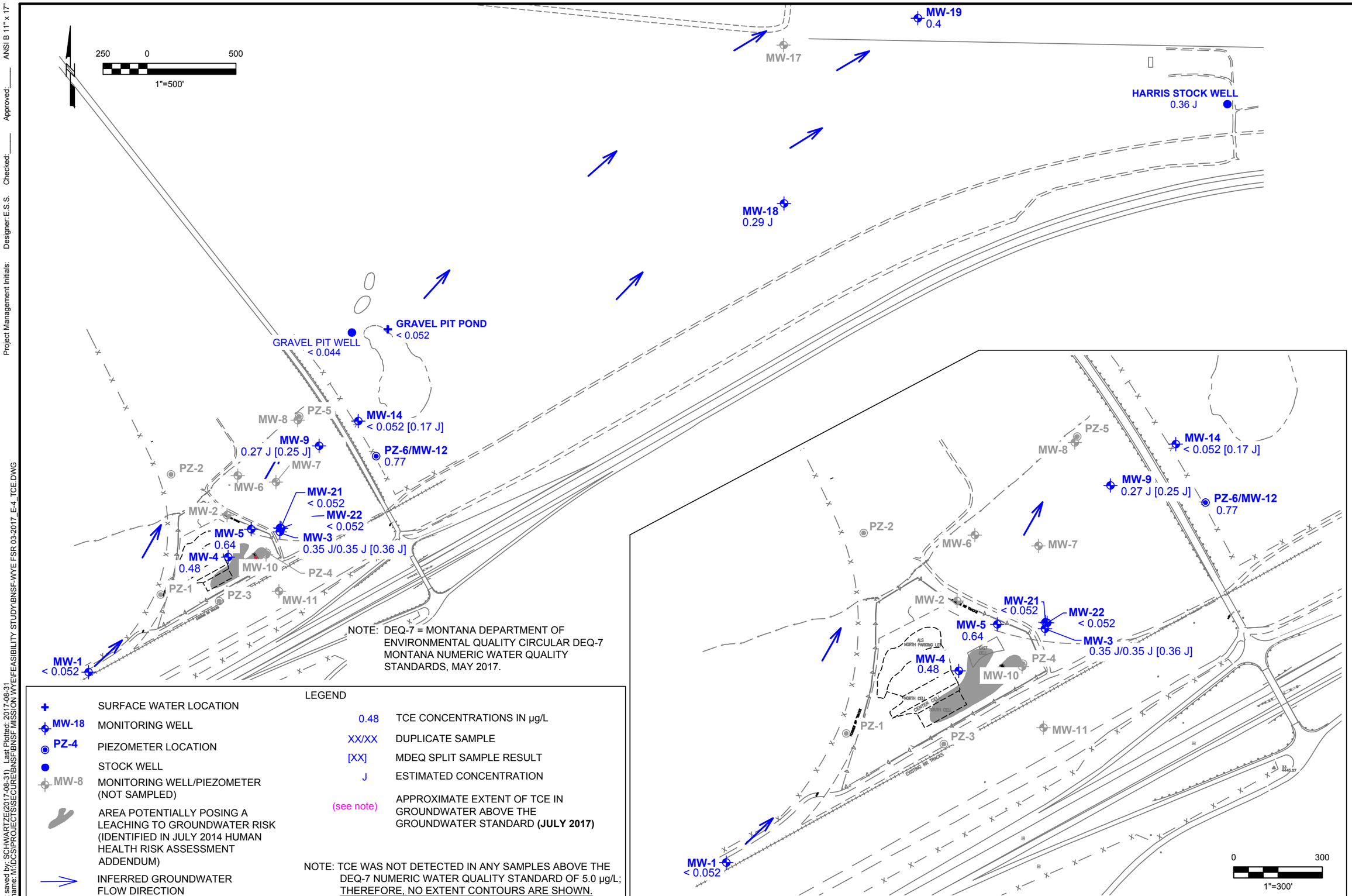

AECOM

Figure: E-4

ESTIMATED EXTENT OF TCE CONCENTRATIONS IN GROUNDWATER JULY 2017

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: 08/31/17

Project Management Initials: Designer:E.S.S. Checked:____ Approved:____ ANSI B 11" x 17"

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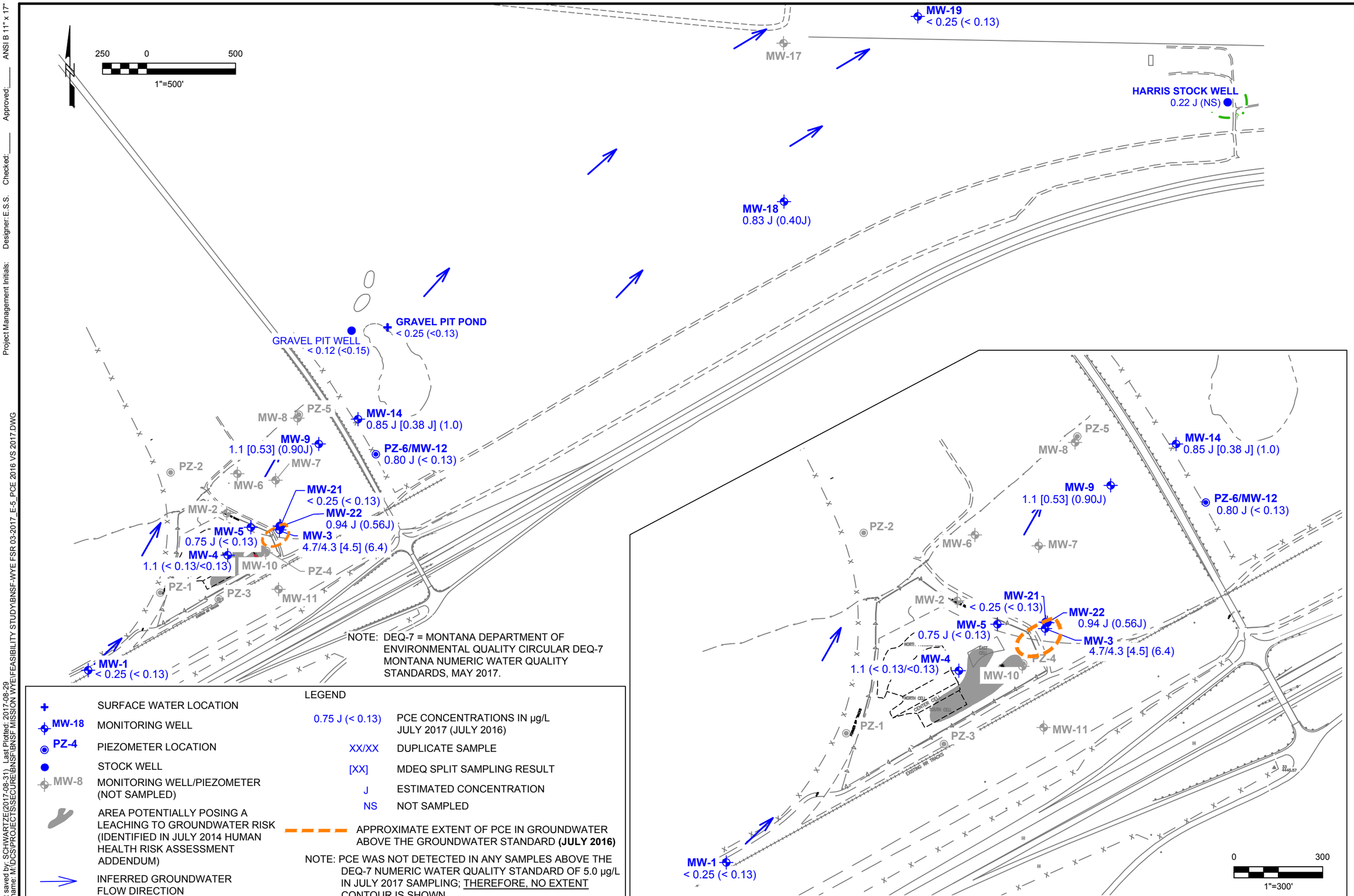

NOTE: DEQ-7 = MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY CIRCULAR DEQ-7 MONTANA NUMERIC WATER QUALITY STANDARDS, MAY 2017.

LEGEND

+	SURFACE WATER LOCATION
MW-18	MONITORING WELL
PZ-4	PIEZOMETER LOCATION
●	STOCK WELL
MW-8	MONITORING WELL/PIEZOMETER (NOT SAMPLED)
	AREA POTENTIALLY POSING A LEACHING TO GROUNDWATER RISK (IDENTIFIED IN JULY 2014 HUMAN HEALTH RISK ASSESSMENT ADDENDUM)
→	INFERRED GROUNDWATER FLOW DIRECTION
0.75 J (< 0.13)	PCE CONCENTRATIONS IN µg/L JULY 2017 (JULY 2016)
XX/XX	DUPLICATE SAMPLE
[XX]	MDEQ SPLIT SAMPLING RESULT
J	ESTIMATED CONCENTRATION
NS	NOT SAMPLED
- - - -	APPROXIMATE EXTENT OF PCE IN GROUNDWATER ABOVE THE GROUNDWATER STANDARD **(JULY 2016)**

NOTE: PCE WAS NOT DETECTED IN ANY SAMPLES ABOVE THE DEQ-7 NUMERIC WATER QUALITY STANDARD OF 5.0 µg/L IN JULY 2017 SAMPLING; THEREFORE, NO EXTENT CONTOUR IS SHOWN.

AECOM

Figure: E-5

COMPARISON OF ESTIMATED EXTENT OF PCE DISTRIBUTION IN GROUNDWATER JULY 2016 AND 2017

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: 08/31/17

Project Management Initials: Designer: E.S.S. Checked:____ Approved:____ ANSI B 11" x 17"

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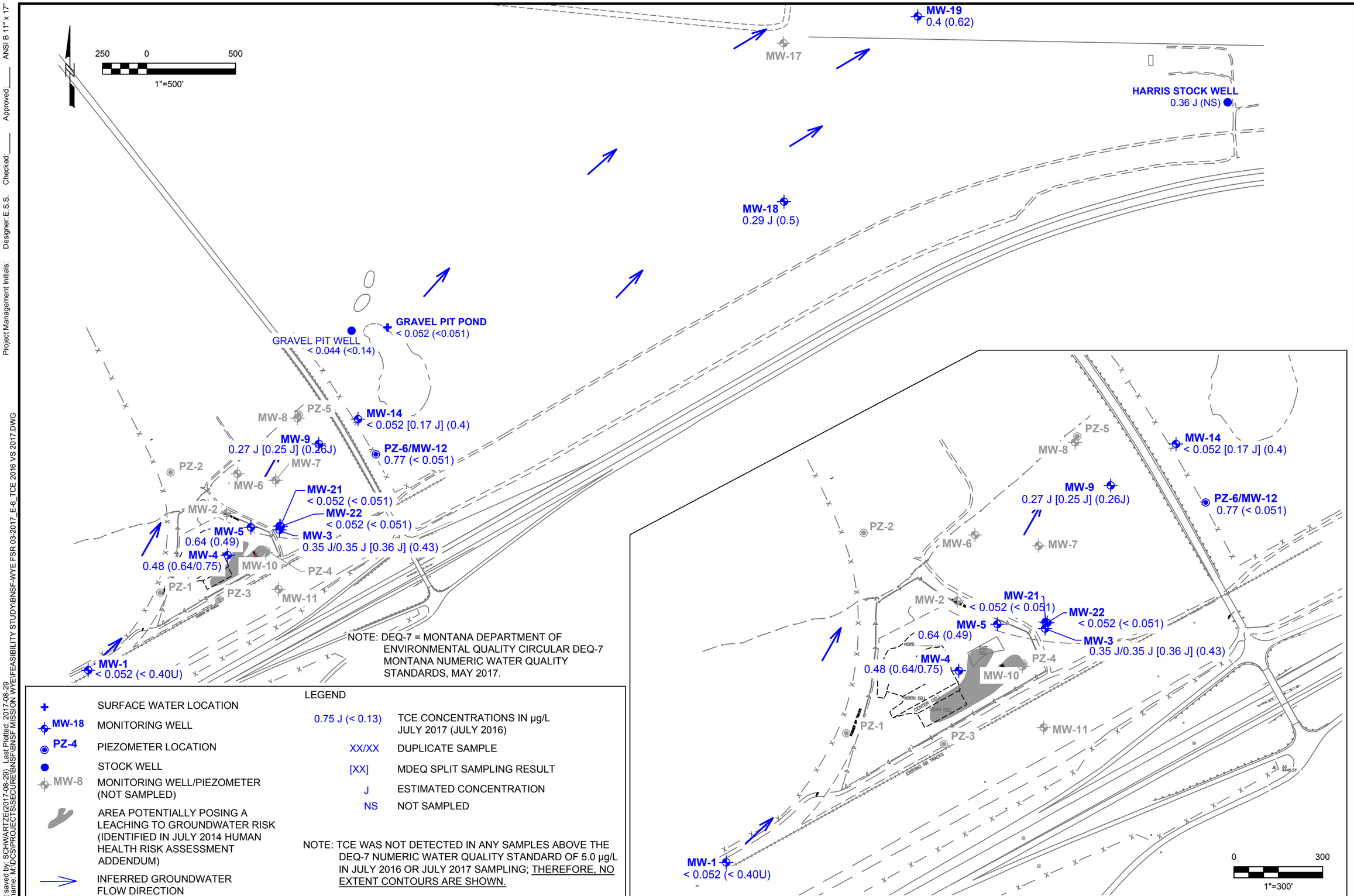

NOTE: DEQ-7 = MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY CIRCULAR DEQ-7 MONTANA NUMERIC WATER QUALITY STANDARDS, MAY 2017.

LEGEND

+	SURFACE WATER LOCATION
MW-18	MONITORING WELL
PZ-4	PIEZOMETER LOCATION
●	STOCK WELL
MW-8	MONITORING WELL/PIEZOMETER (NOT SAMPLED)
	AREA POTENTIALLY POSING A LEACHING TO GROUNDWATER RISK (IDENTIFIED IN JULY 2014 HUMAN HEALTH RISK ASSESSMENT ADDENDUM)
→	INFERRED GROUNDWATER FLOW DIRECTION

0.75 J (< 0.13)	TCE CONCENTRATIONS IN µg/L JULY 2017 (JULY 2016)
XX/XX	DUPLICATE SAMPLE
[XX]	MDEQ SPLIT SAMPLING RESULT
J	ESTIMATED CONCENTRATION
NS	NOT SAMPLED

NOTE: TCE WAS NOT DETECTED IN ANY SAMPLES ABOVE THE DEQ-7 NUMERIC WATER QUALITY STANDARD OF 5.0 µg/L IN JULY 2016 OR JULY 2017 SAMPLING; THEREFORE, NO EXTENT CONTOURS ARE SHOWN.

AECOM

Figure: E-6

COMPARISON OF ESTIMATED EXTENT OF TCE DISTRIBUTION IN GROUNDWATER JULY 2016 AND 2017

Feasibility Study Report Rev 3

BNSF, Mission Wye, Montana
Project No.: 60517242 Date: 08/31/17

Project Management Initials: Designer: E.S.S. Checked:____ Approved:____ ANSI B 11" x 17"

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Attachment 1

Historical Groundwater Level Data

Historical Water Elevation Data
February 1991 - July 2017
BNSF Mission Wye Site, Livingston, Montana

WELL SPECIFICATIONS						GROUNDWATER MEASUREMENTS (1)							
Well Number	**Measuring Pt. Elevation (2)**	**Ground Elevation (3)**	**Top of Well Screen**	**Bottom of Well Screen**	**Casing Size & Type**	**Feb 18 1991**	**Feb 25 1991**	**Apr 1 1991**	**Aug 7 1991**	**Sept 9 1991**	**Nov 4 1991**	**Dec 31 1991**	**Mar 25 1992**
PZ-1	4,408.95	4,406.71	4,401.21	4,386.21	2" Sch. 40 PVC		4,391.03	4,390.65	4,399.84	4,396.81	4,393.73	4,392.10	4,390.95
PZ-2	4,411.45	4,409.56	4,399.06	4,384.06	2" Sch. 40 PVC		4,389.09	4,388.60	4,397.05	4,394.20	4,391.53	4,390.06	4,389.01
PZ-3	4,415.87	4,414.47	4,400.47	4,385.47	2" Sch. 40 PVC		4,390.52	4,390.17	4,399.23	4,396.17	4,393.12	4,391.51	4,390.45
PZ-4	4,413.95	4,411.96	4,400.16	4,385.16	2" Sch. 40 PVC								4,389.19
PZ-5	4,400.15	4,398.24	4,393.24	4,378.24	2" Sch. 40 PVC								4,387.23
PZ-6	4,412.24	4,410.56	4,398.56	4,378.56	2" Sch. 40 PVC								
MW-1	4,417.03	4,414.89	4,404.49	4,389.49	2" Sch. 80 PVC	4,392.48	4,392.38	4,391.98	4,401.72	4,398.33	4,395.17	4,393.47	4,392.37
MW-2	4,408.22	4,405.94	4,399.41	4,384.41	2" Sch. 80 PVC	4,389.27	4,389.22	4,388.87	4,397.41	4,394.64	4,391.75	Frozen	4,389.15
MW-3	4,412.05	4,410.34	4,400.06	4,385.06	2" Sch. 80 PVC	4,389.08	4,389.00	4,388.65	4,397.30	4,394.55	4,391.62	4,390.07	4,388.93
MW-4	4,413.76	4,412.41	4,400.41	4,385.41	2" Sch. 40 PVC					4,395.36	4,392.34	4,390.77	4,389.65
MW-5	4,413.44	4,412.19	4,399.69	4,384.69	2" Sch. 40 PVC					4,394.79	4,391.84	4,390.27	4,389.10
MW-6	4,407.50	4,405.56	4,398.56	4,383.56	2" Sch. 40 PVC					4,393.73	4,390.95	4,389.40	4,388.35
MW-7	4,400.08	4,398.94	4,396.58	4,381.58	2" Sch. 40 PVC					4,393.66	4,390.86	4,389.38	4,388.28
MW-8	4,400.56	4,398.73	4,393.73	4,378.73	2" Sch. 40 PVC								4,387.50
MW-9	4,400.69	4,398.71	4,393.71	4,378.71	2" Sch. 40 PVC								4,387.53
MW-10	4,413.92	4,411.96	4,399.96	4,384.96	2" Sch. 40 PVC								4,389.18
MW-11	4,413.50	4,411.98	4,399.98	4,384.98	2" Sch. 40 PVC								4,389.92
MW-13	4,407.95	4,406.21	4,396.21	4,371.21	2" Sch. 40 PVC								
MW-14	4,412.29	4,410.07	4,398.07	4,378.07	2" Sch. 40 PVC								
MW-15	4409.34												
MW-16	4406.71												
MW-17	4395.86	4393.4**											
MW-18	4403.67	4401.2**											
MW-19	4399.96	4397.9											
MW-21	4412.57**	4410.4**											
MW-22	4412.39**	4410.3**											
SW-1	4400.2				Staff gauge								
SW-2	4401.9				Staff gauge								
SW-3	4401.3				Concrete riser								
MWSL-1	4,415.55	4,413.31	4,406.31	4,401.31	2" Sch. 40 PVC					4,407.95	4,408.40	4,408.29	4,408.59
MWSL-2	4,415.79	4,413.23	4,410.73	4,405.73	2" Sch. 40 PVC					4,407.89	4,408.34	4,408.33	4,409.33
MWSL-6	4,415.17	4,413.02	4,410.02	4,405.02	2" Sch. 40 PVC					4,407.87	4,408.29	4,408.25	4,408.37

Notes:

A blank indicates the well was not yet installed at this date. All measurements are in feet, relative to mean sea level.

(1) = Elevation relative to mean sea level.

(2) = Measurement at black mark, north side, top of PVC casing.

(3) = Measurement at top of concrete pad.

-- = Not Measured

* = Surface water staff gauge unable to read.

** = Elevations from 2007 Survey.

Historical Water Elevation Data
February 1991 - July 2017
BNSF Mission Wye Site, Livingston, Montana

WELL SPECIFICATIONS						GROUNDWATER MEASUREMENTS (1)							
Well Number	Measuring Pt. Elevation (2)	Ground Elevation (3)	Top of Well Screen	Bottom of Well Screen	Casing Size & Type	Apr 1 1992	May 8 1992	May 27 1992	Jun 22 1992	Jun 24 1992	Jul 28 1992	Jul 30 1992	Aug 24 1992
PZ-1	4,408.95	4,406.71	4,401.21	4,386.21	2" Sch. 40 PVC	4,390.93	4,393.07	4,395.77	4,404.75	4,401.90	4,402.07	4,401.83	4,399.06
PZ-2	4,411.45	4,409.56	4,399.06	4,384.06	2" Sch. 40 PVC	4,388.97	4,390.30	4,392.97	4,397.95	4,398.10	4,398.55	4,398.41	4,396.28
PZ-3	4,415.87	4,414.47	4,400.47	4,385.47	2" Sch. 40 PVC	4,390.43	4,391.46	4,395.23	4,401.12	4,400.92	4,401.45	4,401.22	4,398.48
PZ-4	4,413.95	4,411.96	4,400.16	4,385.16	2" Sch. 40 PVC	4,389.16	4,390.31	4,393.41			4,399.47	4,399.33	4,396.91
PZ-5	4,400.15	4,398.24	4,393.24	4,378.24	2" Sch. 40 PVC	4,387.49	4,388.80	4,391.10			4,396.25	4,396.17	4,394.40
PZ-6	4,412.24	4,410.56	4,398.56	4,378.56	2" Sch. 40 PVC								
MW-1	4,417.03	4,414.89	4,404.49	4,389.49	2" Sch. 80 PVC	4,392.33	4,393.29	4,397.95	4,404.53	4,404.63	4,404.52	4,404.16	4,400.90
MW-2	4,408.22	4,405.94	4,399.41	4,384.41	2" Sch. 80 PVC	4,389.12	4,390.28	4,393.20	4,400.57	4,400.82	4,399.10	4,398.96	4,396.62
MW-3	4,412.05	4,410.34	4,400.06	4,385.06	2" Sch. 80 PVC	4,388.89	4,390.10	4,393.00	4,398.35	4,398.50	4,398.97	4,398.82	4,396.52
MW-4	4,413.76	4,412.41	4,400.41	4,385.41	2" Sch. 40 PVC	4,389.63	4,390.76	4,393.99	4,399.66	4,399.81	4,400.13	4,399.98	4,397.12
MW-5	4,413.44	4,412.19	4,399.69	4,384.69	2" Sch. 40 PVC	4,389.05	4,390.31	4,393.32	4,398.79	4,398.89	4,399.30	4,399.16	4,397.11
MW-6	4,407.50	4,405.56	4,398.56	4,383.56	2" Sch. 40 PVC	4,388.28	4,389.59	4,392.25	4,397.15	4,396.75	4,397.76	4,397.68	4,395.61
MW-7	4,400.08	4,398.94	4,396.58	4,381.58	2" Sch. 40 PVC	4,388.26	4,389.53	4,392.12	4,397.08	4,397.23	4,397.70	4,397.62	4,395.54
MW-8	4,400.56	4,398.73	4,393.73	4,378.73	2" Sch. 40 PVC	4,387.50	4,388.82	4,391.12	4,395.56	4,395.76	4,396.29	4,396.21	4,394.42
MW-9	4,400.69	4,398.71	4,393.71	4,378.71	2" Sch. 40 PVC	4,387.57	4,388.87	4,391.17	4,395.74	4,395.89	4,395.79	4,396.31	4,394.52
MW-10	4,413.92	4,411.96	4,399.96	4,384.96	2" Sch. 40 PVC	4,389.18	4,390.32	4,393.45	4,398.97	4,399.12	4,399.50	4,399.36	4,396.94
MW-11	4,413.50	4,411.98	4,399.98	4,384.98	2" Sch. 40 PVC	4,389.91	4,390.98	4,394.47	4,400.35	4,400.45	4,400.76	4,400.56	4,397.82
MW-13	4,407.95	4,406.21	4,396.21	4,371.21	2" Sch. 40 PVC								
MW-14	4,412.29	4,410.07	4,398.07	4,378.07	2" Sch. 40 PVC								
MW-15	4409.34												
MW-16	4406.71												
MW-17	4395.86	4393.4**											
MW-18	4403.67	4401.2**											
MW-19	4399.96	4397.9											
MW-21	4412.57**	4410.4**											
MW-22	4412.39**	4410.3**											
SW-1	4400.2				Staff gauge								
SW-2	4401.9				Staff gauge								
SW-3	4401.3				Concrete riser								
MWSL-1	4,415.55	4,413.31	4,406.31	4,401.31	2" Sch. 40 PVC	NM	4,408.70	4,408.92	4,409.00	4,408.65	4,408.85	4,408.77	lock frozen
MWSL-2	4,415.79	4,413.23	4,410.73	4,405.73	2" Sch. 40 PVC	NM	4,408.99	4,409.02	4,409.44	4,409.39	4,409.23	4,409.13	4,408.53
MWSL-6	4,415.17	4,413.02	4,410.02	4,405.02	2" Sch. 40 PVC	NM	4,408.75	4,408.91	4,409.12	4,409.02	4,408.92	4,408.85	4,408.45

Notes:

A blank indicates the well was not yet installed at this date. All measurements are in feet, relative to mean sea level.

(1) = Elevation relative to mean sea level.

(2) = Measurement at black mark, north side, top of PVC casing.

(3) = Measurement at top of concrete pad.

-- = Not Measured

* = Surface water staff gauge unable to read.

** = Elevations from 2007 Survey.

Historical Water Elevation Data
February 1991 - July 2017
BNSF Mission Wye Site, Livingston, Montana

WELL SPECIFICATIONS						GROUNDWATER MEASUREMENTS (1)							
Well Number	Measuring Pt. Elevation (2)	Ground Elevation (3)	Top of Well Screen	Bottom of Well Screen	Casing Size & Type	Aug 31 1992	Apr 5 1993	Jul 13 1993	Apr 11 1994	Jul 27 1994	May 3 1995	Jul 31 1995	Oct 20 1995
PZ-1	4,408.95	4,406.71	4,401.21	4,386.21	2" Sch. 40 PVC	4,398.47	4,391.48	4408.18	4391.63	4399.88	4391.73	4402.01	4395.56
PZ-2	4,411.45	4,409.56	4,399.06	4,384.06	2" Sch. 40 PVC	4,395.81	4,389.43	4400.17	4389.54	4397.03	4389.58	4398.08	4393.26
PZ-3	4,415.87	4,414.47	4,400.47	4,385.47	2" Sch. 40 PVC	4,397.85	4,390.92	4403.21	4391.07	4399.27	4391.13	4401.6	4394.97
PZ-4	4,413.95	4,411.96	4,400.16	4,385.16	2" Sch. 40 PVC	4,396.41	4,413.95						
PZ-5	4,400.15	4,398.24	4,393.24	4,378.24	2" Sch. 40 PVC	4,393.95	4,400.15	4397.37		4395.04	4388	4395.75	4391.60
PZ-6	4,412.24	4,410.56	4,398.56	4,378.56	2" Sch. 40 PVC	4,393.82	4,387.78	4397.00	4387.90	4394.87	4387.85	4395.5	4391.51
MW-1	4,417.03	4,414.89	4,404.49	4,389.49	2" Sch. 80 PVC	4,400.27	4,392.83	4406.48	4392.94	4401.71	4393.13	4404.81	4396.83
MW-2	4,408.22	4,405.94	4,399.41	4,384.41	2" Sch. 80 PVC	4,396.14	4,389.57	4400.84	4389.69	4397.40	4389.71	4398.8	4393.51
MW-3	4,412.05	4,410.34	4,400.06	4,385.06	2" Sch. 80 PVC	4,396.03	4,389.41	4400.46	4389.54	4397.29	4389.55	4398.71	4393.40
MW-4	4,413.76	4,412.41	4,400.41	4,385.41	2" Sch. 40 PVC	4,396.92	4,390.16	4401.87	4390.26	4398.23	4390.3	4400.01	4394.16
MW-5	4,413.44	4,412.19	4,399.69	4,384.69	2" Sch. 40 PVC	4,396.32	4,389.61	4400.91	4389.74	4397.55	4389.72	4399.06	4393.61
MW-6	4,407.50	4,405.56	4,398.56	4,383.56	2" Sch. 40 PVC	4,395.14	4,388.77	4399.24	4388.87	4396.31	4388.88	4397.35	4395.65
MW-7	4,400.08	4,398.94	4,396.58	4,381.58	2" Sch. 40 PVC	4,395.08	4,388.74	4398.86		4396.24	4388.83	4397.26	4392.57
MW-8	4,400.56	4,398.73	4,393.73	4,378.73	2" Sch. 40 PVC	4,393.98	4,387.95	4397.42		4395.06	4388.01	4395.79	4391.63
MW-9	4,400.69	4,398.71	4,393.71	4,378.71	2" Sch. 40 PVC	4,394.07	4,388.03	4397.52		4395.14	4388.08	4395.91	4391.71
MW-10	4,413.92	4,411.96	4,399.96	4,384.96	2" Sch. 40 PVC	4,396.44	4,389.69	4401.05	4389.80	4397.72	4389.82	4399.37	4393.74
MW-11	4,413.50	4,411.98	4,399.98	4,384.98	2" Sch. 40 PVC	4,397.28	4,390.45	4402.36	4390.60	4398.67	4390.64	4400.88	4394.47
MW-13	4,407.95	4,406.21	4,396.21	4,371.21	2" Sch. 40 PVC	4,391.51	4,386.08	4394.28	4386.15	4392.65	4386.13	4393.18	4389.44
MW-14	4,412.29	4,410.07	4,398.07	4,378.07	2" Sch. 40 PVC	4,393.55	4,387.65	4396.97	4387.76	4394.59	4387.73	4395.20	4391.31
MW-15	4409.34												
MW-16	4406.71												
MW-17	4395.86	4393.4**											
MW-18	4403.67	4401.2**											
MW-19	4399.96	4397.9											
MW-21	4412.57**	4410.4**											
MW-22	4412.39**	4410.3**											
SW-1	4400.2				Staff gauge			4398.4	Dry	--*	Dry	--*	
SW-2	4401.9				Staff gauge			4399.7	Dry	--*	Dry	--*	
SW-3	4401.3				Concrete riser			4394.15	4386.67	4393.3	4386.5	4393.55	
MWSL-1	4,415.55	4,413.31	4,406.31	4,401.31	2" Sch. 40 PVC	4,408.63	4,408.51	4409.27	4408.98	4408.76	4409.04	4408.65	4406.25
MWSL-2	4,415.79	4,413.23	4,410.73	4,405.73	2" Sch. 40 PVC	4,408.75	4,408.55	4409.56	4408.78	4408.92	4409.15	4408.71	4404.69
MWSL-6	4,415.17	4,413.02	4,410.02	4,405.02	2" Sch. 40 PVC	4,408.63	4,408.44	4409.29	4408.79	4408.74	4409.00	4408.63	4404.67

Notes:

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(1) = Elevation relative to mean sea level.

(2) = Measurement at black mark, north side, top of PVC casing.

(3) = Measurement at top of concrete pad.

-- = Not Measured

* = Surface water staff gauge unable to read.

** = Elevations from 2007 Survey.

Historical Water Elevation Data
February 1991 - July 2017
BNSF Mission Wye Site, Livingston, Montana

WELL SPECIFICATIONS						GROUNDWATER MEASUREMENTS (1)						
Well Number	Measuring Pt. Elevation (2)	Ground Elevation (3)	Top of Well Screen	Bottom of Well Screen	Casing Size & Type	Dec 14 1995	Apr 29 1996	Jul 24 1996	Apr 29 1997	Jul 14 l997	Apr 29 1998	Jul 30 1998
PZ-1	4,408.95	4,406.71	4,401.21	4,386.21	2" Sch. 40 PVC	4393.4	4393.17	4400.79	4394.51	4401.45	4392.37	4400.75
PZ-2	4,411.45	4,409.56	4,399.06	4,384.06	2" Sch. 40 PVC	4390.78	4390.79	4397.63	4391.65	4398.25	4390.16	4396.63
PZ-3	4,415.87	4,414.47	4,400.47	4,385.47	2" Sch. 40 PVC	4392.54	4392.57	4400.26	4393.81	4400.77	4391.8	4400.23
PZ-4	4,413.95	4,411.96	4,400.16	4,385.16	2" Sch. 40 PVC				4392.25	4399.03	4390.39	4398.51
PZ-5	4,400.15	4,398.24	4,393.24	4,378.24	2" Sch. 40 PVC		4389.14	4395.59	4389.86	4396.13	4388.53	4395.55
PZ-6	4,412.24	4,410.56	4,398.56	4,378.56	2" Sch. 40 PVC	4389.58	4388.98	4395.43	4389.66	4395.86	4388.36	4395.32
MW-1	4,417.03	4,414.89	4,404.49	4,389.49	2" Sch. 80 PVC	4394.78	4394.9	4402.88	4396.57	4403.47	4393.83	4402.85
MW-2	4,408.22	4,405.94	4,399.41	4,384.41	2" Sch. 80 PVC		4391.02	4398.15	4392.01	4398.75	4390.31	4398.14
MW-3	4,412.05	4,410.34	4,400.06	4,385.06	2" Sch. 80 PVC		4390.90	4398.06	4391.89	4398.58	4390.17	4398.05
MW-4	4,413.76	4,412.41	4,400.41	4,385.41	2" Sch. 40 PVC		4391.67	4399.09	4392.78	4399.64	4390.92	4399.08
MW-5	4,413.44	4,412.19	4,399.69	4,384.69	2" Sch. 40 PVC	4390.59	4391.11	4398.34	4392.14	4398.9	4390.38	4398.29
MW-6	4,407.50	4,405.56	4,398.56	4,383.56	2" Sch. 40 PVC		4390.17	4396.95	4391.04	4397.58	4389.46	4396.93
MW-7	4,400.08	4,398.94	4,396.58	4,381.58	2" Sch. 40 PVC	4390.23	4390.08	4396.88	4390.96	4397.46	4389.42	4396.85
MW-8	4,400.56	4,398.73	4,393.73	4,378.73	2" Sch. 40 PVC		4389.16	4395.61	4389.88	4396.18	4388.54	4395.59
MW-9	4,400.69	4,398.71	4,393.71	4,378.71	2" Sch. 40 PVC	4389.8	4389.24	4395.73		4396.25	4388.61	4395.67
MW-10	4,413.92	4,411.96	4,399.96	4,384.96	2" Sch. 40 PVC		4391.21	4398.55	4392.28	4399.08	4390.46	4398.54
MW-11	4,413.50	4,411.98	4,399.98	4,384.98	2" Sch. 40 PVC		4392.05	4399.70	4393.16	4400.13	4391.26	4399.72
MW-13	4,407.95	4,406.21	4,396.21	4,371.21	2" Sch. 40 PVC	4387.47	4387.12	4393.09	4387.65	4393.75	4386.63	4393.21
MW-14	4,412.29	4,410.07	4,398.07	4,378.07	2" Sch. 40 PVC	4389.44	4388.83	4395.14	4389.47	4395.63	4388.21	4395.04
MW-15	4409.34					4387.24	4386.68	4392.66	4387.15	4393.42	4386.15	4392.70
MW-16	4406.71					4386.90	4386.35	4392.46	4386.79	4393.19	4385.80	4392.35
MW-17	4395.86	4393.4**				4382.76	4382.26	4387.19	4382.56	4387.96	4381.86	4387.37
MW-18	4403.67	4401.2**				4383.65	4383.08	4388.66	4383.43	4389.15	4382.68	4388.15
MW-19	4399.96	4397.9				4378.86	4378.52	4383.59	4378.73	4384.16	4378.28	4382.36
MW-21	4412.57**	4410.4**										
MW-22	4412.39**	4410.3**										
SW-1	4400.2				Staff gauge		Dry	4398.6	Dry			
SW-2	4401.9				Staff gauge		Dry	4400.00	Dry		4401.66	
SW-3	4401.3				Concrete riser		4388.33	4394.42		4394.80	4387.66	4394.26
MWSL-1	4,415.55	4,413.31	4,406.31	4,401.31	2" Sch. 40 PVC			4408.59	Abandoned			
MWSL-2	4,415.79	4,413.23	4,410.73	4,405.73	2" Sch. 40 PVC			4408.93	Abandoned			
MWSL-6	4,415.17	4,413.02	4,410.02	4,405.02	2" Sch. 40 PVC			4408.63	Abandoned			

Notes:

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(1) = Elevation relative to mean sea level.

(2) = Measurement at black mark, north side, top of PVC casing.

(3) = Measurement at top of concrete pad.

-- = Not Measured

* = Surface water staff gauge unable to read.

** = Elevations from 2007 Survey.

Historical Water Elevation Data
February 1991 - July 2017
BNSF Mission Wye Site, Livingston, Montana

WELL SPECIFICATIONS						GROUNDWATER MEASUREMENTS (1)						
Well Number	Measuring Pt. Elevation (2)	Ground Elevation (3)	Top of Well Screen	Bottom of Well Screen	Casing Size & Type	May 5 1999	July 27 1999	April 1 2000	July 11 2000	July 10 2001	July 9 2002	July 8 2003
PZ-1	4,408.95	4,406.71	4,401.21	4,386.21	2" Sch. 40 PVC	4392.21	4400.10	4390.55	4398.82	4398.58	4399.95	4398.2
PZ-2	4,411.45	4,409.56	4,399.06	4,384.06	2" Sch. 40 PVC	4390.00	4397.02	4388.57	4395.96	4396.23	4396.92	4395.13
PZ-3	4,415.87	4,414.47	4,400.47	4,385.47	2" Sch. 40 PVC	4391.61	4399.70	4390.06	4398.29	4397.94	4399.29	4397.66
PZ-4	4,413.95	4,411.96	4,400.16	4,385.16	2" Sch. 40 PVC	4390.21	4397.84	4388.76	4396.68	4396.62	4397.54	4395.91
PZ-5	4,400.15	4,398.24	4,393.24	4,378.24	2" Sch. 40 PVC	4388.37	4394.87		4394.16	4394.45	4394.72	4393.05
PZ-6	4,412.24	4,410.56	4,398.56	4,378.56	2" Sch. 40 PVC	4388.12	4394.66	4386.95	4393.98	4394.29	4394.44	4392.87
MW-1	4,417.03	4,414.89	4,404.49	4,389.49	2" Sch. 80 PVC	4393.7	4402.23		4400.58	4400.02	4401.98	4400.19
MW-2	4,408.22	4,405.94	4,399.41	4,384.41	2" Sch. 80 PVC	4395.12	4397.44	4388.72	4396.36	4396.43	4397.24	4395.54
MW-3	4,412.05	4,410.34	4,400.06	4,385.06	2" Sch. 80 PVC	4389.95	4397.35	4388.48	4396.33	4396.31	4397.09	4395.46
MW-4	4,413.76	4,412.41	4,400.41	4,385.41	2" Sch. 40 PVC	4390.72	4398.39	4389.25	4397.17	4397.08	4398.14	4396.43
MW-5	4,413.44	4,412.19	4,399.69	4,384.69	2" Sch. 40 PVC	4390.11	4397.064	4388.64	4396.55	4396.55	4397.4	4395.74
MW-6	4,407.50	4,405.56	4,398.56	4,383.56	2" Sch. 40 PVC	4389.27	4396.25	4387.90	4395.33	4395.56	4396.10	4394.38
MW-7	4,400.08	4,398.94	4,396.58	4,381.58	2" Sch. 40 PVC	4389.20	4396.17	4390.06	4395.27	4395.47	4395.97	4394.3
MW-8	4,400.56	4,398.73	4,393.73	4,378.73	2" Sch. 40 PVC	4388.39	4394.91		4394.19	4394.5	4394.77	4393.1
MW-9	4,400.69	4,398.71	4,393.71	4,378.71	2" Sch. 40 PVC	4388.39	4394.99	4387.17	4394.25	4394.53	4394.8	4393.15
MW-10	4,413.92	4,411.96	4,399.96	4,384.96	2" Sch. 40 PVC	4390.22	4397.88	4388.78	4396.71	4396.66	4397.57	4395.94
MW-11	4,413.50	4,411.98	4,399.98	4,384.98	2" Sch. 40 PVC	4390.98	4399.05	4389.55	4397.71	4397.41	4398.6	4397.07
MW-13	4,407.95	4,406.21	4,396.21	4,371.21	2" Sch. 40 PVC	4386.49	4392.65	4385.22	4392.24	4392.47	4392.75	4391.09
MW-14	4,412.29	4,410.07	4,398.07	4,378.07	2" Sch. 40 PVC	4388.03	4394.37	4386.81	4393.78	4394.08	4394.19	4392.57
MW-15	4409.34					4386.03	4392.16	4384.84	4391.79	4392.09	4392.25	4390.71
MW-16	4406.71					4385.66	4391.85	4384.52	4391.51	4391.87	4391.96	4390.48
MW-17	4395.86	4393.4**				4381.67	4387.11	4380.84	4387.58	4387.12	4387.42	4386.44
MW-18	4403.67	4401.2**				4376.51	4388.1	4381.65	4387.98	4388.18	4388.04	4386.82
MW-19	4399.96	4397.9				4378.14	4383.16	4377.59	4382.59	4382.91	4383.27	4381.42
MW-21	4412.57**	4410.4**										
MW-22	4412.39**	4410.3**										
SW-1	4400.2				Staff gauge							
SW-2	4401.9				Staff gauge	4401.30			4400.40			
SW-3	4401.3				Concrete riser		4393.62	4386.53	4393.09		4393.38	4392.12
MWSL-1	4,415.55	4,413.31	4,406.31	4,401.31	2" Sch. 40 PVC							
MWSL-2	4,415.79	4,413.23	4,410.73	4,405.73	2" Sch. 40 PVC							
MWSL-6	4,415.17	4,413.02	4,410.02	4,405.02	2" Sch. 40 PVC							

Notes:

A blank indicates the well was not yet installed at this date. All measurements are in feet, relative to mean sea level.

(1) = Elevation relative to mean sea level.

(2) = Measurement at black mark, north side, top of PVC casing.

(3) = Measurement at top of concrete pad.

-- = Not Measured

* = Surface water staff gauge unable to read.

** = Elevations from 2007 Survey.

Historical Water Elevation Data
February 1991 - July 2017
BNSF Mission Wye Site, Livingston, Montana

WELL SPECIFICATIONS						GROUNDWATER MEASUREMENTS (1)						
Well Number	Measuring Pt. Elevation (2)	Ground Elevation (3)	Top of Well Screen	Bottom of Well Screen	Casing Size & Type	July 20 2004	July 6 2005	July 25 2006	July 11 2007	July 8 2008	July 7 2009	July 13 2010
PZ-1	4,408.95	4,406.71	4,401.21	4,386.21	2" Sch. 40 PVC	4399.05	4398.65	4399.37	4397.72	4399.30	4399.40	4401.07
PZ-2	4,411.45	4,409.56	4,399.06	4,384.06	2" Sch. 40 PVC	4400.02	4395.13	4397.04	4395.31	4396	4395.66	4397.41
PZ-3	4,415.87	4,414.47	4,400.47	4,385.47	2" Sch. 40 PVC	4398.39	4397.54	4399.35	4397.1	4398.57	4398.02	4400.59
PZ-4	4,413.95	4,411.96	4,400.16	4,385.16	2" Sch. 40 PVC	4397.00	4395.80	4397.68	4395.67	4396.68	4397.32	4398.46
PZ-5	4,400.15	4,398.24	4,393.24	4,378.24	2" Sch. 40 PVC	4394.81	4393.00	4394.80	4393.35	4393.57	4393.53	4394.87
PZ-6	4,412.24	4,410.56	4,398.56	4,378.56	2" Sch. 40 PVC	4394.59	4392.67	4394.62	4393.24	4392.27	4393.47	4394.58
MW-1	4,417.03	4,414.89	4,404.49	4,389.49	2" Sch. 80 PVC	4400.46	4400.58	4401.79	4399.17	4401.40	4401.89	4403.84
MW-2	4,408.22	4,405.94	4,399.41	4,384.41	2" Sch. 80 PVC	4396.87	4395.41	4397.38	4395.53	4396.34	4397.14	4397.94
MW-3	4,412.05	4,410.34	4,400.06	4,385.06	2" Sch. 80 PVC	4396.72	4395.35	4397.24	4395.33	4396.21	4397.02	4397.79
MW-4	4,413.76	4,412.41	4,400.41	4,385.41	2" Sch. 40 PVC	4397.52	4396.39	4398.24	4396.12	4397.31	4397.51	4399.03
MW-5	4,413.44	4,412.19	4,399.69	4,384.69	2" Sch. 40 PVC	4396.97	4395.66	4397.52	4395.55	4396.54	4396.35	4398.14
MW-6	4,407.50	4,405.56	4,398.56	4,383.56	2" Sch. 40 PVC	4395.94	4394.37	4396.19	4394.54	4395.09	4395.40	4396.52
MW-7	4,400.08	4,398.94	4,396.58	4,381.58	2" Sch. 40 PVC	4395.86	4394.85	4396.08	4394.45	4394.95	4394.90	4396.37
MW-8	4,400.56	4,398.73	4,393.73	4,378.73	2" Sch. 40 PVC	4394.81	4393.04	4394.87	4393.39	4393.6	4393.80	4394.93
MW-9	4,400.69	4,398.71	4,393.71	4,378.71	2" Sch. 40 PVC	4394.83	4393.04	4394.87	4393.44	4393.68	4393.83	4394.96
MW-10	4,413.92	4,411.96	4,399.96	4,384.96	2" Sch. 40 PVC	4397.02	4395.84	4397.71	4395.7	4396.73	4397.35	4398.44
MW-11	4,413.50	4,411.98	4,399.98	4,384.98	2" Sch. 40 PVC	4397.85	4396.77	4398.76	4396.59	4397.87	4398.06	4399.86
MW-13	4,407.95	4,406.21	4,396.21	4,371.21	2" Sch. 40 PVC	4392.95	4390.92	4392.80				
MW-14	4,412.29	4,410.07	4,398.07	4,378.07	2" Sch. 40 PVC	4394.34	4392.40	4394.31	4392.94	4392.95	4393.27	4394.22
MW-15	4409.34					4392.53	4390.39					
MW-16	4406.71					4392.31	4390.11	4391.99				
MW-17	4395.86	4393.4**				4386.84	4384.87	4386.05	4385.48	4385.13	4386.12	4386.88
MW-18	4403.67	4401.2**				4388.27	4385.99	4387.69	4387.05	4386.35	4386.83	4387.62
MW-19	4399.96	4397.9				4382.48	4380.35	4381.36	4381.25	4380.55	4380.80	4382.83
MW-21	4412.57**	4410.4**							4395.0	4395.84	4396.33	4397.40
MW-22	4412.39**	4410.3**							4395.06	4395.93	4396.47	4397.50
SW-1	4400.2				Staff gauge							
SW-2	4401.9				Staff gauge							
SW-3	4401.3				Concrete riser	4397.40						
MWSL-1	4,415.55	4,413.31	4,406.31	4,401.31	2" Sch. 40 PVC							
MWSL-2	4,415.79	4,413.23	4,410.73	4,405.73	2" Sch. 40 PVC							
MWSL-6	4,415.17	4,413.02	4,410.02	4,405.02	2" Sch. 40 PVC							

Notes:

A blank indicates the well was not yet installed at this date. All measurements are in feet, relative to mean sea level.

(1) = Elevation relative to mean sea level.

(2) = Measurement at black mark, north side, top of PVC casing.

(3) = Measurement at top of concrete pad.

-- = Not Measured

* = Surface water staff gauge unable to read.

** = Elevations from 2007 Survey.

Historical Water Elevation Data
February 1991 - July 2017
BNSF Mission Wye Site, Livingston, Montana

WELL SPECIFICATIONS						GROUNDWATER MEASUREMENTS (1)						
Well Number	**Measuring Pt. Elevation (2)**	**Ground Elevation (3)**	**Top of Well Screen**	**Bottom of Well Screen**	**Casing Size & Type**	**July 12 2011**	**July 2-3 2012**	**July 8 2013**	**July 2 2014**	**July 22 2015**	**July 6-7 2016**	**July 12-13 2017**
PZ-1	4,408.95	4,406.71	4,401.21	4,386.21	2" Sch. 40 PVC	4402.20	4398.87	4401.88	4400.44	4397.31	4397.56	4400.30
PZ-2	4,411.45	4,409.56	4,399.06	4,384.06	2" Sch. 40 PVC	4398.51	4395.14	4397.77	4396.86	4394.64	4394.69	4397.11
PZ-3	4,415.87	4,414.47	4,400.47	4,385.47	2" Sch. 40 PVC	4401.62	4398.34	4401.25	4399.99	4396.88	4396.94	4398.95
PZ-4	4,413.95	4,411.96	4,400.16	4,385.16	2" Sch. 40 PVC	4399.50	4396.27	4398.93	4397.96	4395.29	4395.36	4398.08
PZ-5	4,400.15	4,398.24	4,393.24	4,378.24	2" Sch. 40 PVC	4395.95	4392.76	4395.03	4394.49	4392.72	4392.75	4394.95
PZ-6	4,412.24	4,410.56	4,398.56	4,378.56	2" Sch. 40 PVC	4395.71	4392.61	4394.81	4394.33	4392.64	4392.65	4394.76
MW-1	4,417.03	4,414.89	4,404.49	4,389.49	2" Sch. 80 PVC	4404.78	4401.29	4404.72	4402.81	4399.08	4399.19	4402.41
MW-2	4,408.22	4,405.94	4,399.41	4,384.41	2" Sch. 80 PVC	4398.94	4394.73	4398.39	4397.45	4394.97	4395.09	4397.60
MW-3	4,412.05	4,410.34	4,400.06	4,385.06	2" Sch. 80 PVC	4398.94	4395.74	4398.31	4397.42	4395.00	4394.96	4397.60
MW-4	4,413.76	4,412.41	4,400.41	4,385.41	2" Sch. 40 PVC	4400.21	4396.92	4399.74	4398.61	4395.75	4395.82	4398.65
MW-5	4,413.44	4,412.19	4,399.69	4,384.69	2" Sch. 40 PVC	4399.28	4396.06	4398.67	4397.73	4395.13	4395.19	4396.84
MW-6	4,407.50	4,405.56	4,398.56	4,383.56	2" Sch. 40 PVC	4397.65	4394.36	4396.84	4396.09	4393.96	4393.06	4396.37
MW-7	4,400.08	4,398.94	4,396.58	4,381.58	2" Sch. 40 PVC	4397.52	4394.27	4396.73	4395.97	4393.88	4393.92	4396.28
MW-8	4,400.56	4,398.73	4,393.73	4,378.73	2" Sch. 40 PVC	4396.02	4392.82	4395.08	4394.56	4392.76	4392.78	4395.01
MW-9	4,400.69	4,398.71	4,393.71	4,378.71	2" Sch. 40 PVC	4396.07	4392.91	4395.18	4394.62	4392.79	4392.80	4395.04
MW-10	4,413.92	4,411.96	4,399.96	4,384.96	2" Sch. 40 PVC	4399.56	4396.32	4398.97	4398.00	4395.31	4395.38	4398.12
MW-11	4,413.50	4,411.98	4,399.98	4,384.98	2" Sch. 40 PVC	4400.94	4397.63	4400.57	4399.35	4396.21	4396.34	4399.39
MW-13	4,407.95	4,406.21	4,396.21	4,371.21	2" Sch. 40 PVC							
MW-14	4,412.29	4,410.07	4,398.07	4,378.07	2" Sch. 40 PVC	4395.36	4392.24	4394.42	4393.98	4392.36	4392.34	4394.48
MW-15	4409.34											
MW-16	4406.71											
MW-17	4395.86	4393.4**				4387.21	4384.36	4385.70	4386.15	4384.86	4384.71	4386.60
MW-18	4403.67	4401.2**				4388.59	4385.52	4387.13	4387.45	4386.25	4386.12	4388.22
MW-19	4399.96	4397.9				4383.06	4380.19	4381.21	4382.15	4380.63	4380.50	4382.21
MW-21	4412.57**	4410.4**				4398.57	4395.34	4397.91	4396.99	4394.62	4394.56	4397.19
MW-22	4412.39**	4410.3**				4398.65	4395.45	4398.01	4397.12	4394.70	4394.69	4397.29
SW-1	4400.2				Staff gauge							
SW-2	4401.9				Staff gauge							
SW-3	4401.3				Concrete riser							
MWSL-1	4,415.55	4,413.31	4,406.31	4,401.31	2" Sch. 40 PVC							
MWSL-2	4,415.79	4,413.23	4,410.73	4,405.73	2" Sch. 40 PVC							
MWSL-6	4,415.17	4,413.02	4,410.02	4,405.02	2" Sch. 40 PVC							

Notes:

A blank indicates the well was not yet installed at this date. All measurements are in feet, relative to mean sea level.

(1) = Elevation relative to mean sea level.

(2) = Measurement at black mark, north side, top of PVC casing.

(3) = Measurement at top of concrete pad.

-- = Not Measured

* = Surface water staff gauge unable to read.

** = Elevations from 2007 Survey.

Attachment 2

Groundwater Sampling Field Forms and Notes

1-5 - Day 1 WL measurements

July 2017 Groundwater Elevation Field Sheet
BNSF Mission Wye in Livingston, Montana

	Well Number	Measuring Pt. Elevation (Ft-MSL) [1]	Screened Interval (From TOIC)	2016 Depth to Water (feet)	2016 Total Depth (feet)	2017 Depth to Water (feet)	2017 Total Depth (feet)
3- 7	PZ-1 7/13	4408.95		11.39	22.58	8.65	22.46
3 or 4- 0	PZ-2 7/13	4411.45		16.76	27.85	14.34	27.72
3- 8	PZ-3 7/13	4415.87		18.39	29.21	16.92	30.09
3- 10	PZ-4 7/12	4413.95		18.59	28.52	15.87	28.41
2- 4	PZ-5 7/12	4400.15		7.40	11.61	5.20	11.35
	PZ-6/MW-12	4412.24	12' - 32'	19.59	34.43	17.48	34.30
1- 1	MW-1 7/12	4417.03	10' - 25'	17.84	24.41	14.62	24.25
4- 0	MW-2 7/13	4408.22		13.13	23.54	10.62	23.41
4- 11	MW-3 7/12	4412.05	10' - 25'	17.09	26.89	14.45	26.77
3- 6	MW-4 7/12	4413.76	12' - 27'	17.94	29.04	15.11	28.90
3- 0	MW-5 7/12	4413.44	12.5' - 27.5'	18.25	28.64	16.60	28.36
4- 0	MW-6 7/13	4407.5		14.44	24.81	11.13	24.70
2- 5	MW-7 7/12	4400.08		6.16	9.53	3.80	9.40
2- 3	MW-8 7/12	4400.56		7.78	11.91	5.55	11.63
2- 2	MW-9 7/12	4400.69	5' - 20'	7.89	18.83	5.65	22.44
3- 9	MW-10 7/12	4413.92		18.54	29.24	15.80	29.09
5-	MW-11 7/13	4413.50		17.16	28.95	~~14.71~~ 14.11	28.79
	MW-14 7/12	4412.29	12' - 32'	19.95	34.68	17.81	34.44
	MW-17 7/13	4395.86		11.15	23.72	9.26	23.59
	MW-18 7/13	4403.67	25' - 30'	17.55	32.47	15.45	32.34
	MW-19 7/13	4399.96	19' - 24'	19.46	26.98	17.15	26.87
4- 13	MW-21 7/13	4412.57	34' - 39'	18.01	41.24	15.38	41.10
4- 12	MW-22 7/13	4412.39	12' - 22'	17.7	23.38	15.10	23.38

Needs Cap
Able to retrieve cap from the outer casing.

Notes:
(1) Measurement at black mark or at top of PVC on north side of casing.
ft-MSL - feet relative to mean sea level
NM - Not measured.
MW-1 was marked as MW-1A in the field un the past.

Well ID: MW-1

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company
Date: 7/12/17
Time: Start 11:15 am/pm
Finish 1200 am/pm
Project No: 60539836
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear, Sl. breeze, 78°F
Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 24.25
c. Length of Water Column 9.63 (a-b)
Casing Diameter/Material 2" PVC; 15' screen
b. Water Table Depth 14.62
d. Calculated System Volume (see back) NA
Screen 10-25 ft bgs

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556 MPS	06C2321 AD

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate mL ~~(gal/min)~~	Color/Odor
1118	0.5	12.61	6.95	626	10.51	42.1	200	Clear / None
1121	~~1.0~~ 0.5	12.76	6.89	614	~~9.0~~ 9.52	27.5	↓	Clear None
1125	1.2	12.21	7.02	612	9.46	23.1	200/min	Clear / None
1129	1.6	13.26	7.16	611	9.15	16.4		
1133	2.0	13.43	7.26	612	9.03	16.0		
1140	2.4	13.21	7.30	612	9.11	19.9		
1145	2.8	13.40	7.26	610	8.89	21.0		

d. Acceptance criteria pass/fail
Have parameters stabilized
If no or N/A - Explain below.

Yes	No	N/A
☑	☐	☐

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-1/071217	VOA	3	HCl	VOC - 8260B	1145
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments Background Well

Signature [signature] Date 7-12-17

Well ID: MW-3

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company
Date: 7/12/17
Time: Start 1455 am/pm
Finish 1546 am/pm
Project No: 60539836
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear, sl. breezy 86°F
Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 26.77
c. Length of Water Column 12.32 (a-b)
Casing Diameter/Material 2" PVC - 15' Screen
b. Water Table Depth 14.45
d. Calculated System Volume (see back) NA
Screen 10-25ft bgs

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556 MPS	06C2321AD

Start purge - 1505

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate (gal/min)	Color/Odor
1510	0.3	16.80	7.13	744	9.70	49.2	200mL/min	Clear / no odor
1515	0.6	16.55	7.16	743	8.13	44.7		
1520	0.8	15.98	7.24	745	8.37	41.0		
1525	1.2	15.55	7.28	749	8.51	40.0		
1530	1.5	15.28	7.31	745	8.25	39.9		

d. Acceptance criteria pass/fail
Have parameters stabilized — Yes ☑ No ☐ N/A ☐
If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-3/071217	VOA	3	HCl	VOC - 8260B	1530
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments MDEQ Collected Split Sample.

Signature
Date ~~07/21/17~~ 07/12/17 SY

Well ID: Field Dup @ MW-3 MW-33

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company Date: 7/12/17 Time: Start _____ am/pm
Project No: 60539836 Finish _____ am/pm
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear, Sl. breeze, ~86°F Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length _____ c. Length of Water Column _____ (a-b) Casing Diameter/Material _____

b. Water Table Depth _____ d. Calculated System Volume (see back) _____

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

NA Duplicate of MW-3

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

	Make	Model	Serial Number
	YSI		

NA Duplicate

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate (gal/min)	Color/Odor

d. Acceptance criteria pass/fail Yes ☐ No ☐ N/A ☐
Have parameters stabilized
If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-33/071217	VOA	3	HCl	VOC - 8260B	1545
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments Duplicate collected at MW-3. MDEQ collected split from MW-3 but not a duplicate.

Signature _____ Date 7/12/17

Well ID: MW-4

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company
Date: 7/12/17
Time: Start 1615 am/pm
Finish 1655 am/pm
Project No: 60539836
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear, Sl. breeze, 88°F
Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 28.90
c. Length of Water Column 13.79 (a-b)
b. Water Table Depth 15.11
d. Calculated System Volume (see back) NA

Casing Diameter/Material
2" PVC, 15' Screen
Screen 12-27 ft bgs

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556 MPS	06C2321 AD

Start Purge 1626

	Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate (gal/min)	Color/Odor
1630	~~1625~~	0.3	15.26	6.81	617	7.04	35.4	200mL/m	clear, no odor
1635	~~1630~~	0.7	13.71	6.84	613	4.71	29.7		
1640	~~1635~~	1.0	13.34	6.89	611	4.11	24.8		
	1645	1.4	13.47	6.95	610	3.58	20.4		
	1648	1.7	13.32	7.03	614	3.41	16.8		

d. Acceptance criteria pass/fail
Have parameters stabilized — Yes ☑ No ☐ N/A ☐
If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-4/071217	VOA	3	HCl	VOC - 8260B	1650
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments

Signature
Date 07/12/17

Well ID: MW-5

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company Date: 7/12/17 Time: Start 1705 am/pm
Project No: 60539836 Finish 1740 am/pm
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear, Sl. breeze, 88°F Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 28.36 c. Length of Water Column 11.76 (a-b) Casing Diameter/Material 2" PVC 15' Screen

b. Water Table Depth 16.60 d. Calculated System Volume (see back) NA Screen 12.5 - 27.5 ft bg

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556 MPS	06C2321 AD

Purge Start 1715

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate (gal/min)	Color/Odor
1720	0.1	16.58	6.91	649	8.71	53.9	~75mL/m	clear / no odor
1725	0.3	13.50	6.97	643	6.74	49.6	200mL/m	|
1728	0.5	12.99	7.02	639	6.83	47.1	|	|
1731	0.7	13.05	7.04	641	6.83	45.5	|	|
1734	1.0	13.02	7.05	639	6.77	44.6	|	|

d. Acceptance criteria pass/fail Yes ☑ No ☐ N/A ☐ (continued on back)
Have parameters stabilized
If no or N/A - Explain below.

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-5/071217	VOA	3	HCl	VOC - 8260B	1735
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments

Signature Date 07/12/17

Well ID: MW-9

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company
Date: 7/12/17
Time: Start 1242 am/pm
Finish 1335 am/pm
Project No: 60539836
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear, slight breeze 82°F
Collector(s): S. Young/A: Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 22.44
c. Length of Water Column 16.79 (a-b)
Casing Diameter/Material 2" PVC - 15' screen
b. Water Table Depth 5.65
d. Calculated System Volume (see back) NA
Screen 5-20 ft bgs

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556-MPS	06C2321-AD

Start purge @ 1306

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate (gal/min)	Color/Odor
1312	0.3	16.06	7.01	637	6.62	42.0	200mL/m	clear, no odor
1317	0.6	14.74	7.01	630	5.16	29.5		" "
1321	~1	14.55	7.03	630	5.10	27.4		" "
1325	1.2	14.37	7.07	628	4.92	24.9		" "
1330	1.4	14.28	7.12	628	4.77	22.8		

d. Acceptance criteria pass/fail
Have parameters stabilized — Yes ☑ No ☐ N/A ☐
If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-9/071217	VOA	3	HCl	VOC - 8260B	1330
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments MDEQ collected ~~duplicate~~ split sample.

Signature
Date 07/12/17

Well ID: MW-12

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company
Date: 7/13/17
Time: Start 1125 am/pm
Finish 1205 am/pm
Project No: 60539836
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear, Calm, 82°F
Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 34.30
c. Length of Water Column 16.82 (a-b)
Casing Diameter/Material 2" PVC - 20' screen
b. Water Table Depth 17.48
d. Calculated System Volume (see back) NA
Screen 12-32 ft bgs

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556 MPS	06C2321 AD

Purge Start @ 1135

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate (gal/min)	Color/Odor
1139	0.5	15.67	7.06	574	12.17	12.7	~400 mL/min	Clear/None, reduced flow rate
1143	0.8	14.30	7.03	568	7.42	2.9	~200 mL/min	
1147	1.1	14.22	7.17	567	8.35	-7.3	~200"	
1151	1.5	14.24	7.25	566	8.43	-11.4	"	
1154	1.75	14.21	7.29	566	8.37	-13.2		

d. Acceptance criteria pass/fail
Have parameters stabilized — Yes ☑ No ☐ N/A ☐
If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-12/071317	VOA	3	HCl	VOC - 8260B	1155
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments

Signature Date 7/13/17

Well ID: MW-14

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company Date: 7/12/17 Time: Start 1355 am/pm
Project No: 60539836 Finish 1440 am/pm
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear, slight breeze, 82°F Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 34.44 c. Length of Water Column 16.63 (a-b)

b. Water Table Depth 17.81 d. Calculated System Volume (see back) NA

Casing Diameter/Material
2" PVC - 20' ft screen
Screen 12-32 ft bgs

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

	Make	Model	Serial Number
begin purge @ 1403	YSI	556-MPS	06C2321AD

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate (~~gal~~/min)	Color/Odor
1415	0.25	16.75	6.97	655	7.87	62.5	225 L/m	Clear.
1419	0.6	14.81	7.06	650	8.09	61.2		Clear
1423	0.9	13.90	7.07	647	8.18	58.3		Clear
1427	1.2	13.78	7.17	645	8.05	54.4		Clear
1431	1.5	13.66	7.17	646	~~7.75~~	52.6		DO = 7.75
1433	1.8	13.42	7.24	646	7.81	51.6		Clear

d. Acceptance criteria pass/fail Yes ☑ No ☐ N/A ☐
Have parameters stabilized
If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-14/071217	VOA	3	HCl	VOC - 8260B	1435
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments MDEQ Collected split sample.

Signature [signature] Date 07/12/17

Well ID: MW- 18

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company
Date: 7/13/17
Time: Start 1035 am/pm
Finish 1120 am/pm
Project No: 60539836
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear, calm, 82°F
Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 32.34
c. Length of Water Column 16.89 (a-b)
Casing Diameter/Material 2" ~~Screen~~ PVC - 5' Screen
b. Water Table Depth 15.45
d. Calculated System Volume (see back) NA
Screen 25-30 ft bgs

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556 MPS	06C2321 AD

Start purge 1042

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate (gal/min)	Color/Odor
1048	0.5	13.69	6.94	453	11.70	22.4	~350 mL/m	Clear-None
1052	1.0	12.95	7.04	448	5.91	9.7		reduced flow rate
1056	1.2	15.73	7.27	443	5.04	-8.1	~150 mL/m	increase flow rate.
1100	1.4	13.24	7.56	451	6.55	-17.2	~200	
1106	1.9	13.08	7.27	448	6.03	-6.5	"	Clear.
1108	2.1	12.96	7.30	448	6.05	-8.1	"	

d. Acceptance criteria pass/fail
Have parameters stabilized — Yes ☑ No ☐ N/A ☐
If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-18/071317	VOA	3	HCl	VOC - 8260B	1110
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments Sprayed DEET around well to deter ants.
Collected MS/MSD @1115

Signature
Date 07/13/17

Well ID: MW-19

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company
Date: 7/13/17
Time: Start 0920 am/pm
Finish _____ am/pm
Project No: 60539836
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear Calm, ~78°F
Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 26.87
c. Length of Water Column 9.12 (a-b)
Casing Diameter/Material 2" PVC - 5' Screen
b. Water Table Depth 17.75
d. Calculated System Volume (see back) NA
Screen 19-24 ft bgs

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556 MPS	06C2321 AD

Purge Start Time 0930

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate ~~(gal/min)~~	Color/Odor
0934	0.3	13.58	6.69	408	11.36	26.9	~200ml/min	Clear
0938	0.7	12.64	6.81	406	7.69	15.6	~300 "	
0942	1.25	12.65	7.00	406	7.59	4.6	"	
0946	2.0	12.63	7.20	406	7.54	-5.1	~600 ml/l	Reduced flow rate.
0950	2.3	13.31	7.41	406	7.35	-15.3	~200	
0954	2.6	13.19	7.49	406	7.13	-18.9		Clear

d. Acceptance criteria pass/fail
Have parameters stabilized — Yes ☑ No ☐ N/A ☐
If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-19/071317	VOA	3	HCl	VOC - 8260B	0955
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments

Signature _____ Date 07/13/17

Well ID: MW-21

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company Date: 7/13/17 Time: Start ~~1215~~ 1300 am/pm
Project No: 60539836 Finish _____ am/pm
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear, Calm 94°F Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 41.10 c. Length of Water Column 25.72 (a-b) Casing Diameter/Material 2" PVC 5' screen

b. Water Table Depth 15.38 d. Calculated System Volume (see back) NA Screen 34-39 ft

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556 MPS	06C2321 AD

Start Purge 1310

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate (gal/min)	Color/Odor
1314	0.3	15.09	6.99	552	10.02	25.6	200mL/m	slightly silty (gray) / no odor
1318	0.6	14.26	7.01	557	8.06	20.0		" "
1322	0.9	14.04	7.05	552	8.73	13.6		clear / no odor
1326	1.2	13.95	7.21	551	9.06	8.0		
1330	1.5	13.90	7.23	550	9.16	6.7		

d. Acceptance criteria pass/fail Yes ☑ No ☐ N/A ☐
Have parameters stabilized
If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-21/~~07/13/17~~ 07/13/17	VOA	3	HCl	VOC - 8260B	1330
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments

Signature Date 07/13/17

Well ID: MW-22

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company
Date: 7/13/17
Time: Start 1215 am/pm
Finish _____ am/pm
Project No: 60539836
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear, Calm, 94.1°
Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 23.38
c. Length of Water Column 8.28 (a-b)
b. Water Table Depth 15.10
d. Calculated System Volume (see back) NA

Casing Diameter/Material
2" PVC; 10 ft Screen
Screen 12-22 ft bgs

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556 MPS	06C2321 AD

Start Purge @ 1230

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate ~~(gal/min)~~	Color/Odor
1236	0.3	13.06	6.86	574	8.50	-17.8	200mL/m	Slightly silty / no odor
1240	0.6	12.96	6.89	572	6.90	-21.3		→ light gray
1244	0.9	12.81	7.03	570	7.63	-23.8		
1248	1.2	12.77	7.15	565	8.70	-25.5		
1252	1.5	12.91	7.30	566	9.07	-28.8		

d. Acceptance criteria pass/fail

	Yes	No	N/A
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-22/071317	VOA	3	HCl	VOC - 8260B	1255
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments

Signature

Date 07/13/17

Well ID: Gravel Pit Well

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company Date: 7/13/17 Time: Start 1503 am/pm
Project No: 60539836 Finish _____ am/pm
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear, Sl. breezy 98°F Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length _____ c. Length of Water Column _____ (a-b) Casing Diameter/Material _____

b. Water Table Depth _____ d. Calculated System Volume (see back) _____

NA

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI		

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate (gal/min)	Color/Odor
				NA				

d. Acceptance criteria pass/fail Yes ☐ No ☐ N/A ☐ (continued on back)
Have parameters stabilized
If no or N/A - Explain below.

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
	~~VOA~~	~~3~~	~~HCl~~	~~VOC - 8260B~~	
Gravel Pit Well/071317	VOA	3	HCl+ascorbic acid	VOC - 524.2	1510

Comments Turned pump on at 1503. Water is flowing through an old hose. VOAs were preserved with ascorbic acid. Transferred HCl from unused 8260 VOAs.

Signature _____ Date 07/13/17.

Well ID: Gravel Pit Pond

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company
Date: 7/13/17
Time: Start 1525 am/pm
Finish ~~1535~~ 1545 am/pm
Project No: 60539836
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear, Calm, 100°F
Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length _____ c. Length of Water Column _____ (a-b)

Casing Diameter/Material _____

b. Water Table Depth _____ d. Calculated System Volume (see back) _____

2. WELL PURGE DATA

NA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI		

NA

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate (gal/min)	Color/Odor

d. Acceptance criteria pass/fail

	Yes	No	N/A
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
Gravel Pit Pond/071317	VOA	3	HCl	VOC - 8260B	1535
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments Collected from SE shore of pond. Used hip waders to walk into water. Collected into 1L amber then transferred to VOAs.

Signature _____ Date 07/13/17

Well ID: Harris Stock well

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company
Date: 7/13/17
Time: Start 850 am/pm
Finish 905 am/pm
Project No: 60539836
Site Location: Mission Wye - Livingston, MT
Weather Conds: Clear, calm, 70°F
Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length _____ c. Length of Water Column _____ (a-b) NA

Casing Diameter/Material _____

b. Water Table Depth _____ d. Calculated System Volume (see back) _____

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	NA ~~556 MPS~~	06C2321AD

Start Purge 850

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate (gal/min)	Color/Odor
				NA				

d. Acceptance criteria pass/fail
Have parameters stabilized — Yes ☐ No ☐ N/A ☐
If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
	~~VOA~~	~~3~~	~~HCl~~	~~VOC - 8260B~~	
	VOA	3	HCl+ascorbic acid	VOC - 524.2	905

Comments Turned spigot on at 858, let purge. Water was rusty at first then cleared.

Signature _____ Date 07/13/17

Well ID: Field Blank
MW-30

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company
Date: 7/12/17
Time: Start 1200 am/pm
Finish 1200 am/pm
Project No: 60539836
Site Location: Mission Wye - Livingston, MT
Weather Conds:
Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length _____ c. Length of Water Column _____ (a-b)

Casing Diameter/Material _____

b. Water Table Depth _____ d. Calculated System Volume (see back) _____

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

	Make	Model	Serial Number
	YSI		

N/A

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate (gal/min)	Color/Odor

Field Blank

d. Acceptance criteria pass/fail — Yes ☐ No ☐ N/A ☐

Have parameters stabilized

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-30-071217	VOA	3	HCl	VOC - 8260B	~~10~~ 1100
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments: Collected after sampling MW-1

Signature: _____ Date: 07/12/17

Well ID: Equip Blank
MW-32

Low Flow Ground Water Sample Collection Record

Client: BNSF Railway Company
Date: 7/12/17
Time: Start ~~1030~~ 1200 am/pm
Finish 1200 am/pm
Project No: 60539836
Site Location: Mission Wye - Livingston, MT
Weather Conds:
Collector(s): S. Young/A. Schaaf

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length _____ c. Length of Water Column _____ (a-b)

Casing Diameter/Material _____

b. Water Table Depth _____ d. Calculated System Volume (see back) _____

2. WELL PURGE DATA

a. Purge Method: Portable Bladder Pump with GeoControl Pro Controller

b. Acceptance Criteria defined (see workplan)

- Temperature	3%	-D.O.	10% or +/- 0.2 mg/L
- pH	+/- 2.0 unit	- ORP	± 20mV
- Sp. Cond.	3%		

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI		

Time (24hr)	Volume Removed (Gallons)	Temp. (°C)	pH	Spec. Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Flow Rate (gal/min)	Color/Odor

NA Equipment Blank

d. Acceptance criteria pass/fail

	Yes	No	N/A
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Portable Bladder Pump with disposable Bladder

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
MW-32-071217	VOA	3	HCl	VOC - 8260B	1030
	~~VOA~~	~~3~~	~~HCl+ascorbic acid~~	~~VOC - 524.2~~	

Comments Collected after sampling MW-1. Poured lab DI water through new bladder and decanned bladder pump.

Signature _____ Date 07/12/17

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

2207159

Section A Required Client Information:

Company: AECom
Address: 207 N Broadway Ste 315, Billings, MT 59101
Email To: Shelly.Young@AECom.com
Phone: 406 396 1532 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: MARGARET.ZERLEY@AECom.com
Copy To: SHELLY.YOUNG@AECom.com
Purchase Order No.:
Project Name: BNSF Mission Wye
Project Number: 60539836-310

Section C Invoice Information:

Attention: ~~Yuanh~~ Yuch Chuang
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager: Carol Darg
Pace Profile #: 32797

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☑ OTHER CERCLA

Site Location STATE: MT

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	COLLECTED Composite Start TIME	COLLECTED Composite End/Grab DATE	COLLECTED Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other Ascorbic Acid	Analysis Test (Y/N): VOC 8260B	VOC 524.2	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-12/071317	W	G			7/13/17	1155		3									X			
2	MW-13/071317						1110											X			
3	MW-19/071317						0955											X			
4	MW-21/071317						1330											X			
5	MW-22/071317						1255											X			
6	Gravel Pit Pond/071317						1535											X			
7	Gravel Pit Well/071317						1510										X		X		
8	~~Gravel Pit P~~ Havensstock Well/071317						0905										X		X		
9	Trip Blank						NA											X			
10	~~MS/MSD@MW-19~~	W	G				1115		3				X					X			
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
VOC analysis only.	Shelly Young / AECom	7/13/17	1630	FedEx 736753261732	7/13/17	1630	
Please perform lab dup:							
on 524.2 sample if							
sufficient volume.							

MS/MSD collected at MW-19/071317

3

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Shelly Young

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 07/13/17

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 2

2207143

Section A Required Client Information:

Company: ~~BNSF~~ / AECOM
Address: 207 N Broadway
Ste 315; Billings, MT 59101
Email To: shelly.young@aecom.com
Phone: 406 896 4532 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: margaret.zebley@aecom.com
Copy To: shelly.young@aecom.com
Purchase Order No.:
Project Name: BNSF MSS Billings 2017 GW
Project Number: 60539336-310

Section C Invoice Information:

Attention: Yueh Chuang
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager: Carol Durg
Pace Profile #: 32797

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☑ OTHER CERCLA

Site Location STATE: MT

Section D Required Client Information

Matrix Codes (see valid codes to left) — MATRIX / CODE
Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N): Y

ITEM #	SAMPLE ID	MATRIX CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	Composite Start TIME	Composite End/GRAB DATE	Composite End/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test: VOC 8260B	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-1 / 071217	W	G			7/12/17	1145		3				X					X	N	
2	MW-3 / 071217						1530						X					X		
3	MW-4 / 071217						1650						X					X		
4	MW-5 / 071217						1735						X					X		
5	MW-9 / 071217						1330						X					X		
6	MW-14 / 071217						1435						X					X		
7	MW-30 / 071217						1100						X					X		
8	MW-32 / 071217						1030						X					X		
9	MW-33 / 071217						1545						X					X		
10	Trip Blank / 071217						NA						X					X		
11																				
12																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
VOC analysis only	Shelly Young / AECOM	7/13/17	1630	FedEx 736753261732	7/13/17	1630	

3

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Shelly Young
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 07/13/17

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Attachment 3

Groundwater Laboratory Data and QA/QC Report

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

July 27, 2017

Shelly Young
AECOM, Inc.
207 North Broadway, Suite 315
Billings, MT 59101

RE: Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Dear Shelly Young:
Enclosed are the analytical results for sample(s) received by the laboratory on July 14, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carol Davy
carol.davy@pacelabs.com
1(612)607-6436
Project Manager

Enclosures

cc: Mr. Yueh Chuang, BNSF Railway
Cole Grover, AECOM
Mary Sark, BNSF
Margaret Zebley, AECOM, Inc.

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CERTIFICATIONS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Minnesota Certification IDs

1700 Elm Street SE, Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: UST-078
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014
Arkansas Certification #: 88-0680
California Certification #: MN00064
CNMI Saipan Certification #:MP0003
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida Certification #: E87605
Georgia Certification #: 959
Guam EPA Certification #: MN00064
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: 03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: MN00064
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081
New Jersey Certification #: MN002
New York Certification #: 11647
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon NwTPH Certification #: MN300001
Oregon Secondary Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Virginia Certification #: 460163
Washington Certification #: C486
West Virginia DW Certification #: 9952 C
West Virginia WW Certification #: 382
Wisconsin Certification #: 999407970
Wyoming via EPA Region 8 Certification #: 8TMS-L

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SAMPLE SUMMARY

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10395793001	**MW-1 / 071217**	Water	07/12/17 11:45	07/14/17 09:30
10395793002	**MW-3 / 071217**	Water	07/12/17 15:30	07/14/17 09:30
10395793003	**MW-4 / 071217**	Water	07/12/17 16:50	07/14/17 09:30
10395793004	**MW-5 / 071217**	Water	07/12/17 17:35	07/14/17 09:30
10395793005	**MW-9 / 071217**	Water	07/12/17 13:30	07/14/17 09:30
10395793006	**MW-14 / 071217**	Water	07/12/17 14:35	07/14/17 09:30
10395793007	**MW-30 / 071217**	Water	07/12/17 11:00	07/14/17 09:30
10395793008	**MW-32 / 071217**	Water	07/12/17 10:30	07/14/17 09:30
10395793009	**MW-33 / 071217**	Water	07/12/17 15:45	07/14/17 09:30
10395793010	**Trip Blank / 071217**	Water	07/12/17 00:00	07/14/17 09:30
10395793011	**MW-12 / 071317**	Water	07/13/17 11:55	07/14/17 09:30
10395793012	**MW-18 / 071317**	Water	07/13/17 11:10	07/14/17 09:30
10395793013	**MW-19 / 071317**	Water	07/13/17 09:55	07/14/17 09:30
10395793014	**MW-21 / 071317**	Water	07/13/17 13:30	07/14/17 09:30
10395793015	**MW-22 / 071317**	Water	07/13/17 12:55	07/14/17 09:30
10395793016	**Gravel Pit Pond /071317**	Water	07/13/17 15:35	07/14/17 09:30
10395793017	**Gravel Pit Well /071317**	Water	07/13/17 15:10	07/14/17 09:30
10395793018	**Harris Stock Well /071317**	Water	07/13/17 09:05	07/14/17 09:30

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SAMPLE ANALYTE COUNT

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10395793001	**MW-1 / 071217**	EPA 8260B	PRD	70	PASI-M
10395793002	**MW-3 / 071217**	EPA 8260B	PRD	70	PASI-M
10395793003	**MW-4 / 071217**	EPA 8260B	PRD	70	PASI-M
10395793004	**MW-5 / 071217**	EPA 8260B	PRD	70	PASI-M
10395793005	**MW-9 / 071217**	EPA 8260B	PRD	70	PASI-M
10395793006	**MW-14 / 071217**	EPA 8260B	PRD	70	PASI-M
10395793007	**MW-30 / 071217**	EPA 8260B	PRD	70	PASI-M
10395793008	**MW-32 / 071217**	EPA 8260B	PRD	70	PASI-M
10395793009	**MW-33 / 071217**	EPA 8260B	PRD	70	PASI-M
10395793010	**Trip Blank / 071217**	EPA 8260B	PRD	70	PASI-M
10395793011	**MW-12 / 071317**	EPA 8260B	PRD	70	PASI-M
10395793012	**MW-18 / 071317**	EPA 8260B	PRD	70	PASI-M
10395793013	**MW-19 / 071317**	EPA 8260B	PRD	70	PASI-M
10395793014	**MW-21 / 071317**	EPA 8260B	PRD	70	PASI-M
10395793015	**MW-22 / 071317**	EPA 8260B	PRD	70	PASI-M
10395793016	**Gravel Pit Pond /071317**	EPA 8260B	DJB	70	PASI-M
10395793017	**Gravel Pit Well /071317**	EPA 524.2	DJB	63	PASI-M
10395793018	**Harris Stock Well /071317**	EPA 524.2	DJB	63	PASI-M

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PROJECT NARRATIVE

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Date: July 27, 2017

The Trip Blank vials were received with headspace. One vial contained 7mm of headspace and the other contained 8mm. The second Trip Blank listed on the COC was not received.

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PROJECT NARRATIVE

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Method: **EPA 524.2**
Description: 524.2 MSV
Client: AECOM
Date: July 27, 2017

General Information:
2 samples were analyzed for EPA 524.2. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

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.

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates 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: 486277

A matrix spike/matrix spike duplicate was not performed due to insufficient sample volume.

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: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: July 27, 2017

General Information:
16 samples were analyzed for EPA 8260B. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

L2: Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results for this analyte in associated samples may be biased low.

- MW-1 / 071217 (Lab ID: 10395793001)
- MW-12 / 071317 (Lab ID: 10395793011)
- MW-14 / 071217 (Lab ID: 10395793006)
- MW-18 / 071317 (Lab ID: 10395793012)
- MW-19 / 071317 (Lab ID: 10395793013)
- MW-21 / 071317 (Lab ID: 10395793014)
- MW-22 / 071317 (Lab ID: 10395793015)
- MW-3 / 071217 (Lab ID: 10395793002)
- MW-30 / 071217 (Lab ID: 10395793007)
- MW-32 / 071217 (Lab ID: 10395793008)
- MW-33 / 071217 (Lab ID: 10395793009)
- MW-4 / 071217 (Lab ID: 10395793003)
- MW-5 / 071217 (Lab ID: 10395793004)
- MW-9 / 071217 (Lab ID: 10395793005)
- Trip Blank / 071217 (Lab ID: 10395793010)

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.

QC Batch: 486905

CL: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.

- BLANK (Lab ID: 2650363)
  - Bromomethane
  - Chloroethane
- LCS (Lab ID: 2650364)
  - Bromomethane
  - Chloroethane
- MS (Lab ID: 2650365)
  - Bromomethane
  - Chloroethane
- MSD (Lab ID: 2650366)
  - Bromomethane
  - Chloroethane
- MW-1 / 071217 (Lab ID: 10395793001)

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PROJECT NARRATIVE

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: July 27, 2017

QC Batch: 486905

CL: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.

- Bromomethane
- Chloroethane

- MW-12 / 071317 (Lab ID: 10395793011)
  - Bromomethane
  - Chloroethane
- MW-14 / 071217 (Lab ID: 10395793006)
  - Bromomethane
  - Chloroethane
- MW-18 / 071317 (Lab ID: 10395793012)
  - Bromomethane
  - Chloroethane
- MW-19 / 071317 (Lab ID: 10395793013)
  - Bromomethane
  - Chloroethane
- MW-21 / 071317 (Lab ID: 10395793014)
  - Bromomethane
  - Chloroethane
- MW-22 / 071317 (Lab ID: 10395793015)
  - Bromomethane
  - Chloroethane
- MW-3 / 071217 (Lab ID: 10395793002)
  - Bromomethane
  - Chloroethane
- MW-30 / 071217 (Lab ID: 10395793007)
  - Bromomethane
  - Chloroethane
- MW-32 / 071217 (Lab ID: 10395793008)
  - Bromomethane
  - Chloroethane
- MW-33 / 071217 (Lab ID: 10395793009)
  - Bromomethane
  - Chloroethane
- MW-4 / 071217 (Lab ID: 10395793003)
  - Bromomethane
  - Chloroethane
- MW-5 / 071217 (Lab ID: 10395793004)
  - Bromomethane
  - Chloroethane
- MW-9 / 071217 (Lab ID: 10395793005)
  - Bromomethane
  - Chloroethane
- Trip Blank / 071217 (Lab ID: 10395793010)
  - Bromomethane
  - Chloroethane

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PROJECT NARRATIVE

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Method: **EPA 8260B**
Description: 8260B VOC
Client: AECOM
Date: July 27, 2017

Internal Standards:
All internal standards were within QC limits with any exceptions noted below.

Surrogates:
All surrogates 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: 486905

B: Analyte was detected in the associated method blank.
- BLANK for HBN 486905 [MSV/4082 (Lab ID: 2650363)
  - Acetone

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits 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: 486905

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10395793012

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- MS (Lab ID: 2650365)
  - 1,2-Dibromoethane (EDB)
- MSD (Lab ID: 2650366)
  - Tetrahydrofuran

R1: RPD value was outside control limits.
- MSD (Lab ID: 2650366)
  - Chloromethane

QC Batch: 487356

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10396486008

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
- MSD (Lab ID: 2652747)
  - Tetrahydrofuran

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-1 / 071217 **Lab ID: 10395793001** Collected: 07/12/17 11:45 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		07/24/17 18:08	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 18:08	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:08	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 18:08	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 18:08	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 18:08	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 18:08	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 18:08	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 18:08	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:08	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 18:08	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 18:08	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 18:08	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 18:08	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 18:08	75-00-3	CL,L2
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:08	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 18:08	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 18:08	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 18:08	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 18:08	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:08	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 18:08	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 18:08	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:08	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 18:08	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:08	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 18:08	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:08	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:08	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 18:08	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 18:08	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:08	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:08	75-43-4	L2
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/24/17 18:08	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 18:08	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 18:08	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 18:08	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 18:08	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 18:08	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 18:08	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 18:08	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 18:08	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 18:08	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 18:08	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/24/17 18:08	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 18:08	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-1 / 071217 **Lab ID: 10395793001** Collected: 07/12/17 11:45 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 18:08	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 18:08	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 18:08	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 18:08	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:08	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 18:08	79-34-5	
Tetrachloroethene	**<0.25**	ug/L	1.0	0.25	1		07/24/17 18:08	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 18:08	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 18:08	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:08	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:08	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:08	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 18:08	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		07/24/17 18:08	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 18:08	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 18:08	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 18:08	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 18:08	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 18:08	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 18:08	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 18:08	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	100	%.	75-137		1		07/24/17 18:08	17060-07-0	
Toluene-d8 (S)	95	%.	75-125		1		07/24/17 18:08	2037-26-5	
4-Bromofluorobenzene (S)	104	%.	75-125		1		07/24/17 18:08	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-3 / 071217 **Lab ID: 10395793002** Collected: 07/12/17 15:30 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**2.7J**	ug/L	20.0	2.0	1		07/24/17 18:24	67-64-1	B
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 18:24	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:24	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 18:24	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 18:24	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 18:24	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 18:24	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 18:24	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 18:24	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:24	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 18:24	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 18:24	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 18:24	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 18:24	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 18:24	75-00-3	CL,L2
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:24	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 18:24	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 18:24	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 18:24	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 18:24	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:24	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 18:24	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 18:24	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:24	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 18:24	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:24	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 18:24	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:24	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:24	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 18:24	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 18:24	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:24	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:24	75-43-4	L2
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/24/17 18:24	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 18:24	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 18:24	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 18:24	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 18:24	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 18:24	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 18:24	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 18:24	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 18:24	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 18:24	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 18:24	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/24/17 18:24	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 18:24	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-3 / 071217 **Lab ID: 10395793002** Collected: 07/12/17 15:30 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 18:24	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 18:24	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 18:24	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 18:24	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:24	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 18:24	79-34-5	
Tetrachloroethene	**4.7**	ug/L	1.0	0.25	1		07/24/17 18:24	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 18:24	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 18:24	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:24	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:24	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:24	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 18:24	79-00-5	
Trichloroethene	**0.35J**	ug/L	0.40	0.052	1		07/24/17 18:24	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 18:24	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 18:24	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 18:24	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 18:24	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 18:24	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 18:24	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 18:24	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	99	%.	75-137		1		07/24/17 18:24	17060-07-0	
Toluene-d8 (S)	94	%.	75-125		1		07/24/17 18:24	2037-26-5	
4-Bromofluorobenzene (S)	104	%.	75-125		1		07/24/17 18:24	460-00-4	

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(612)607-1700

ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-4 / 071217 **Lab ID: 10395793003** Collected: 07/12/17 16:50 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		07/24/17 18:40	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 18:40	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:40	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 18:40	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 18:40	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 18:40	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 18:40	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 18:40	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 18:40	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:40	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 18:40	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 18:40	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 18:40	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 18:40	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 18:40	75-00-3	CL,L2
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:40	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 18:40	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 18:40	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 18:40	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 18:40	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:40	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 18:40	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 18:40	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:40	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 18:40	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:40	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 18:40	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:40	75-34-3	
1,2-Dichloroethane	**0.22J**	ug/L	1.0	0.17	1		07/24/17 18:40	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 18:40	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 18:40	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:40	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:40	75-43-4	L2
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/24/17 18:40	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 18:40	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 18:40	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 18:40	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 18:40	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 18:40	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 18:40	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 18:40	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 18:40	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 18:40	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 18:40	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/24/17 18:40	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 18:40	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-4 / 071217 **Lab ID: 10395793003** Collected: 07/12/17 16:50 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 18:40	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 18:40	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 18:40	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 18:40	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:40	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 18:40	79-34-5	
Tetrachloroethene	**1.1**	ug/L	1.0	0.25	1		07/24/17 18:40	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 18:40	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 18:40	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:40	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:40	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:40	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 18:40	79-00-5	
Trichloroethene	**0.48**	ug/L	0.40	0.052	1		07/24/17 18:40	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 18:40	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 18:40	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 18:40	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 18:40	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 18:40	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 18:40	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 18:40	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	102	%.	75-137		1		07/24/17 18:40	17060-07-0	
Toluene-d8 (S)	96	%.	75-125		1		07/24/17 18:40	2037-26-5	
4-Bromofluorobenzene (S)	105	%.	75-125		1		07/24/17 18:40	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-5 / 071217 **Lab ID: 10395793004** Collected: 07/12/17 17:35 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		07/24/17 18:56	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 18:56	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:56	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 18:56	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 18:56	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 18:56	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 18:56	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 18:56	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 18:56	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:56	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 18:56	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 18:56	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 18:56	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 18:56	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 18:56	75-00-3	CL,L2
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:56	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 18:56	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 18:56	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 18:56	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 18:56	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:56	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 18:56	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 18:56	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:56	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 18:56	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:56	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 18:56	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:56	75-34-3	
1,2-Dichloroethane	**0.18J**	ug/L	1.0	0.17	1		07/24/17 18:56	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 18:56	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 18:56	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 18:56	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:56	75-43-4	L2
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/24/17 18:56	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 18:56	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 18:56	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 18:56	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 18:56	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 18:56	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 18:56	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 18:56	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 18:56	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 18:56	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 18:56	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/24/17 18:56	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 18:56	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-5 / 071217 **Lab ID: 10395793004** Collected: 07/12/17 17:35 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 18:56	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 18:56	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 18:56	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 18:56	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:56	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 18:56	79-34-5	
Tetrachloroethene	**0.75J**	ug/L	1.0	0.25	1		07/24/17 18:56	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 18:56	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 18:56	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:56	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 18:56	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 18:56	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 18:56	79-00-5	
Trichloroethene	**0.64**	ug/L	0.40	0.052	1		07/24/17 18:56	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 18:56	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 18:56	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 18:56	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 18:56	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 18:56	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 18:56	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 18:56	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	97	%.	75-137		1		07/24/17 18:56	17060-07-0	
Toluene-d8 (S)	96	%.	75-125		1		07/24/17 18:56	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	75-125		1		07/24/17 18:56	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-9 / 071217 **Lab ID: 10395793005** Collected: 07/12/17 13:30 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		07/24/17 19:12	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 19:12	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 19:12	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 19:12	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 19:12	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 19:12	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 19:12	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 19:12	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 19:12	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 19:12	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 19:12	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 19:12	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 19:12	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 19:12	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 19:12	75-00-3	CL,L2
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/24/17 19:12	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 19:12	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 19:12	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 19:12	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 19:12	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 19:12	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 19:12	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 19:12	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 19:12	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 19:12	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 19:12	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 19:12	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 19:12	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 19:12	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 19:12	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 19:12	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 19:12	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 19:12	75-43-4	L2
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/24/17 19:12	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 19:12	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 19:12	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 19:12	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 19:12	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 19:12	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 19:12	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 19:12	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 19:12	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 19:12	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 19:12	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/24/17 19:12	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 19:12	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-9 / 071217 **Lab ID: 10395793005** Collected: 07/12/17 13:30 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 19:12	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 19:12	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 19:12	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 19:12	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 19:12	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 19:12	79-34-5	
Tetrachloroethene	**1.1**	ug/L	1.0	0.25	1		07/24/17 19:12	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 19:12	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 19:12	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 19:12	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 19:12	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 19:12	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 19:12	79-00-5	
Trichloroethene	**0.27J**	ug/L	0.40	0.052	1		07/24/17 19:12	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 19:12	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 19:12	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 19:12	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 19:12	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 19:12	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 19:12	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 19:12	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	102	%.	75-137		1		07/24/17 19:12	17060-07-0	
Toluene-d8 (S)	96	%.	75-125		1		07/24/17 19:12	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	75-125		1		07/24/17 19:12	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-14 / 071217 **Lab ID: 10395793006** Collected: 07/12/17 14:35 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		07/24/17 19:28	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 19:28	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 19:28	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 19:28	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 19:28	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 19:28	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 19:28	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 19:28	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 19:28	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 19:28	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 19:28	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 19:28	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 19:28	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 19:28	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 19:28	75-00-3	CL,L2
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/24/17 19:28	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 19:28	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 19:28	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 19:28	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 19:28	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 19:28	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 19:28	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 19:28	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 19:28	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 19:28	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 19:28	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 19:28	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 19:28	75-34-3	
1,2-Dichloroethane	**0.22J**	ug/L	1.0	0.17	1		07/24/17 19:28	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 19:28	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 19:28	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 19:28	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 19:28	75-43-4	L2
1,2-Dichloropropane	**0.58J**	ug/L	4.0	0.22	1		07/24/17 19:28	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 19:28	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 19:28	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 19:28	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 19:28	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 19:28	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 19:28	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 19:28	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 19:28	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 19:28	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 19:28	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/24/17 19:28	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 19:28	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-14 / 071217 **Lab ID: 10395793006** Collected: 07/12/17 14:35 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 19:28	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 19:28	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 19:28	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 19:28	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 19:28	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 19:28	79-34-5	
Tetrachloroethene	**0.85J**	ug/L	1.0	0.25	1		07/24/17 19:28	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 19:28	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 19:28	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 19:28	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 19:28	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 19:28	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 19:28	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		07/24/17 19:28	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 19:28	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 19:28	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 19:28	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 19:28	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 19:28	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 19:28	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 19:28	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	99	%.	75-137		1		07/24/17 19:28	17060-07-0	
Toluene-d8 (S)	95	%.	75-125		1		07/24/17 19:28	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	75-125		1		07/24/17 19:28	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-30 / 071217 **Lab ID: 10395793007** Collected: 07/12/17 11:00 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**2.1J**	ug/L	20.0	2.0	1		07/24/17 19:44	67-64-1	B
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 19:44	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 19:44	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 19:44	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 19:44	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 19:44	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 19:44	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 19:44	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 19:44	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 19:44	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 19:44	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 19:44	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 19:44	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 19:44	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 19:44	75-00-3	CL,L2
Chloroform	**0.86J**	ug/L	1.0	0.21	1		07/24/17 19:44	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 19:44	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 19:44	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 19:44	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 19:44	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 19:44	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 19:44	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 19:44	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 19:44	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 19:44	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 19:44	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 19:44	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 19:44	75-34-3	
1,2-Dichloroethane	**0.19J**	ug/L	1.0	0.17	1		07/24/17 19:44	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 19:44	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 19:44	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 19:44	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 19:44	75-43-4	L2
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/24/17 19:44	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 19:44	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 19:44	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 19:44	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 19:44	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 19:44	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 19:44	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 19:44	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 19:44	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 19:44	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 19:44	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/24/17 19:44	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 19:44	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-30 / 071217 **Lab ID: 10395793007** Collected: 07/12/17 11:00 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 19:44	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 19:44	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 19:44	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 19:44	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 19:44	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 19:44	79-34-5	
Tetrachloroethene	**<0.25**	ug/L	1.0	0.25	1		07/24/17 19:44	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 19:44	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 19:44	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 19:44	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 19:44	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 19:44	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 19:44	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		07/24/17 19:44	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 19:44	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 19:44	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 19:44	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 19:44	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 19:44	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 19:44	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 19:44	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	98	%.	75-137		1		07/24/17 19:44	17060-07-0	
Toluene-d8 (S)	96	%.	75-125		1		07/24/17 19:44	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	75-125		1		07/24/17 19:44	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-32 / 071217 **Lab ID: 10395793008** Collected: 07/12/17 10:30 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**4.5J**	ug/L	20.0	2.0	1		07/24/17 20:00	67-64-1	B
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 20:00	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:00	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 20:00	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 20:00	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 20:00	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 20:00	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 20:00	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 20:00	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:00	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 20:00	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 20:00	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 20:00	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 20:00	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 20:00	75-00-3	CL,L2
Chloroform	**0.74J**	ug/L	1.0	0.21	1		07/24/17 20:00	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 20:00	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 20:00	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 20:00	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 20:00	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:00	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 20:00	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 20:00	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:00	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 20:00	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:00	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 20:00	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:00	75-34-3	
1,2-Dichloroethane	**0.22J**	ug/L	1.0	0.17	1		07/24/17 20:00	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 20:00	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 20:00	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:00	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:00	75-43-4	L2
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/24/17 20:00	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 20:00	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 20:00	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 20:00	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 20:00	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 20:00	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 20:00	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 20:00	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 20:00	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 20:00	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 20:00	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/24/17 20:00	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 20:00	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-32 / 071217 **Lab ID: 10395793008** Collected: 07/12/17 10:30 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 20:00	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 20:00	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 20:00	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 20:00	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:00	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 20:00	79-34-5	
Tetrachloroethene	**<0.25**	ug/L	1.0	0.25	1		07/24/17 20:00	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 20:00	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 20:00	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:00	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:00	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:00	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 20:00	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		07/24/17 20:00	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 20:00	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 20:00	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 20:00	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 20:00	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 20:00	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 20:00	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 20:00	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	98	%.	75-137		1		07/24/17 20:00	17060-07-0	
Toluene-d8 (S)	95	%.	75-125		1		07/24/17 20:00	2037-26-5	
4-Bromofluorobenzene (S)	104	%.	75-125		1		07/24/17 20:00	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-33 / 071217 **Lab ID: 10395793009** Collected: 07/12/17 15:45 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**2.3J**	ug/L	20.0	2.0	1		07/24/17 20:16	67-64-1	B
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 20:16	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:16	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 20:16	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 20:16	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 20:16	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 20:16	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 20:16	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 20:16	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:16	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 20:16	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 20:16	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 20:16	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 20:16	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 20:16	75-00-3	CL,L2
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:16	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 20:16	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 20:16	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 20:16	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 20:16	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:16	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 20:16	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 20:16	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:16	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 20:16	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:16	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 20:16	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:16	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:16	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 20:16	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 20:16	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:16	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:16	75-43-4	L2
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/24/17 20:16	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 20:16	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 20:16	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 20:16	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 20:16	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 20:16	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 20:16	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 20:16	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 20:16	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 20:16	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 20:16	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/24/17 20:16	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 20:16	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-33 / 071217 **Lab ID: 10395793009** Collected: 07/12/17 15:45 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 20:16	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 20:16	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 20:16	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 20:16	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:16	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 20:16	79-34-5	
Tetrachloroethene	**4.3**	ug/L	1.0	0.25	1		07/24/17 20:16	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 20:16	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 20:16	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:16	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:16	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:16	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 20:16	79-00-5	
Trichloroethene	**0.35J**	ug/L	0.40	0.052	1		07/24/17 20:16	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 20:16	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 20:16	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 20:16	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 20:16	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 20:16	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 20:16	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 20:16	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	101	%.	75-137		1		07/24/17 20:16	17060-07-0	
Toluene-d8 (S)	96	%.	75-125		1		07/24/17 20:16	2037-26-5	
4-Bromofluorobenzene (S)	104	%.	75-125		1		07/24/17 20:16	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: Trip Blank / 071217 **Lab ID: 10395793010** Collected: 07/12/17 00:00 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		07/24/17 16:48	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 16:48	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 16:48	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 16:48	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 16:48	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 16:48	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 16:48	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 16:48	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 16:48	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 16:48	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 16:48	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 16:48	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 16:48	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 16:48	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 16:48	75-00-3	CL
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/24/17 16:48	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 16:48	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 16:48	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 16:48	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 16:48	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 16:48	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 16:48	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 16:48	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 16:48	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 16:48	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 16:48	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 16:48	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 16:48	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 16:48	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 16:48	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 16:48	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 16:48	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 16:48	75-43-4	L2
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/24/17 16:48	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 16:48	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 16:48	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 16:48	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 16:48	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 16:48	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 16:48	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 16:48	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 16:48	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 16:48	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 16:48	99-87-6	
Methylene Chloride	**0.69J**	ug/L	4.0	0.29	1		07/24/17 16:48	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 16:48	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: Trip Blank / 071217 **Lab ID: 10395793010** Collected: 07/12/17 00:00 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 16:48	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 16:48	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 16:48	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 16:48	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 16:48	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 16:48	79-34-5	
Tetrachloroethene	**<0.25**	ug/L	1.0	0.25	1		07/24/17 16:48	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 16:48	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 16:48	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 16:48	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 16:48	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 16:48	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 16:48	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		07/24/17 16:48	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 16:48	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 16:48	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 16:48	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 16:48	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 16:48	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 16:48	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 16:48	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	98	%.	75-137		1		07/24/17 16:48	17060-07-0	
Toluene-d8 (S)	93	%.	75-125		1		07/24/17 16:48	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	75-125		1		07/24/17 16:48	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-12 / 071317 **Lab ID: 10395793011** Collected: 07/13/17 11:55 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		07/24/17 20:32	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 20:32	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:32	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 20:32	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 20:32	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 20:32	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 20:32	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 20:32	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 20:32	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:32	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 20:32	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 20:32	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 20:32	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 20:32	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 20:32	75-00-3	CL,L2
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:32	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 20:32	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 20:32	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 20:32	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 20:32	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:32	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 20:32	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 20:32	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:32	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 20:32	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:32	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 20:32	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:32	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:32	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 20:32	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 20:32	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:32	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:32	75-43-4	L2
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/24/17 20:32	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 20:32	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 20:32	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 20:32	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 20:32	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 20:32	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 20:32	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 20:32	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 20:32	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 20:32	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 20:32	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/24/17 20:32	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 20:32	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-12 / 071317 **Lab ID: 10395793011** Collected: 07/13/17 11:55 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 20:32	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 20:32	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 20:32	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 20:32	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:32	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 20:32	79-34-5	
Tetrachloroethene	**0.80J**	ug/L	1.0	0.25	1		07/24/17 20:32	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 20:32	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 20:32	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:32	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:32	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:32	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 20:32	79-00-5	
Trichloroethene	**0.77**	ug/L	0.40	0.052	1		07/24/17 20:32	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 20:32	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 20:32	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 20:32	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 20:32	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 20:32	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 20:32	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 20:32	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	100	%.	75-137		1		07/24/17 20:32	17060-07-0	
Toluene-d8 (S)	95	%.	75-125		1		07/24/17 20:32	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	75-125		1		07/24/17 20:32	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-18 / 071317 **Lab ID: 10395793012** Collected: 07/13/17 11:10 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		07/24/17 17:04	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 17:04	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 17:04	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 17:04	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 17:04	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 17:04	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 17:04	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 17:04	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 17:04	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 17:04	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 17:04	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 17:04	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 17:04	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 17:04	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 17:04	75-00-3	CL,L2
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/24/17 17:04	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 17:04	74-87-3	R1
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 17:04	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 17:04	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 17:04	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 17:04	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 17:04	106-93-4	M1
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 17:04	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 17:04	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 17:04	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 17:04	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 17:04	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 17:04	75-34-3	
1,2-Dichloroethane	**0.21J**	ug/L	1.0	0.17	1		07/24/17 17:04	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 17:04	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 17:04	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 17:04	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 17:04	75-43-4	L2
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/24/17 17:04	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 17:04	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 17:04	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 17:04	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 17:04	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 17:04	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 17:04	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 17:04	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 17:04	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 17:04	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 17:04	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/24/17 17:04	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 17:04	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-18 / 071317 **Lab ID: 10395793012** Collected: 07/13/17 11:10 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 17:04	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 17:04	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 17:04	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 17:04	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 17:04	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 17:04	79-34-5	
Tetrachloroethene	**0.83J**	ug/L	1.0	0.25	1		07/24/17 17:04	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 17:04	109-99-9	M1
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 17:04	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 17:04	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 17:04	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 17:04	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 17:04	79-00-5	
Trichloroethene	**0.29J**	ug/L	0.40	0.052	1		07/24/17 17:04	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 17:04	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 17:04	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 17:04	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 17:04	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 17:04	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 17:04	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 17:04	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	100	%.	75-137		1		07/24/17 17:04	17060-07-0	
Toluene-d8 (S)	94	%.	75-125		1		07/24/17 17:04	2037-26-5	
4-Bromofluorobenzene (S)	105	%.	75-125		1		07/24/17 17:04	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-19 / 071317 **Lab ID: 10395793013** Collected: 07/13/17 09:55 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		07/24/17 20:48	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 20:48	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:48	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 20:48	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 20:48	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 20:48	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 20:48	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 20:48	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 20:48	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:48	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 20:48	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 20:48	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 20:48	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 20:48	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 20:48	75-00-3	CL,L2
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:48	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 20:48	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 20:48	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 20:48	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 20:48	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:48	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 20:48	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 20:48	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:48	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 20:48	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:48	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 20:48	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:48	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:48	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 20:48	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 20:48	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 20:48	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:48	75-43-4	L2
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/24/17 20:48	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 20:48	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 20:48	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 20:48	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 20:48	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 20:48	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 20:48	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 20:48	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 20:48	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 20:48	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 20:48	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/24/17 20:48	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 20:48	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-19 / 071317 **Lab ID: 10395793013** Collected: 07/13/17 09:55 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 20:48	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 20:48	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 20:48	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 20:48	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:48	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 20:48	79-34-5	
Tetrachloroethene	**<0.25**	ug/L	1.0	0.25	1		07/24/17 20:48	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 20:48	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 20:48	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:48	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 20:48	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 20:48	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 20:48	79-00-5	
Trichloroethene	**0.40**	ug/L	0.40	0.052	1		07/24/17 20:48	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 20:48	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 20:48	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 20:48	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 20:48	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 20:48	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 20:48	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 20:48	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	99	%.	75-137		1		07/24/17 20:48	17060-07-0	
Toluene-d8 (S)	95	%.	75-125		1		07/24/17 20:48	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	75-125		1		07/24/17 20:48	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-21 / 071317 **Lab ID: 10395793014** Collected: 07/13/17 13:30 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		07/24/17 21:04	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 21:04	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 21:04	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 21:04	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 21:04	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 21:04	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 21:04	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 21:04	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 21:04	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 21:04	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 21:04	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 21:04	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 21:04	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 21:04	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 21:04	75-00-3	CL,L2
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/24/17 21:04	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 21:04	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 21:04	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 21:04	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 21:04	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 21:04	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 21:04	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 21:04	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 21:04	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 21:04	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 21:04	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 21:04	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 21:04	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 21:04	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 21:04	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 21:04	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 21:04	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 21:04	75-43-4	L2
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/24/17 21:04	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 21:04	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 21:04	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 21:04	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 21:04	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 21:04	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 21:04	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 21:04	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 21:04	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 21:04	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 21:04	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/24/17 21:04	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 21:04	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-21 / 071317 **Lab ID: 10395793014** Collected: 07/13/17 13:30 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 21:04	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 21:04	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 21:04	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 21:04	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 21:04	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 21:04	79-34-5	
Tetrachloroethene	**<0.25**	ug/L	1.0	0.25	1		07/24/17 21:04	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 21:04	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 21:04	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 21:04	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 21:04	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 21:04	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 21:04	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		07/24/17 21:04	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 21:04	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 21:04	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 21:04	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 21:04	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 21:04	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 21:04	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 21:04	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	100	%.	75-137		1		07/24/17 21:04	17060-07-0	
Toluene-d8 (S)	95	%.	75-125		1		07/24/17 21:04	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	75-125		1		07/24/17 21:04	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-22 / 071317 **Lab ID: 10395793015** Collected: 07/13/17 12:55 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**<2.0**	ug/L	20.0	2.0	1		07/24/17 21:20	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/24/17 21:20	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 21:20	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/24/17 21:20	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/24/17 21:20	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/24/17 21:20	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/24/17 21:20	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/24/17 21:20	74-83-9	CL
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/24/17 21:20	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 21:20	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 21:20	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/24/17 21:20	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/24/17 21:20	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/24/17 21:20	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/24/17 21:20	75-00-3	CL,L2
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/24/17 21:20	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/24/17 21:20	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/24/17 21:20	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/24/17 21:20	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/24/17 21:20	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/24/17 21:20	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/24/17 21:20	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/24/17 21:20	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/24/17 21:20	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 21:20	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 21:20	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/24/17 21:20	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 21:20	75-34-3	
1,2-Dichloroethane	**0.20J**	ug/L	1.0	0.17	1		07/24/17 21:20	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/24/17 21:20	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/24/17 21:20	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/24/17 21:20	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/24/17 21:20	75-43-4	L2
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/24/17 21:20	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/24/17 21:20	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/24/17 21:20	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 21:20	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 21:20	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/24/17 21:20	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/24/17 21:20	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/24/17 21:20	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 21:20	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/24/17 21:20	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/24/17 21:20	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/24/17 21:20	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/24/17 21:20	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: MW-22 / 071317 **Lab ID: 10395793015** Collected: 07/13/17 12:55 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/24/17 21:20	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/24/17 21:20	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/24/17 21:20	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/24/17 21:20	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 21:20	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/24/17 21:20	79-34-5	
Tetrachloroethene	**0.94J**	ug/L	1.0	0.25	1		07/24/17 21:20	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/24/17 21:20	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/24/17 21:20	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 21:20	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/24/17 21:20	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/24/17 21:20	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/24/17 21:20	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		07/24/17 21:20	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/24/17 21:20	75-69-4	L2
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/24/17 21:20	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/24/17 21:20	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/24/17 21:20	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/24/17 21:20	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/24/17 21:20	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/24/17 21:20	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	99	%.	75-137		1		07/24/17 21:20	17060-07-0	
Toluene-d8 (S)	96	%.	75-125		1		07/24/17 21:20	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	75-125		1		07/24/17 21:20	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: Gravel Pit Pond /071317 **Lab ID: 10395793016** Collected: 07/13/17 15:35 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Acetone	**2.6J**	ug/L	80.0	2.0	1		07/26/17 19:07	67-64-1	
Allyl chloride	**<0.25**	ug/L	4.0	0.25	1		07/26/17 19:07	107-05-1	
Benzene	**<0.16**	ug/L	1.0	0.16	1		07/26/17 19:07	71-43-2	
Bromobenzene	**<0.34**	ug/L	1.0	0.34	1		07/26/17 19:07	108-86-1	
Bromochloromethane	**<0.19**	ug/L	1.0	0.19	1		07/26/17 19:07	74-97-5	
Bromodichloromethane	**<0.24**	ug/L	1.0	0.24	1		07/26/17 19:07	75-27-4	
Bromoform	**<0.27**	ug/L	4.0	0.27	1		07/26/17 19:07	75-25-2	
Bromomethane	**<0.44**	ug/L	4.0	0.44	1		07/26/17 19:07	74-83-9	
2-Butanone (MEK)	**<1.1**	ug/L	5.0	1.1	1		07/26/17 19:07	78-93-3	
n-Butylbenzene	**<0.16**	ug/L	1.0	0.16	1		07/26/17 19:07	104-51-8	
sec-Butylbenzene	**<0.19**	ug/L	1.0	0.19	1		07/26/17 19:07	135-98-8	
tert-Butylbenzene	**<0.22**	ug/L	1.0	0.22	1		07/26/17 19:07	98-06-6	
Carbon tetrachloride	**<0.20**	ug/L	1.0	0.20	1		07/26/17 19:07	56-23-5	
Chlorobenzene	**<0.11**	ug/L	1.0	0.11	1		07/26/17 19:07	108-90-7	
Chloroethane	**<0.34**	ug/L	1.0	0.34	1		07/26/17 19:07	75-00-3	
Chloroform	**<0.21**	ug/L	1.0	0.21	1		07/26/17 19:07	67-66-3	
Chloromethane	**<0.25**	ug/L	4.0	0.25	1		07/26/17 19:07	74-87-3	
2-Chlorotoluene	**<0.30**	ug/L	1.0	0.30	1		07/26/17 19:07	95-49-8	
4-Chlorotoluene	**<0.26**	ug/L	1.0	0.26	1		07/26/17 19:07	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.60**	ug/L	4.0	0.60	1		07/26/17 19:07	96-12-8	
Dibromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/26/17 19:07	124-48-1	
1,2-Dibromoethane (EDB)	**<0.20**	ug/L	1.0	0.20	1		07/26/17 19:07	106-93-4	
Dibromomethane	**<0.19**	ug/L	4.0	0.19	1		07/26/17 19:07	74-95-3	
1,2-Dichlorobenzene	**<0.17**	ug/L	1.0	0.17	1		07/26/17 19:07	95-50-1	
1,3-Dichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/26/17 19:07	541-73-1	
1,4-Dichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/26/17 19:07	106-46-7	
Dichlorodifluoromethane	**<0.23**	ug/L	1.0	0.23	1		07/26/17 19:07	75-71-8	
1,1-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/26/17 19:07	75-34-3	
1,2-Dichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/26/17 19:07	107-06-2	
1,1-Dichloroethene	**<0.28**	ug/L	1.0	0.28	1		07/26/17 19:07	75-35-4	
cis-1,2-Dichloroethene	**<0.12**	ug/L	1.0	0.12	1		07/26/17 19:07	156-59-2	
trans-1,2-Dichloroethene	**<0.16**	ug/L	1.0	0.16	1		07/26/17 19:07	156-60-5	
Dichlorofluoromethane	**<0.21**	ug/L	1.0	0.21	1		07/26/17 19:07	75-43-4	
1,2-Dichloropropane	**<0.22**	ug/L	4.0	0.22	1		07/26/17 19:07	78-87-5	
1,3-Dichloropropane	**<0.096**	ug/L	1.0	0.096	1		07/26/17 19:07	142-28-9	
2,2-Dichloropropane	**<0.13**	ug/L	4.0	0.13	1		07/26/17 19:07	594-20-7	
1,1-Dichloropropene	**<0.23**	ug/L	1.0	0.23	1		07/26/17 19:07	563-58-6	
cis-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/26/17 19:07	10061-01-5	
trans-1,3-Dichloropropene	**<0.15**	ug/L	4.0	0.15	1		07/26/17 19:07	10061-02-6	
Diethyl ether (Ethyl ether)	**<0.19**	ug/L	4.0	0.19	1		07/26/17 19:07	60-29-7	
Ethylbenzene	**<0.15**	ug/L	1.0	0.15	1		07/26/17 19:07	100-41-4	
Hexachloro-1,3-butadiene	**<0.18**	ug/L	1.0	0.18	1		07/26/17 19:07	87-68-3	
Isopropylbenzene (Cumene)	**<0.25**	ug/L	1.0	0.25	1		07/26/17 19:07	98-82-8	
p-Isopropyltoluene	**<0.19**	ug/L	1.0	0.19	1		07/26/17 19:07	99-87-6	
Methylene Chloride	**<0.29**	ug/L	4.0	0.29	1		07/26/17 19:07	75-09-2	
4-Methyl-2-pentanone (MIBK)	**<0.43**	ug/L	5.0	0.43	1		07/26/17 19:07	108-10-1	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: Gravel Pit Pond /071317 **Lab ID: 10395793016** Collected: 07/13/17 15:35 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B								
Methyl-tert-butyl ether	**<0.15**	ug/L	1.0	0.15	1		07/26/17 19:07	1634-04-4	
Naphthalene	**<0.20**	ug/L	4.0	0.20	1		07/26/17 19:07	91-20-3	
n-Propylbenzene	**<0.23**	ug/L	1.0	0.23	1		07/26/17 19:07	103-65-1	
Styrene	**<0.29**	ug/L	1.0	0.29	1		07/26/17 19:07	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.17**	ug/L	1.0	0.17	1		07/26/17 19:07	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.22**	ug/L	1.0	0.22	1		07/26/17 19:07	79-34-5	
Tetrachloroethene	**<0.25**	ug/L	1.0	0.25	1		07/26/17 19:07	127-18-4	
Tetrahydrofuran	**<1.5**	ug/L	10.0	1.5	1		07/26/17 19:07	109-99-9	
Toluene	**<0.14**	ug/L	1.0	0.14	1		07/26/17 19:07	108-88-3	
1,2,3-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/26/17 19:07	87-61-6	
1,2,4-Trichlorobenzene	**<0.21**	ug/L	1.0	0.21	1		07/26/17 19:07	120-82-1	
1,1,1-Trichloroethane	**<0.17**	ug/L	1.0	0.17	1		07/26/17 19:07	71-55-6	
1,1,2-Trichloroethane	**<0.15**	ug/L	1.0	0.15	1		07/26/17 19:07	79-00-5	
Trichloroethene	**<0.052**	ug/L	0.40	0.052	1		07/26/17 19:07	79-01-6	
Trichlorofluoromethane	**<0.33**	ug/L	1.0	0.33	1		07/26/17 19:07	75-69-4	
1,2,3-Trichloropropane	**<0.28**	ug/L	4.0	0.28	1		07/26/17 19:07	96-18-4	
1,1,2-Trichlorotrifluoroethane	**<0.32**	ug/L	1.0	0.32	1		07/26/17 19:07	76-13-1	
1,2,4-Trimethylbenzene	**<0.18**	ug/L	1.0	0.18	1		07/26/17 19:07	95-63-6	
1,3,5-Trimethylbenzene	**<0.27**	ug/L	1.0	0.27	1		07/26/17 19:07	108-67-8	
Vinyl chloride	**<0.069**	ug/L	0.20	0.069	1		07/26/17 19:07	75-01-4	
Xylene (Total)	**<0.32**	ug/L	3.0	0.32	1		07/26/17 19:07	1330-20-7	
Surrogates									
1,2-Dichloroethane-d4 (S)	107	%.	75-137		1		07/26/17 19:07	17060-07-0	
Toluene-d8 (S)	105	%.	75-125		1		07/26/17 19:07	2037-26-5	
4-Bromofluorobenzene (S)	97	%.	75-125		1		07/26/17 19:07	460-00-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: Gravel Pit Well /071317 **Lab ID: 10395793017** Collected: 07/13/17 15:10 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
524.2 MSV	Analytical Method: EPA 524.2								
Benzene	**<0.086**	ug/L	0.50	0.086	1		07/20/17 13:53	71-43-2	
Bromobenzene	**<0.081**	ug/L	0.50	0.081	1		07/20/17 13:53	108-86-1	
Bromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/20/17 13:53	74-97-5	
Bromodichloromethane	**<0.090**	ug/L	1.0	0.090	1		07/20/17 13:53	75-27-4	
Bromoform	**<0.23**	ug/L	4.0	0.23	1		07/20/17 13:53	75-25-2	
Bromomethane	**<0.20**	ug/L	4.0	0.20	1		07/20/17 13:53	74-83-9	
n-Butylbenzene	**<0.081**	ug/L	0.50	0.081	1		07/20/17 13:53	104-51-8	
sec-Butylbenzene	**<0.063**	ug/L	0.50	0.063	1		07/20/17 13:53	135-98-8	
tert-Butylbenzene	**<0.097**	ug/L	0.50	0.097	1		07/20/17 13:53	98-06-6	
Carbon tetrachloride	**<0.076**	ug/L	1.0	0.076	1		07/20/17 13:53	56-23-5	
Chlorobenzene	**<0.068**	ug/L	0.50	0.068	1		07/20/17 13:53	108-90-7	
Chloroethane	**<0.18**	ug/L	1.0	0.18	1		07/20/17 13:53	75-00-3	
Chloroform	**<0.10**	ug/L	1.0	0.10	1		07/20/17 13:53	67-66-3	
Chloromethane	**<0.21**	ug/L	4.0	0.21	1		07/20/17 13:53	74-87-3	
2-Chlorotoluene	**<0.11**	ug/L	0.50	0.11	1		07/20/17 13:53	95-49-8	
4-Chlorotoluene	**<0.10**	ug/L	0.50	0.10	1		07/20/17 13:53	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.18**	ug/L	4.0	0.18	1		07/20/17 13:53	96-12-8	
Dibromochloromethane	**<0.13**	ug/L	0.50	0.13	1		07/20/17 13:53	124-48-1	
1,2-Dibromoethane (EDB)	**<0.091**	ug/L	0.50	0.091	1		07/20/17 13:53	106-93-4	
Dibromomethane	**<0.098**	ug/L	1.0	0.098	1		07/20/17 13:53	74-95-3	
1,2-Dichlorobenzene	**<0.10**	ug/L	0.50	0.10	1		07/20/17 13:53	95-50-1	
1,3-Dichlorobenzene	**<0.082**	ug/L	0.50	0.082	1		07/20/17 13:53	541-73-1	
1,4-Dichlorobenzene	**<0.075**	ug/L	0.50	0.075	1		07/20/17 13:53	106-46-7	
Dichlorodifluoromethane	**<0.16**	ug/L	1.0	0.16	1		07/20/17 13:53	75-71-8	
1,1-Dichloroethane	**<0.088**	ug/L	0.50	0.088	1		07/20/17 13:53	75-34-3	
1,2-Dichloroethane	**<0.092**	ug/L	0.50	0.092	1		07/20/17 13:53	107-06-2	
1,1-Dichloroethene	**<0.089**	ug/L	0.50	0.089	1		07/20/17 13:53	75-35-4	
cis-1,2-Dichloroethene	**<0.085**	ug/L	0.50	0.085	1		07/20/17 13:53	156-59-2	
trans-1,2-Dichloroethene	**<0.11**	ug/L	0.50	0.11	1		07/20/17 13:53	156-60-5	
1,2-Dichloropropane	**<0.084**	ug/L	4.0	0.084	1		07/20/17 13:53	78-87-5	
1,3-Dichloropropane	**<0.094**	ug/L	0.50	0.094	1		07/20/17 13:53	142-28-9	
2,2-Dichloropropane	**<0.097**	ug/L	1.0	0.097	1		07/20/17 13:53	594-20-7	
1,1-Dichloropropene	**<0.080**	ug/L	0.50	0.080	1		07/20/17 13:53	563-58-6	
cis-1,3-Dichloropropene	**<0.071**	ug/L	0.50	0.071	1		07/20/17 13:53	10061-01-5	
trans-1,3-Dichloropropene	**<0.055**	ug/L	0.50	0.055	1		07/20/17 13:53	10061-02-6	
Ethylbenzene	**<0.051**	ug/L	0.50	0.051	1		07/20/17 13:53	100-41-4	
Hexachloro-1,3-butadiene	**<0.11**	ug/L	1.0	0.11	1		07/20/17 13:53	87-68-3	
Isopropylbenzene (Cumene)	**<0.11**	ug/L	0.50	0.11	1		07/20/17 13:53	98-82-8	
p-Isopropyltoluene	**<0.083**	ug/L	0.50	0.083	1		07/20/17 13:53	99-87-6	
Methylene Chloride	**<0.20**	ug/L	4.0	0.20	1		07/20/17 13:53	75-09-2	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/20/17 13:53	91-20-3	
n-Propylbenzene	**<0.096**	ug/L	0.50	0.096	1		07/20/17 13:53	103-65-1	
Styrene	**<0.075**	ug/L	0.50	0.075	1		07/20/17 13:53	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.062**	ug/L	0.50	0.062	1		07/20/17 13:53	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.11**	ug/L	0.50	0.11	1		07/20/17 13:53	79-34-5	
Tetrachloroethene	**<0.12**	ug/L	0.50	0.12	1		07/20/17 13:53	127-18-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: Gravel Pit Well /071317 **Lab ID: 10395793017** Collected: 07/13/17 15:10 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
524.2 MSV	Analytical Method: EPA 524.2								
Toluene	**<0.080**	ug/L	0.50	0.080	1		07/20/17 13:53	108-88-3	
1,2,3-Trichlorobenzene	**<0.10**	ug/L	1.0	0.10	1		07/20/17 13:53	87-61-6	
1,2,4-Trichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/20/17 13:53	120-82-1	
1,1,1-Trichloroethane	**<0.10**	ug/L	0.50	0.10	1		07/20/17 13:53	71-55-6	
1,1,2-Trichloroethane	**<0.098**	ug/L	0.50	0.098	1		07/20/17 13:53	79-00-5	
Trichloroethene	**<0.044**	ug/L	0.40	0.044	1		07/20/17 13:53	79-01-6	
Trichlorofluoromethane	**<0.13**	ug/L	0.50	0.13	1		07/20/17 13:53	75-69-4	
1,2,3-Trichloropropane	**<0.073**	ug/L	4.0	0.073	1		07/20/17 13:53	96-18-4	
1,2,4-Trimethylbenzene	**<0.083**	ug/L	1.0	0.083	1		07/20/17 13:53	95-63-6	
1,3,5-Trimethylbenzene	**0.12J**	ug/L	0.50	0.078	1		07/20/17 13:53	108-67-8	
Vinyl chloride	**<0.098**	ug/L	0.20	0.098	1		07/20/17 13:53	75-01-4	
Xylene (Total)	**<0.073**	ug/L	1.5	0.073	1		07/20/17 13:53	1330-20-7	
m&p-Xylene	**<0.073**	ug/L	1.0	0.073	1		07/20/17 13:53	179601-23-1	
o-Xylene	**<0.073**	ug/L	0.50	0.073	1		07/20/17 13:53	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	98	%.	75-125		1		07/20/17 13:53	460-00-4	
Toluene-d8 (S)	104	%.	75-125		1		07/20/17 13:53	2037-26-5	
1,2-Dichloroethane-d4 (S)	94	%.	75-125		1		07/20/17 13:53	17060-07-0	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: Harris Stock Well /071317 **Lab ID: 10395793018** Collected: 07/13/17 09:05 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
524.2 MSV	Analytical Method: EPA 524.2								
Benzene	**<0.086**	ug/L	0.50	0.086	1		07/20/17 14:15	71-43-2	
Bromobenzene	**<0.081**	ug/L	0.50	0.081	1		07/20/17 14:15	108-86-1	
Bromochloromethane	**<0.16**	ug/L	1.0	0.16	1		07/20/17 14:15	74-97-5	
Bromodichloromethane	**<0.090**	ug/L	1.0	0.090	1		07/20/17 14:15	75-27-4	
Bromoform	**<0.23**	ug/L	4.0	0.23	1		07/20/17 14:15	75-25-2	
Bromomethane	**<0.20**	ug/L	4.0	0.20	1		07/20/17 14:15	74-83-9	
n-Butylbenzene	**<0.081**	ug/L	0.50	0.081	1		07/20/17 14:15	104-51-8	
sec-Butylbenzene	**<0.063**	ug/L	0.50	0.063	1		07/20/17 14:15	135-98-8	
tert-Butylbenzene	**<0.097**	ug/L	0.50	0.097	1		07/20/17 14:15	98-06-6	
Carbon tetrachloride	**<0.076**	ug/L	1.0	0.076	1		07/20/17 14:15	56-23-5	
Chlorobenzene	**<0.068**	ug/L	0.50	0.068	1		07/20/17 14:15	108-90-7	
Chloroethane	**<0.18**	ug/L	1.0	0.18	1		07/20/17 14:15	75-00-3	
Chloroform	**<0.10**	ug/L	1.0	0.10	1		07/20/17 14:15	67-66-3	
Chloromethane	**<0.21**	ug/L	4.0	0.21	1		07/20/17 14:15	74-87-3	
2-Chlorotoluene	**<0.11**	ug/L	0.50	0.11	1		07/20/17 14:15	95-49-8	
4-Chlorotoluene	**<0.10**	ug/L	0.50	0.10	1		07/20/17 14:15	106-43-4	
1,2-Dibromo-3-chloropropane	**<0.18**	ug/L	4.0	0.18	1		07/20/17 14:15	96-12-8	
Dibromochloromethane	**<0.13**	ug/L	0.50	0.13	1		07/20/17 14:15	124-48-1	
1,2-Dibromoethane (EDB)	**<0.091**	ug/L	0.50	0.091	1		07/20/17 14:15	106-93-4	
Dibromomethane	**<0.098**	ug/L	1.0	0.098	1		07/20/17 14:15	74-95-3	
1,2-Dichlorobenzene	**<0.10**	ug/L	0.50	0.10	1		07/20/17 14:15	95-50-1	
1,3-Dichlorobenzene	**<0.082**	ug/L	0.50	0.082	1		07/20/17 14:15	541-73-1	
1,4-Dichlorobenzene	**<0.075**	ug/L	0.50	0.075	1		07/20/17 14:15	106-46-7	
Dichlorodifluoromethane	**<0.16**	ug/L	1.0	0.16	1		07/20/17 14:15	75-71-8	
1,1-Dichloroethane	**<0.088**	ug/L	0.50	0.088	1		07/20/17 14:15	75-34-3	
1,2-Dichloroethane	**<0.092**	ug/L	0.50	0.092	1		07/20/17 14:15	107-06-2	
1,1-Dichloroethene	**<0.089**	ug/L	0.50	0.089	1		07/20/17 14:15	75-35-4	
cis-1,2-Dichloroethene	**<0.085**	ug/L	0.50	0.085	1		07/20/17 14:15	156-59-2	
trans-1,2-Dichloroethene	**<0.11**	ug/L	0.50	0.11	1		07/20/17 14:15	156-60-5	
1,2-Dichloropropane	**<0.084**	ug/L	4.0	0.084	1		07/20/17 14:15	78-87-5	
1,3-Dichloropropane	**<0.094**	ug/L	0.50	0.094	1		07/20/17 14:15	142-28-9	
2,2-Dichloropropane	**<0.097**	ug/L	1.0	0.097	1		07/20/17 14:15	594-20-7	
1,1-Dichloropropene	**<0.080**	ug/L	0.50	0.080	1		07/20/17 14:15	563-58-6	
cis-1,3-Dichloropropene	**<0.071**	ug/L	0.50	0.071	1		07/20/17 14:15	10061-01-5	
trans-1,3-Dichloropropene	**<0.055**	ug/L	0.50	0.055	1		07/20/17 14:15	10061-02-6	
Ethylbenzene	**<0.051**	ug/L	0.50	0.051	1		07/20/17 14:15	100-41-4	
Hexachloro-1,3-butadiene	**<0.11**	ug/L	1.0	0.11	1		07/20/17 14:15	87-68-3	
Isopropylbenzene (Cumene)	**<0.11**	ug/L	0.50	0.11	1		07/20/17 14:15	98-82-8	
p-Isopropyltoluene	**<0.083**	ug/L	0.50	0.083	1		07/20/17 14:15	99-87-6	
Methylene Chloride	**<0.20**	ug/L	4.0	0.20	1		07/20/17 14:15	75-09-2	
Naphthalene	**<0.064**	ug/L	4.0	0.064	1		07/20/17 14:15	91-20-3	
n-Propylbenzene	**<0.096**	ug/L	0.50	0.096	1		07/20/17 14:15	103-65-1	
Styrene	**<0.075**	ug/L	0.50	0.075	1		07/20/17 14:15	100-42-5	
1,1,1,2-Tetrachloroethane	**<0.062**	ug/L	0.50	0.062	1		07/20/17 14:15	630-20-6	
1,1,2,2-Tetrachloroethane	**<0.11**	ug/L	0.50	0.11	1		07/20/17 14:15	79-34-5	
Tetrachloroethene	**0.22J**	ug/L	0.50	0.12	1		07/20/17 14:15	127-18-4	

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ANALYTICAL RESULTS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Sample: Harris Stock Well /071317 **Lab ID: 10395793018** Collected: 07/13/17 09:05 Received: 07/14/17 09:30 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
524.2 MSV	Analytical Method: EPA 524.2								
Toluene	**<0.080**	ug/L	0.50	0.080	1		07/20/17 14:15	108-88-3	
1,2,3-Trichlorobenzene	**<0.10**	ug/L	1.0	0.10	1		07/20/17 14:15	87-61-6	
1,2,4-Trichlorobenzene	**<0.12**	ug/L	1.0	0.12	1		07/20/17 14:15	120-82-1	
1,1,1-Trichloroethane	**<0.10**	ug/L	0.50	0.10	1		07/20/17 14:15	71-55-6	
1,1,2-Trichloroethane	**<0.098**	ug/L	0.50	0.098	1		07/20/17 14:15	79-00-5	
Trichloroethene	**0.36J**	ug/L	0.40	0.044	1		07/20/17 14:15	79-01-6	
Trichlorofluoromethane	**<0.13**	ug/L	0.50	0.13	1		07/20/17 14:15	75-69-4	
1,2,3-Trichloropropane	**<0.073**	ug/L	4.0	0.073	1		07/20/17 14:15	96-18-4	
1,2,4-Trimethylbenzene	**<0.083**	ug/L	1.0	0.083	1		07/20/17 14:15	95-63-6	
1,3,5-Trimethylbenzene	**<0.078**	ug/L	0.50	0.078	1		07/20/17 14:15	108-67-8	
Vinyl chloride	**<0.098**	ug/L	0.20	0.098	1		07/20/17 14:15	75-01-4	
Xylene (Total)	**<0.073**	ug/L	1.5	0.073	1		07/20/17 14:15	1330-20-7	
m&p-Xylene	**<0.073**	ug/L	1.0	0.073	1		07/20/17 14:15	179601-23-1	
o-Xylene	**<0.073**	ug/L	0.50	0.073	1		07/20/17 14:15	95-47-6	
Surrogates									
4-Bromofluorobenzene (S)	96	%.	75-125		1		07/20/17 14:15	460-00-4	
Toluene-d8 (S)	104	%.	75-125		1		07/20/17 14:15	2037-26-5	
1,2-Dichloroethane-d4 (S)	93	%.	75-125		1		07/20/17 14:15	17060-07-0	

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

QC Batch: 486277 | Analysis Method: EPA 524.2
QC Batch Method: EPA 524.2 | Analysis Description: 524.2 MSV
Associated Lab Samples: 10395793017, 10395793018

METHOD BLANK: 2647215 | Matrix: Water
Associated Lab Samples: 10395793017, 10395793018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.062	0.50	0.062	07/20/17 12:04	
1,1,1-Trichloroethane	ug/L	<0.10	0.50	0.10	07/20/17 12:04	
1,1,2,2-Tetrachloroethane	ug/L	<0.11	0.50	0.11	07/20/17 12:04	
1,1,2-Trichloroethane	ug/L	<0.098	0.50	0.098	07/20/17 12:04	
1,1-Dichloroethane	ug/L	<0.088	0.50	0.088	07/20/17 12:04	
1,1-Dichloroethene	ug/L	<0.089	0.50	0.089	07/20/17 12:04	
1,1-Dichloropropene	ug/L	<0.080	0.50	0.080	07/20/17 12:04	
1,2,3-Trichlorobenzene	ug/L	<0.10	1.0	0.10	07/20/17 12:04	MN
1,2,3-Trichloropropane	ug/L	<0.073	4.0	0.073	07/20/17 12:04	
1,2,4-Trichlorobenzene	ug/L	<0.12	1.0	0.12	07/20/17 12:04	MN
1,2,4-Trimethylbenzene	ug/L	<0.083	1.0	0.083	07/20/17 12:04	MN
1,2-Dibromo-3-chloropropane	ug/L	<0.18	4.0	0.18	07/20/17 12:04	
1,2-Dibromoethane (EDB)	ug/L	<0.091	0.50	0.091	07/20/17 12:04	
1,2-Dichlorobenzene	ug/L	<0.10	0.50	0.10	07/20/17 12:04	
1,2-Dichloroethane	ug/L	<0.092	0.50	0.092	07/20/17 12:04	
1,2-Dichloropropane	ug/L	<0.084	4.0	0.084	07/20/17 12:04	
1,3,5-Trimethylbenzene	ug/L	<0.078	0.50	0.078	07/20/17 12:04	
1,3-Dichlorobenzene	ug/L	<0.082	0.50	0.082	07/20/17 12:04	
1,3-Dichloropropane	ug/L	<0.094	0.50	0.094	07/20/17 12:04	
1,4-Dichlorobenzene	ug/L	<0.075	0.50	0.075	07/20/17 12:04	
2,2-Dichloropropane	ug/L	<0.097	1.0	0.097	07/20/17 12:04	
2-Chlorotoluene	ug/L	<0.11	0.50	0.11	07/20/17 12:04	
4-Chlorotoluene	ug/L	<0.10	0.50	0.10	07/20/17 12:04	
Benzene	ug/L	<0.086	0.50	0.086	07/20/17 12:04	
Bromobenzene	ug/L	<0.081	0.50	0.081	07/20/17 12:04	
Bromochloromethane	ug/L	<0.16	1.0	0.16	07/20/17 12:04	
Bromodichloromethane	ug/L	<0.090	1.0	0.090	07/20/17 12:04	
Bromoform	ug/L	<0.23	4.0	0.23	07/20/17 12:04	
Bromomethane	ug/L	<0.20	4.0	0.20	07/20/17 12:04	
Carbon tetrachloride	ug/L	<0.076	1.0	0.076	07/20/17 12:04	
Chlorobenzene	ug/L	<0.068	0.50	0.068	07/20/17 12:04	
Chloroethane	ug/L	<0.18	1.0	0.18	07/20/17 12:04	
Chloroform	ug/L	<0.10	1.0	0.10	07/20/17 12:04	
Chloromethane	ug/L	<0.21	4.0	0.21	07/20/17 12:04	
cis-1,2-Dichloroethene	ug/L	<0.085	0.50	0.085	07/20/17 12:04	
cis-1,3-Dichloropropene	ug/L	<0.071	0.50	0.071	07/20/17 12:04	
Dibromochloromethane	ug/L	<0.13	0.50	0.13	07/20/17 12:04	
Dibromomethane	ug/L	<0.098	1.0	0.098	07/20/17 12:04	
Dichlorodifluoromethane	ug/L	<0.16	1.0	0.16	07/20/17 12:04	
Ethylbenzene	ug/L	<0.051	0.50	0.051	07/20/17 12:04	
Hexachloro-1,3-butadiene	ug/L	<0.11	1.0	0.11	07/20/17 12:04	

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

METHOD BLANK: 2647215 Matrix: Water
Associated Lab Samples: 10395793017, 10395793018

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Isopropylbenzene (Cumene)	ug/L	<0.11	0.50	0.11	07/20/17 12:04	
m&p-Xylene	ug/L	<0.073	1.0	0.073	07/20/17 12:04	
Methylene Chloride	ug/L	<0.20	4.0	0.20	07/20/17 12:04	
n-Butylbenzene	ug/L	<0.081	0.50	0.081	07/20/17 12:04	
n-Propylbenzene	ug/L	<0.096	0.50	0.096	07/20/17 12:04	
Naphthalene	ug/L	1.4J	4.0	0.064	07/20/17 12:04	MN
o-Xylene	ug/L	<0.073	0.50	0.073	07/20/17 12:04	
p-Isopropyltoluene	ug/L	<0.083	0.50	0.083	07/20/17 12:04	
sec-Butylbenzene	ug/L	<0.063	0.50	0.063	07/20/17 12:04	
Styrene	ug/L	<0.075	0.50	0.075	07/20/17 12:04	
tert-Butylbenzene	ug/L	<0.097	0.50	0.097	07/20/17 12:04	
Tetrachloroethene	ug/L	<0.12	0.50	0.12	07/20/17 12:04	
Toluene	ug/L	<0.080	0.50	0.080	07/20/17 12:04	
trans-1,2-Dichloroethene	ug/L	<0.11	0.50	0.11	07/20/17 12:04	
trans-1,3-Dichloropropene	ug/L	<0.055	0.50	0.055	07/20/17 12:04	
Trichloroethene	ug/L	<0.044	0.40	0.044	07/20/17 12:04	
Trichlorofluoromethane	ug/L	<0.13	0.50	0.13	07/20/17 12:04	
Vinyl chloride	ug/L	<0.098	0.20	0.098	07/20/17 12:04	
Xylene (Total)	ug/L	<0.073	1.5	0.073	07/20/17 12:04	
1,2-Dichloroethane-d4 (S)	%.	95	75-125		07/20/17 12:04	
4-Bromofluorobenzene (S)	%.	102	75-125		07/20/17 12:04	
Toluene-d8 (S)	%.	104	75-125		07/20/17 12:04	

LABORATORY CONTROL SAMPLE & LCSD: 2647216 2647217

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	21.1	18.4	105	92	70-130	14	20	
1,1,1-Trichloroethane	ug/L	20	18.5	16.1	92	80	70-130	14	20	
1,1,2,2-Tetrachloroethane	ug/L	20	23.3	20.7	117	104	70-130	12	20	
1,1,2-Trichloroethane	ug/L	20	21.0	19.2	105	96	70-130	9	20	
1,1-Dichloroethane	ug/L	20	19.2	17.0	96	85	70-130	12	20	
1,1-Dichloroethene	ug/L	20	18.2	16.3	91	81	70-130	11	20	
1,1-Dichloropropene	ug/L	20	19.2	16.9	96	84	70-130	13	20	
1,2,3-Trichlorobenzene	ug/L	20	20.4	19.0	102	95	70-130	7	20	
1,2,3-Trichloropropane	ug/L	20	22.6	20.3	113	102	70-130	11	20	
1,2,4-Trichlorobenzene	ug/L	20	20.1	18.9	101	95	70-130	6	20	
1,2,4-Trimethylbenzene	ug/L	20	19.8	17.2	99	86	70-130	14	20	
1,2-Dibromo-3-chloropropane	ug/L	50	53.8	48.9	108	98	70-130	10	20	
1,2-Dibromoethane (EDB)	ug/L	20	20.7	18.4	103	92	70-130	12	20	
1,2-Dichlorobenzene	ug/L	20	20.8	18.1	104	91	70-130	14	20	
1,2-Dichloroethane	ug/L	20	18.2	15.3	91	76	70-130	17	20	
1,2-Dichloropropane	ug/L	20	19.5	17.1	98	86	70-130	13	20	
1,3,5-Trimethylbenzene	ug/L	20	21.4	18.7	107	93	70-130	14	20	
1,3-Dichlorobenzene	ug/L	20	20.4	17.3	102	87	70-130	16	20	

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

LABORATORY CONTROL SAMPLE & LCSD: 2647216 2647217

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,3-Dichloropropane	ug/L	20	22.3	19.6	112	98	70-130	13	20	
1,4-Dichlorobenzene	ug/L	20	20.3	17.3	102	86	70-130	16	20	
2,2-Dichloropropane	ug/L	20	18.4	16.0	92	80	70-130	14	20	
2-Chlorotoluene	ug/L	20	19.9	17.4	99	87	70-130	13	20	
4-Chlorotoluene	ug/L	20	21.4	18.5	107	92	70-130	15	20	
Benzene	ug/L	20	17.7	15.8	89	79	70-130	12	20	
Bromobenzene	ug/L	20	20.9	18.1	105	91	70-130	14	20	
Bromochloromethane	ug/L	20	20.1	17.3	100	87	70-130	15	20	
Bromodichloromethane	ug/L	20	18.7	16.4	93	82	70-130	13	20	
Bromoform	ug/L	20	22.0	19.7	110	99	70-130	11	20	
Bromomethane	ug/L	20	23.7	21.9	119	109	70-130	8	20	
Carbon tetrachloride	ug/L	20	18.3	15.7	91	78	70-130	15	20	
Chlorobenzene	ug/L	20	19.0	16.4	95	82	70-130	15	20	
Chloroethane	ug/L	20	20.2	17.8	101	89	70-130	12	20	
Chloroform	ug/L	20	17.7	15.7	89	78	70-130	12	20	
Chloromethane	ug/L	20	21.1	18.6	105	93	70-130	12	20	
cis-1,2-Dichloroethene	ug/L	20	20.1	17.8	100	89	70-130	12	20	
cis-1,3-Dichloropropene	ug/L	20	20.9	18.3	105	91	70-130	13	20	
Dibromochloromethane	ug/L	20	21.4	19.1	107	95	70-130	12	20	
Dibromomethane	ug/L	20	19.0	17.1	95	86	70-130	11	20	
Dichlorodifluoromethane	ug/L	20	18.8	16.6	94	83	70-130	13	20	
Ethylbenzene	ug/L	20	19.2	17.1	96	86	70-130	12	20	
Hexachloro-1,3-butadiene	ug/L	20	22.4	20.6	112	103	70-130	8	20	
Isopropylbenzene (Cumene)	ug/L	20	21.0	18.7	105	93	70-130	12	20	
m&p-Xylene	ug/L	40	42.1	37.6	105	94	70-130	11	20	
Methylene Chloride	ug/L	20	19.2	17.0	96	85	70-130	12	20	
n-Butylbenzene	ug/L	20	21.7	20.0	108	100	70-130	8	20	
n-Propylbenzene	ug/L	20	20.3	17.8	101	89	70-130	13	20	
Naphthalene	ug/L	20	21.0	19.0	105	95	70-130	10	20	
o-Xylene	ug/L	20	21.6	18.5	108	93	70-130	15	20	
p-Isopropyltoluene	ug/L	20	22.6	20.6	113	103	70-130	9	20	
sec-Butylbenzene	ug/L	20	21.7	19.7	108	98	70-130	10	20	
Styrene	ug/L	20	21.3	17.9	107	90	70-130	17	20	
tert-Butylbenzene	ug/L	20	21.2	19.2	106	96	70-130	10	20	
Tetrachloroethene	ug/L	20	18.7	16.5	93	83	70-130	12	20	
Toluene	ug/L	20	18.9	17.3	94	87	70-130	9	20	
trans-1,2-Dichloroethene	ug/L	20	17.6	15.7	88	78	70-130	12	20	
trans-1,3-Dichloropropene	ug/L	20	22.0	19.3	110	97	70-130	13	20	
Trichloroethene	ug/L	20	18.9	16.8	95	84	70-130	12	20	
Trichlorofluoromethane	ug/L	20	19.2	16.8	96	84	70-130	13	20	
Vinyl chloride	ug/L	20	18.9	16.7	94	83	70-130	12	20	
Xylene (Total)	ug/L	60	63.7	56.1	106	94	70-130	13	20	
1,2-Dichloroethane-d4 (S)	%.				99	97	75-125			
4-Bromofluorobenzene (S)	%.				102	102	75-125			
Toluene-d8 (S)	%.				104	105	75-125			

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

MATRIX SPIKE SAMPLE: 2647218

Parameter	Units	10395793017 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.062	20	19.3	97	70-130	
1,1,1-Trichloroethane	ug/L	<0.10	20	17.5	88	70-130	
1,1,2,2-Tetrachloroethane	ug/L	<0.11	20	20.9	104	70-130	
1,1,2-Trichloroethane	ug/L	<0.098	20	18.9	95	70-130	
1,1-Dichloroethane	ug/L	<0.088	20	17.8	89	70-130	
1,1-Dichloroethene	ug/L	<0.089	20	18.8	94	70-130	
1,1-Dichloropropene	ug/L	<0.080	20	19.1	95	70-130	
1,2,3-Trichlorobenzene	ug/L	<0.10	20	19.8	99	70-130	
1,2,3-Trichloropropane	ug/L	<0.073	20	19.9	100	70-130	
1,2,4-Trichlorobenzene	ug/L	<0.12	20	19.5	98	70-130	
1,2,4-Trimethylbenzene	ug/L	<0.083	20	18.7	94	70-130	
1,2-Dibromo-3-chloropropane	ug/L	<0.18	50	48.4	97	70-130	
1,2-Dibromoethane (EDB)	ug/L	<0.091	20	18.7	94	70-130	
1,2-Dichlorobenzene	ug/L	<0.10	20	18.8	94	70-130	
1,2-Dichloroethane	ug/L	<0.092	20	15.6	78	70-130	
1,2-Dichloropropane	ug/L	<0.084	20	17.5	88	70-130	
1,3,5-Trimethylbenzene	ug/L	0.12J	20	20.6	102	70-130	
1,3-Dichlorobenzene	ug/L	<0.082	20	19.0	95	70-130	
1,3-Dichloropropane	ug/L	<0.094	20	19.5	98	70-130	
1,4-Dichlorobenzene	ug/L	<0.075	20	18.4	92	70-130	
2,2-Dichloropropane	ug/L	<0.097	20	17.1	85	70-130	
2-Chlorotoluene	ug/L	<0.11	20	18.8	94	70-130	
4-Chlorotoluene	ug/L	<0.10	20	19.8	99	70-130	
Benzene	ug/L	<0.086	20	16.9	85	70-130	
Bromobenzene	ug/L	<0.081	20	19.3	96	70-130	
Bromochloromethane	ug/L	<0.16	20	17.7	89	70-130	
Bromodichloromethane	ug/L	<0.090	20	16.6	83	70-130	
Bromoform	ug/L	<0.23	20	19.4	97	70-130	
Bromomethane	ug/L	<0.20	20	22.5	112	70-130	
Carbon tetrachloride	ug/L	<0.076	20	17.9	90	70-130	
Chlorobenzene	ug/L	<0.068	20	17.3	87	70-130	
Chloroethane	ug/L	<0.18	20	17.6	88	70-130	
Chloroform	ug/L	<0.10	20	16.0	80	70-130	
Chloromethane	ug/L	<0.21	20	18.7	94	70-130	
cis-1,2-Dichloroethene	ug/L	<0.085	20	18.4	92	70-130	
cis-1,3-Dichloropropene	ug/L	<0.071	20	17.8	89	70-130	
Dibromochloromethane	ug/L	<0.13	20	18.5	92	70-130	
Dibromomethane	ug/L	<0.098	20	17.3	86	70-130	
Dichlorodifluoromethane	ug/L	<0.16	20	18.6	93	70-130	
Ethylbenzene	ug/L	<0.051	20	18.9	94	70-130	
Hexachloro-1,3-butadiene	ug/L	<0.11	20	22.5	113	70-130	
Isopropylbenzene (Cumene)	ug/L	<0.11	20	20.3	102	70-130	
m&p-Xylene	ug/L	<0.073	40	41.2	103	70-130	
Methylene Chloride	ug/L	<0.20	20	17.1	85	70-130	
n-Butylbenzene	ug/L	<0.081	20	21.5	107	70-130	
n-Propylbenzene	ug/L	<0.096	20	19.7	98	70-130	
Naphthalene	ug/L	<0.064	20	20.1	101	70-130	

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

MATRIX SPIKE SAMPLE: 2647218

Parameter	Units	10395793017 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
o-Xylene	ug/L	<0.073	20	20.7	104	70-130	
p-Isopropyltoluene	ug/L	<0.083	20	22.1	111	70-130	
sec-Butylbenzene	ug/L	<0.063	20	21.5	108	70-130	
Styrene	ug/L	<0.075	20	19.2	96	70-130	
tert-Butylbenzene	ug/L	<0.097	20	20.9	104	70-130	
Tetrachloroethene	ug/L	<0.12	20	19.7	98	70-130	
Toluene	ug/L	<0.080	20	18.8	94	70-130	
trans-1,2-Dichloroethene	ug/L	<0.11	20	17.6	88	70-130	
trans-1,3-Dichloropropene	ug/L	<0.055	20	19.4	97	70-130	
Trichloroethene	ug/L	<0.044	20	18.3	92	70-130	
Trichlorofluoromethane	ug/L	<0.13	20	18.3	91	70-130	
Vinyl chloride	ug/L	<0.098	20	17.2	86	70-130	
Xylene (Total)	ug/L	<0.073	60	61.9	103	70-130	
1,2-Dichloroethane-d4 (S)	%.				98	75-125	
4-Bromofluorobenzene (S)	%.				102	75-125	
Toluene-d8 (S)	%.				106	75-125	

SAMPLE DUPLICATE: 2647248

Parameter	Units	10395793018 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.062	<0.062		20	
1,1,1-Trichloroethane	ug/L	<0.10	<0.10		20	
1,1,2,2-Tetrachloroethane	ug/L	<0.11	<0.11		20	
1,1,2-Trichloroethane	ug/L	<0.098	<0.098		20	
1,1-Dichloroethane	ug/L	<0.088	<0.088		20	
1,1-Dichloroethene	ug/L	<0.089	<0.089		20	
1,1-Dichloropropene	ug/L	<0.080	<0.080		20	
1,2,3-Trichlorobenzene	ug/L	<0.10	<0.10		20	
1,2,3-Trichloropropane	ug/L	<0.073	<0.073		20	
1,2,4-Trichlorobenzene	ug/L	<0.12	<0.12		20	
1,2,4-Trimethylbenzene	ug/L	<0.083	<0.083		20	
1,2-Dibromo-3-chloropropane	ug/L	<0.18	<0.18		20	
1,2-Dibromoethane (EDB)	ug/L	<0.091	<0.091		20	
1,2-Dichlorobenzene	ug/L	<0.10	<0.10		20	
1,2-Dichloroethane	ug/L	<0.092	<0.092		20	
1,2-Dichloropropane	ug/L	<0.084	<0.084		20	
1,3,5-Trimethylbenzene	ug/L	<0.078	<0.078		20	
1,3-Dichlorobenzene	ug/L	<0.082	<0.082		20	
1,3-Dichloropropane	ug/L	<0.094	<0.094		20	
1,4-Dichlorobenzene	ug/L	<0.075	<0.075		20	
2,2-Dichloropropane	ug/L	<0.097	<0.097		20	
2-Chlorotoluene	ug/L	<0.11	<0.11		20	
4-Chlorotoluene	ug/L	<0.10	<0.10		20	
Benzene	ug/L	<0.086	<0.086		20	
Bromobenzene	ug/L	<0.081	<0.081		20	

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

SAMPLE DUPLICATE: 2647248

Parameter	Units	10395793018 Result	Dup Result	RPD	Max RPD	Qualifiers
Bromochloromethane	ug/L	<0.16	<0.16		20	
Bromodichloromethane	ug/L	<0.090	<0.090		20	
Bromoform	ug/L	<0.23	<0.23		20	
Bromomethane	ug/L	<0.20	<0.20		20	
Carbon tetrachloride	ug/L	<0.076	<0.076		20	
Chlorobenzene	ug/L	<0.068	<0.068		20	
Chloroethane	ug/L	<0.18	<0.18		20	
Chloroform	ug/L	<0.10	<0.10		20	
Chloromethane	ug/L	<0.21	<0.21		20	
cis-1,2-Dichloroethene	ug/L	<0.085	<0.085		20	
cis-1,3-Dichloropropene	ug/L	<0.071	<0.071		20	
Dibromochloromethane	ug/L	<0.13	<0.13		20	
Dibromomethane	ug/L	<0.098	<0.098		20	
Dichlorodifluoromethane	ug/L	<0.16	<0.16		20	
Ethylbenzene	ug/L	<0.051	<0.051		20	
Hexachloro-1,3-butadiene	ug/L	<0.11	<0.11		20	
Isopropylbenzene (Cumene)	ug/L	<0.11	<0.11		20	
m&p-Xylene	ug/L	<0.073	<0.073		20	
Methylene Chloride	ug/L	<0.20	<0.20		20	
n-Butylbenzene	ug/L	<0.081	<0.081		20	
n-Propylbenzene	ug/L	<0.096	<0.096		20	
Naphthalene	ug/L	<0.064	<0.064		20	
o-Xylene	ug/L	<0.073	<0.073		20	
p-Isopropyltoluene	ug/L	<0.083	<0.083		20	
sec-Butylbenzene	ug/L	<0.063	<0.063		20	
Styrene	ug/L	<0.075	<0.075		20	
tert-Butylbenzene	ug/L	<0.097	<0.097		20	
Tetrachloroethene	ug/L	0.22J	0.24J		20	
Toluene	ug/L	<0.080	<0.080		20	
trans-1,2-Dichloroethene	ug/L	<0.11	<0.11		20	
trans-1,3-Dichloropropene	ug/L	<0.055	<0.055		20	
Trichloroethene	ug/L	0.36J	0.32J		20	
Trichlorofluoromethane	ug/L	<0.13	<0.13		20	
Vinyl chloride	ug/L	<0.098	<0.098		20	
Xylene (Total)	ug/L	<0.073	<0.073		20	
1,2-Dichloroethane-d4 (S)	%.	93	92	1		
4-Bromofluorobenzene (S)	%.	96	96	0		
Toluene-d8 (S)	%.	104	106	1		

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

QC Batch: 486905 Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B Analysis Description: 8260B MSV 465 W
Associated Lab Samples: 10395793001, 10395793002, 10395793003, 10395793004, 10395793005, 10395793006, 10395793007, 10395793008, 10395793009, 10395793010, 10395793011, 10395793012, 10395793013, 10395793014, 10395793015

METHOD BLANK: 2650363 Matrix: Water
Associated Lab Samples: 10395793001, 10395793002, 10395793003, 10395793004, 10395793005, 10395793006, 10395793007, 10395793008, 10395793009, 10395793010, 10395793011, 10395793012, 10395793013, 10395793014, 10395793015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.17	1.0	0.17	07/24/17 16:01	
1,1,1-Trichloroethane	ug/L	<0.17	1.0	0.17	07/24/17 16:01	
1,1,2,2-Tetrachloroethane	ug/L	<0.22	1.0	0.22	07/24/17 16:01	
1,1,2-Trichloroethane	ug/L	<0.15	1.0	0.15	07/24/17 16:01	
1,1,2-Trichlorotrifluoroethane	ug/L	<0.32	1.0	0.32	07/24/17 16:01	
1,1-Dichloroethane	ug/L	<0.17	1.0	0.17	07/24/17 16:01	
1,1-Dichloroethene	ug/L	<0.28	1.0	0.28	07/24/17 16:01	
1,1-Dichloropropene	ug/L	<0.23	1.0	0.23	07/24/17 16:01	
1,2,3-Trichlorobenzene	ug/L	<0.21	1.0	0.21	07/24/17 16:01	
1,2,3-Trichloropropane	ug/L	<0.28	4.0	0.28	07/24/17 16:01	
1,2,4-Trichlorobenzene	ug/L	<0.21	1.0	0.21	07/24/17 16:01	
1,2,4-Trimethylbenzene	ug/L	<0.18	1.0	0.18	07/24/17 16:01	
1,2-Dibromo-3-chloropropane	ug/L	<0.60	4.0	0.60	07/24/17 16:01	
1,2-Dibromoethane (EDB)	ug/L	<0.20	1.0	0.20	07/24/17 16:01	
1,2-Dichlorobenzene	ug/L	<0.17	1.0	0.17	07/24/17 16:01	
1,2-Dichloroethane	ug/L	<0.17	1.0	0.17	07/24/17 16:01	
1,2-Dichloropropane	ug/L	<0.22	4.0	0.22	07/24/17 16:01	
1,3,5-Trimethylbenzene	ug/L	<0.27	1.0	0.27	07/24/17 16:01	
1,3-Dichlorobenzene	ug/L	<0.12	1.0	0.12	07/24/17 16:01	
1,3-Dichloropropane	ug/L	<0.096	1.0	0.096	07/24/17 16:01	
1,4-Dichlorobenzene	ug/L	<0.21	1.0	0.21	07/24/17 16:01	
2,2-Dichloropropane	ug/L	<0.13	4.0	0.13	07/24/17 16:01	
2-Butanone (MEK)	ug/L	<1.1	5.0	1.1	07/24/17 16:01	
2-Chlorotoluene	ug/L	<0.30	1.0	0.30	07/24/17 16:01	
4-Chlorotoluene	ug/L	<0.26	1.0	0.26	07/24/17 16:01	
4-Methyl-2-pentanone (MIBK)	ug/L	<0.43	5.0	0.43	07/24/17 16:01	
Acetone	ug/L	3.0J	20.0	2.0	07/24/17 16:01	
Allyl chloride	ug/L	<0.25	4.0	0.25	07/24/17 16:01	
Benzene	ug/L	<0.16	1.0	0.16	07/24/17 16:01	
Bromobenzene	ug/L	<0.34	1.0	0.34	07/24/17 16:01	
Bromochloromethane	ug/L	<0.19	1.0	0.19	07/24/17 16:01	
Bromodichloromethane	ug/L	<0.24	1.0	0.24	07/24/17 16:01	
Bromoform	ug/L	<0.27	4.0	0.27	07/24/17 16:01	
Bromomethane	ug/L	<0.44	4.0	0.44	07/24/17 16:01	CL
Carbon tetrachloride	ug/L	<0.20	1.0	0.20	07/24/17 16:01	
Chlorobenzene	ug/L	<0.11	1.0	0.11	07/24/17 16:01	
Chloroethane	ug/L	<0.34	1.0	0.34	07/24/17 16:01	CL
Chloroform	ug/L	<0.21	1.0	0.21	07/24/17 16:01	

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

METHOD BLANK: 2650363 Matrix: Water

Associated Lab Samples: 10395793001, 10395793002, 10395793003, 10395793004, 10395793005, 10395793006, 10395793007, 10395793008, 10395793009, 10395793010, 10395793011, 10395793012, 10395793013, 10395793014, 10395793015

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloromethane	ug/L	<0.25	4.0	0.25	07/24/17 16:01	
cis-1,2-Dichloroethene	ug/L	<0.12	1.0	0.12	07/24/17 16:01	
cis-1,3-Dichloropropene	ug/L	<0.15	4.0	0.15	07/24/17 16:01	
Dibromochloromethane	ug/L	<0.16	1.0	0.16	07/24/17 16:01	
Dibromomethane	ug/L	<0.19	4.0	0.19	07/24/17 16:01	
Dichlorodifluoromethane	ug/L	<0.23	1.0	0.23	07/24/17 16:01	
Dichlorofluoromethane	ug/L	<0.21	1.0	0.21	07/24/17 16:01	
Diethyl ether (Ethyl ether)	ug/L	0.37J	4.0	0.19	07/24/17 16:01	
Ethylbenzene	ug/L	<0.15	1.0	0.15	07/24/17 16:01	
Hexachloro-1,3-butadiene	ug/L	<0.18	1.0	0.18	07/24/17 16:01	
Isopropylbenzene (Cumene)	ug/L	<0.25	1.0	0.25	07/24/17 16:01	
Methyl-tert-butyl ether	ug/L	<0.15	1.0	0.15	07/24/17 16:01	
Methylene Chloride	ug/L	<0.29	4.0	0.29	07/24/17 16:01	
n-Butylbenzene	ug/L	<0.16	1.0	0.16	07/24/17 16:01	
n-Propylbenzene	ug/L	<0.23	1.0	0.23	07/24/17 16:01	
Naphthalene	ug/L	<0.20	4.0	0.20	07/24/17 16:01	
p-Isopropyltoluene	ug/L	<0.19	1.0	0.19	07/24/17 16:01	
sec-Butylbenzene	ug/L	<0.19	1.0	0.19	07/24/17 16:01	
Styrene	ug/L	<0.29	1.0	0.29	07/24/17 16:01	
tert-Butylbenzene	ug/L	<0.22	1.0	0.22	07/24/17 16:01	
Tetrachloroethene	ug/L	<0.25	1.0	0.25	07/24/17 16:01	
Tetrahydrofuran	ug/L	<1.5	10.0	1.5	07/24/17 16:01	
Toluene	ug/L	<0.14	1.0	0.14	07/24/17 16:01	
trans-1,2-Dichloroethene	ug/L	<0.16	1.0	0.16	07/24/17 16:01	
trans-1,3-Dichloropropene	ug/L	<0.15	4.0	0.15	07/24/17 16:01	
Trichloroethene	ug/L	<0.052	0.40	0.052	07/24/17 16:01	
Trichlorofluoromethane	ug/L	<0.33	1.0	0.33	07/24/17 16:01	
Vinyl chloride	ug/L	<0.069	0.20	0.069	07/24/17 16:01	
Xylene (Total)	ug/L	<0.32	3.0	0.32	07/24/17 16:01	
1,2-Dichloroethane-d4 (S)	%.	96	75-137		07/24/17 16:01	
4-Bromofluorobenzene (S)	%.	102	75-125		07/24/17 16:01	
Toluene-d8 (S)	%.	97	75-125		07/24/17 16:01	

LABORATORY CONTROL SAMPLE: 2650364

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	50	54.8	110	75-125	
1,1,1-Trichloroethane	ug/L	50	49.7	99	69-125	
1,1,2,2-Tetrachloroethane	ug/L	50	45.3	91	70-125	
1,1,2-Trichloroethane	ug/L	50	51.0	102	75-125	
1,1,2-Trichlorotrifluoroethane	ug/L	50	44.4	89	70-133	
1,1-Dichloroethane	ug/L	50	48.4	97	62-130	

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

LABORATORY CONTROL SAMPLE: 2650364

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethene	ug/L	50	46.2	92	64-134	
1,1-Dichloropropene	ug/L	50	54.5	109	65-129	
1,2,3-Trichlorobenzene	ug/L	50	49.5	99	75-125	
1,2,3-Trichloropropane	ug/L	50	45.5	91	70-125	
1,2,4-Trichlorobenzene	ug/L	50	50.0	100	75-125	
1,2,4-Trimethylbenzene	ug/L	50	51.5	103	69-135	
1,2-Dibromo-3-chloropropane	ug/L	125	111	89	73-130	
1,2-Dibromoethane (EDB)	ug/L	50	48.6	97	75-125	
1,2-Dichlorobenzene	ug/L	50	49.9	100	75-125	
1,2-Dichloroethane	ug/L	50	46.8	94	64-126	
1,2-Dichloropropane	ug/L	50	45.6	91	73-125	
1,3,5-Trimethylbenzene	ug/L	50	46.9	94	71-129	
1,3-Dichlorobenzene	ug/L	50	47.5	95	75-125	
1,3-Dichloropropane	ug/L	50	48.1	96	74-125	
1,4-Dichlorobenzene	ug/L	50	47.3	95	75-125	
2,2-Dichloropropane	ug/L	50	54.1	108	59-135	
2-Butanone (MEK)	ug/L	250	197	79	57-142	
2-Chlorotoluene	ug/L	50	46.0	92	73-125	
4-Chlorotoluene	ug/L	50	48.4	97	74-128	
4-Methyl-2-pentanone (MIBK)	ug/L	250	195	78	56-142	
Acetone	ug/L	250	282	113	75-133	
Allyl chloride	ug/L	50	41.2	82	62-139	
Benzene	ug/L	50	52.1	104	74-125	
Bromobenzene	ug/L	50	46.3	93	75-125	
Bromochloromethane	ug/L	50	54.4	109	75-125	
Bromodichloromethane	ug/L	50	51.7	103	72-125	
Bromoform	ug/L	50	52.8	106	74-125	
Bromomethane	ug/L	50	16.7	33	30-150	CL
Carbon tetrachloride	ug/L	50	51.0	102	67-130	
Chlorobenzene	ug/L	50	49.5	99	75-125	
Chloroethane	ug/L	50	27.8	56	63-137	CL,L2
Chloroform	ug/L	50	49.4	99	68-128	
Chloromethane	ug/L	50	33.3	67	46-145	
cis-1,2-Dichloroethene	ug/L	50	51.9	104	75-125	
cis-1,3-Dichloropropene	ug/L	50	53.2	106	73-125	
Dibromochloromethane	ug/L	50	53.8	108	75-125	
Dibromomethane	ug/L	50	55.9	112	73-125	
Dichlorodifluoromethane	ug/L	50	42.3	85	36-150	
Dichlorofluoromethane	ug/L	50	35.9	72	75-125	L2
Diethyl ether (Ethyl ether)	ug/L	50	40.6	81	62-136	
Ethylbenzene	ug/L	50	48.0	96	73-125	
Hexachloro-1,3-butadiene	ug/L	50	49.5	99	69-141	
Isopropylbenzene (Cumene)	ug/L	50	53.7	107	75-126	
Methyl-tert-butyl ether	ug/L	50	52.8	106	70-130	
Methylene Chloride	ug/L	50	49.0	98	74-125	
n-Butylbenzene	ug/L	50	48.1	96	69-133	
n-Propylbenzene	ug/L	50	47.6	95	75-125	

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

LABORATORY CONTROL SAMPLE: 2650364

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Naphthalene	ug/L	50	49.8	100	66-129	
p-Isopropyltoluene	ug/L	50	52.1	104	73-127	
sec-Butylbenzene	ug/L	50	52.5	105	75-131	
Styrene	ug/L	50	54.8	110	75-128	
tert-Butylbenzene	ug/L	50	50.0	100	75-127	
Tetrachloroethene	ug/L	50	47.1	94	71-127	
Tetrahydrofuran	ug/L	500	594	119	75-132	
Toluene	ug/L	50	50.8	102	75-125	
trans-1,2-Dichloroethene	ug/L	50	54.6	109	69-127	
trans-1,3-Dichloropropene	ug/L	50	46.5	93	70-128	
Trichloroethene	ug/L	50	52.4	105	70-125	
Trichlorofluoromethane	ug/L	50	30.9	62	71-125	L2
Vinyl chloride	ug/L	50	43.4	87	69-133	
Xylene (Total)	ug/L	150	159	106	75-125	
1,2-Dichloroethane-d4 (S)	%.			88	75-137	
4-Bromofluorobenzene (S)	%.			101	75-125	
Toluene-d8 (S)	%.			96	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2650365 2650366

Parameter	Units	10395793012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1,2-Tetrachloroethane	ug/L	<0.17	20	20	18.3	19.5	92	98	75-138	6	30	
1,1,1-Trichloroethane	ug/L	<0.17	20	20	20.6	21.1	103	106	75-145	2	30	
1,1,2,2-Tetrachloroethane	ug/L	<0.22	20	20	17.0	18.1	85	90	73-150	6	30	
1,1,2-Trichloroethane	ug/L	<0.15	20	20	16.0	17.8	80	89	75-140	10	30	
1,1,2-Trichlorotrifluoroethane	ug/L	<0.32	20	20	20.1	21.9	101	109	74-150	9	30	
1,1-Dichloroethane	ug/L	<0.17	20	20	19.1	19.3	95	97	75-140	1	30	
1,1-Dichloroethene	ug/L	<0.28	20	20	19.4	21.3	97	106	73-150	9	30	
1,1-Dichloropropene	ug/L	<0.23	20	20	22.9	22.5	114	113	75-150	2	30	
1,2,3-Trichlorobenzene	ug/L	<0.21	20	20	17.0	18.3	85	92	57-147	7	30	
1,2,3-Trichloropropane	ug/L	<0.28	20	20	16.6	17.8	83	89	75-147	7	30	
1,2,4-Trichlorobenzene	ug/L	<0.21	20	20	17.0	18.1	85	90	59-142	6	30	
1,2,4-Trimethylbenzene	ug/L	<0.18	20	20	17.6	18.8	88	94	73-141	6	30	
1,2-Dibromo-3-chloropropane	ug/L	<0.60	50	50	41.2	40.0	82	80	65-136	3	30	
1,2-Dibromoethane (EDB)	ug/L	<0.20	20	20	14.3	15.4	72	77	75-131	7	30	M1
1,2-Dichlorobenzene	ug/L	<0.17	20	20	16.8	16.9	84	85	75-141	1	30	
1,2-Dichloroethane	ug/L	0.21J	20	20	16.7	16.4	82	81	75-125	2	30	
1,2-Dichloropropane	ug/L	<0.22	20	20	17.2	18.5	86	93	71-147	7	30	
1,3,5-Trimethylbenzene	ug/L	<0.27	20	20	16.6	18.0	83	90	75-139	8	30	
1,3-Dichlorobenzene	ug/L	<0.12	20	20	16.4	17.1	82	85	75-142	4	30	
1,3-Dichloropropane	ug/L	<0.096	20	20	16.8	16.7	84	84	75-141	0	30	
1,4-Dichlorobenzene	ug/L	<0.21	20	20	16.1	16.4	80	82	75-139	2	30	
2,2-Dichloropropane	ug/L	<0.13	20	20	21.6	22.4	108	112	60-150	3	30	

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2650365 2650366

Parameter	Units	10395793012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
2-Butanone (MEK)	ug/L	<1.1	100	100	72.2	68.0	72	68	68-133	6	30	
2-Chlorotoluene	ug/L	<0.30	20	20	16.1	17.0	80	85	75-146	5	30	
4-Chlorotoluene	ug/L	<0.26	20	20	17.2	18.1	86	90	75-149	5	30	
4-Methyl-2-pentanone (MIBK)	ug/L	<0.43	100	100	71.5	72.6	72	73	67-150	1	30	
Acetone	ug/L	<2.0	100	100	103	111	103	111	56-150	7	30	
Allyl chloride	ug/L	<0.25	20	20	16.1	17.4	80	87	66-134	8	30	
Benzene	ug/L	<0.16	20	20	18.0	19.2	90	96	74-134	6	30	
Bromobenzene	ug/L	<0.34	20	20	15.9	16.6	79	83	75-138	5	30	
Bromochloromethane	ug/L	<0.19	20	20	18.4	18.7	92	93	75-145	2	30	
Bromodichloromethane	ug/L	<0.24	20	20	17.7	18.2	88	91	75-143	3	30	
Bromoform	ug/L	<0.27	20	20	18.7	18.2	93	91	67-125	2	30	
Bromomethane	ug/L	<0.44	20	20	10.4	9.6	52	48	30-150	7	30	CL
Carbon tetrachloride	ug/L	<0.20	20	20	21.5	21.7	108	109	75-150	1	30	
Chlorobenzene	ug/L	<0.11	20	20	17.0	18.1	85	91	75-133	6	30	
Chloroethane	ug/L	<0.34	20	20	12.2	13.6	61	68	53-150	11	30	CL
Chloroform	ug/L	<0.21	20	20	18.1	18.7	90	93	75-134	3	30	
Chloromethane	ug/L	<0.25	20	20	17.1	12.1	86	61	41-150	34	30	R1
cis-1,2-Dichloroethene	ug/L	<0.12	20	20	19.5	19.5	98	97	73-140	0	30	
cis-1,3-Dichloropropene	ug/L	<0.15	20	20	18.1	19.0	90	95	72-140	5	30	
Dibromochloromethane	ug/L	<0.16	20	20	17.2	17.6	86	88	74-130	2	30	
Dibromomethane	ug/L	<0.19	20	20	18.7	19.3	93	96	70-141	3	30	
Dichlorodifluoromethane	ug/L	<0.23	20	20	22.0	22.3	110	112	50-150	1	30	
Dichlorofluoromethane	ug/L	<0.21	20	20	13.9	15.2	69	76	62-150	9	30	
Diethyl ether (Ethyl ether)	ug/L	<0.19	20	20	14.3	15.3	71	77	71-141	7	30	
Ethylbenzene	ug/L	<0.15	20	20	18.0	18.9	90	94	75-136	5	30	
Hexachloro-1,3-butadiene	ug/L	<0.18	20	20	20.1	20.1	101	100	47-150	0	30	
Isopropylbenzene (Cumene)	ug/L	<0.25	20	20	19.4	20.6	97	103	75-138	6	30	
Methyl-tert-butyl ether	ug/L	<0.15	20	20	18.8	19.6	94	98	75-128	5	30	
Methylene Chloride	ug/L	<0.29	20	20	17.4	17.6	87	88	69-150	1	30	
n-Butylbenzene	ug/L	<0.16	20	20	17.7	19.1	89	96	68-150	8	30	
n-Propylbenzene	ug/L	<0.23	20	20	17.8	19.1	89	96	74-150	7	30	
Naphthalene	ug/L	<0.20	20	20	17.8	18.3	89	92	61-138	3	30	
p-Isopropyltoluene	ug/L	<0.19	20	20	19.3	21.0	97	105	70-142	8	30	
sec-Butylbenzene	ug/L	<0.19	20	20	19.2	20.4	96	102	74-150	6	30	
Styrene	ug/L	<0.29	20	20	18.1	19.0	91	95	70-140	5	30	
tert-Butylbenzene	ug/L	<0.22	20	20	17.8	19.3	89	96	73-140	8	30	
Tetrachloroethene	ug/L	0.83J	20	20	18.2	18.7	87	90	72-141	3	30	
Tetrahydrofuran	ug/L	<1.5	200	200	292	313	146	156	53-150	7	30	M1
Toluene	ug/L	<0.14	20	20	17.7	19.2	88	96	71-138	8	30	
trans-1,2-Dichloroethene	ug/L	<0.16	20	20	20.0	20.6	100	103	74-149	3	30	
trans-1,3-Dichloropropene	ug/L	<0.15	20	20	15.5	15.5	78	77	74-138	0	30	
Trichloroethene	ug/L	0.29J	20	20	20.2	20.8	100	103	70-150	3	30	
Trichlorofluoromethane	ug/L	<0.33	20	20	14.8	17.5	74	88	57-150	17	30	
Vinyl chloride	ug/L	<0.069	20	20	22.1	19.5	110	97	59-150	13	30	
Xylene (Total)	ug/L	<0.32	60	60	58.0	62.0	97	103	75-131	7	30	

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2650365 2650366

Parameter	Units	10395793012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,2-Dichloroethane-d4 (S)	%.						92	90	75-137			
4-Bromofluorobenzene (S)	%.						103	103	75-125			
Toluene-d8 (S)	%.						95	100	75-125			

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

QC Batch: 487356 | Analysis Method: EPA 8260B
QC Batch Method: EPA 8260B | Analysis Description: 8260B MSV 465 W
Associated Lab Samples: 10395793016

METHOD BLANK: 2652581 | Matrix: Water
Associated Lab Samples: 10395793016

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.17	1.0	0.17	07/26/17 13:18	
1,1,1-Trichloroethane	ug/L	<0.17	1.0	0.17	07/26/17 13:18	
1,1,2,2-Tetrachloroethane	ug/L	<0.22	1.0	0.22	07/26/17 13:18	
1,1,2-Trichloroethane	ug/L	<0.15	1.0	0.15	07/26/17 13:18	
1,1,2-Trichlorotrifluoroethane	ug/L	<0.32	1.0	0.32	07/26/17 13:18	
1,1-Dichloroethane	ug/L	<0.17	1.0	0.17	07/26/17 13:18	
1,1-Dichloroethene	ug/L	<0.28	1.0	0.28	07/26/17 13:18	
1,1-Dichloropropene	ug/L	<0.23	1.0	0.23	07/26/17 13:18	
1,2,3-Trichlorobenzene	ug/L	<0.21	1.0	0.21	07/26/17 13:18	
1,2,3-Trichloropropane	ug/L	<0.28	4.0	0.28	07/26/17 13:18	
1,2,4-Trichlorobenzene	ug/L	<0.21	1.0	0.21	07/26/17 13:18	
1,2,4-Trimethylbenzene	ug/L	<0.18	1.0	0.18	07/26/17 13:18	
1,2-Dibromo-3-chloropropane	ug/L	<0.60	4.0	0.60	07/26/17 13:18	
1,2-Dibromoethane (EDB)	ug/L	<0.20	1.0	0.20	07/26/17 13:18	
1,2-Dichlorobenzene	ug/L	<0.17	1.0	0.17	07/26/17 13:18	
1,2-Dichloroethane	ug/L	<0.17	1.0	0.17	07/26/17 13:18	
1,2-Dichloropropane	ug/L	<0.22	4.0	0.22	07/26/17 13:18	
1,3,5-Trimethylbenzene	ug/L	<0.27	1.0	0.27	07/26/17 13:18	
1,3-Dichlorobenzene	ug/L	<0.12	1.0	0.12	07/26/17 13:18	
1,3-Dichloropropane	ug/L	<0.096	1.0	0.096	07/26/17 13:18	
1,4-Dichlorobenzene	ug/L	<0.21	1.0	0.21	07/26/17 13:18	
2,2-Dichloropropane	ug/L	<0.13	4.0	0.13	07/26/17 13:18	
2-Butanone (MEK)	ug/L	<1.1	5.0	1.1	07/26/17 13:18	
2-Chlorotoluene	ug/L	<0.30	1.0	0.30	07/26/17 13:18	
4-Chlorotoluene	ug/L	<0.26	1.0	0.26	07/26/17 13:18	
4-Methyl-2-pentanone (MIBK)	ug/L	<0.43	5.0	0.43	07/26/17 13:18	
Acetone	ug/L	<2.0	80.0	2.0	07/26/17 13:18	MN
Allyl chloride	ug/L	<0.25	4.0	0.25	07/26/17 13:18	
Benzene	ug/L	<0.16	1.0	0.16	07/26/17 13:18	
Bromobenzene	ug/L	<0.34	1.0	0.34	07/26/17 13:18	
Bromochloromethane	ug/L	<0.19	1.0	0.19	07/26/17 13:18	
Bromodichloromethane	ug/L	<0.24	1.0	0.24	07/26/17 13:18	
Bromoform	ug/L	<0.27	4.0	0.27	07/26/17 13:18	
Bromomethane	ug/L	<0.44	4.0	0.44	07/26/17 13:18	
Carbon tetrachloride	ug/L	<0.20	1.0	0.20	07/26/17 13:18	
Chlorobenzene	ug/L	<0.11	1.0	0.11	07/26/17 13:18	
Chloroethane	ug/L	<0.34	1.0	0.34	07/26/17 13:18	
Chloroform	ug/L	<0.21	1.0	0.21	07/26/17 13:18	
Chloromethane	ug/L	<0.25	4.0	0.25	07/26/17 13:18	
cis-1,2-Dichloroethene	ug/L	<0.12	1.0	0.12	07/26/17 13:18	
cis-1,3-Dichloropropene	ug/L	<0.15	4.0	0.15	07/26/17 13:18	

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

METHOD BLANK: 2652581 Matrix: Water
Associated Lab Samples: 10395793016

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Dibromochloromethane	ug/L	<0.16	1.0	0.16	07/26/17 13:18	
Dibromomethane	ug/L	<0.19	4.0	0.19	07/26/17 13:18	
Dichlorodifluoromethane	ug/L	<0.23	1.0	0.23	07/26/17 13:18	
Dichlorofluoromethane	ug/L	<0.21	1.0	0.21	07/26/17 13:18	
Diethyl ether (Ethyl ether)	ug/L	<0.19	4.0	0.19	07/26/17 13:18	
Ethylbenzene	ug/L	<0.15	1.0	0.15	07/26/17 13:18	
Hexachloro-1,3-butadiene	ug/L	<0.18	1.0	0.18	07/26/17 13:18	
Isopropylbenzene (Cumene)	ug/L	<0.25	1.0	0.25	07/26/17 13:18	
Methyl-tert-butyl ether	ug/L	<0.15	1.0	0.15	07/26/17 13:18	
Methylene Chloride	ug/L	<0.29	4.0	0.29	07/26/17 13:18	
n-Butylbenzene	ug/L	<0.16	1.0	0.16	07/26/17 13:18	
n-Propylbenzene	ug/L	<0.23	1.0	0.23	07/26/17 13:18	
Naphthalene	ug/L	<0.20	4.0	0.20	07/26/17 13:18	
p-Isopropyltoluene	ug/L	<0.19	1.0	0.19	07/26/17 13:18	
sec-Butylbenzene	ug/L	<0.19	1.0	0.19	07/26/17 13:18	
Styrene	ug/L	<0.29	1.0	0.29	07/26/17 13:18	
tert-Butylbenzene	ug/L	<0.22	1.0	0.22	07/26/17 13:18	
Tetrachloroethene	ug/L	<0.25	1.0	0.25	07/26/17 13:18	
Tetrahydrofuran	ug/L	<1.5	10.0	1.5	07/26/17 13:18	
Toluene	ug/L	<0.14	1.0	0.14	07/26/17 13:18	
trans-1,2-Dichloroethene	ug/L	<0.16	1.0	0.16	07/26/17 13:18	
trans-1,3-Dichloropropene	ug/L	<0.15	4.0	0.15	07/26/17 13:18	
Trichloroethene	ug/L	<0.052	0.40	0.052	07/26/17 13:18	
Trichlorofluoromethane	ug/L	<0.33	1.0	0.33	07/26/17 13:18	
Vinyl chloride	ug/L	<0.069	0.20	0.069	07/26/17 13:18	
Xylene (Total)	ug/L	<0.32	3.0	0.32	07/26/17 13:18	
1,2-Dichloroethane-d4 (S)	%.	102	75-137		07/26/17 13:18	
4-Bromofluorobenzene (S)	%.	100	75-125		07/26/17 13:18	
Toluene-d8 (S)	%.	106	75-125		07/26/17 13:18	

LABORATORY CONTROL SAMPLE: 2652582

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	19.6	98	75-125	
1,1,1-Trichloroethane	ug/L	20	18.3	92	69-125	
1,1,2,2-Tetrachloroethane	ug/L	20	22.3	111	70-125	
1,1,2-Trichloroethane	ug/L	20	19.8	99	75-125	
1,1,2-Trichlorotrifluoroethane	ug/L	20	18.7	94	70-133	
1,1-Dichloroethane	ug/L	20	17.7	88	62-130	
1,1-Dichloroethene	ug/L	20	18.3	91	64-134	
1,1-Dichloropropene	ug/L	20	18.7	93	65-129	
1,2,3-Trichlorobenzene	ug/L	20	21.2	106	75-125	
1,2,3-Trichloropropane	ug/L	20	22.0	110	70-125	
1,2,4-Trichlorobenzene	ug/L	20	19.8	99	75-125	

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QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

LABORATORY CONTROL SAMPLE: 2652582

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	20	20.1	101	69-135	
1,2-Dibromo-3-chloropropane	ug/L	50	50.1	100	73-130	
1,2-Dibromoethane (EDB)	ug/L	20	19.3	97	75-125	
1,2-Dichlorobenzene	ug/L	20	21.1	105	75-125	
1,2-Dichloroethane	ug/L	20	17.0	85	64-126	
1,2-Dichloropropane	ug/L	20	19.1	96	73-125	
1,3,5-Trimethylbenzene	ug/L	20	22.1	111	71-129	
1,3-Dichlorobenzene	ug/L	20	21.3	106	75-125	
1,3-Dichloropropane	ug/L	20	20.9	105	74-125	
1,4-Dichlorobenzene	ug/L	20	20.8	104	75-125	
2,2-Dichloropropane	ug/L	20	15.0	75	59-135	
2-Butanone (MEK)	ug/L	100	92.9	93	57-142	
2-Chlorotoluene	ug/L	20	20.3	101	73-125	
4-Chlorotoluene	ug/L	20	21.7	108	74-128	
4-Methyl-2-pentanone (MIBK)	ug/L	100	106	106	56-142	
Acetone	ug/L	100	107	107	75-133	
Allyl chloride	ug/L	20	17.0	85	62-139	
Benzene	ug/L	20	17.1	86	74-125	
Bromobenzene	ug/L	20	20.3	102	75-125	
Bromochloromethane	ug/L	20	18.0	90	75-125	
Bromodichloromethane	ug/L	20	18.0	90	72-125	
Bromoform	ug/L	20	19.3	96	74-125	
Bromomethane	ug/L	20	16.7	83	30-150	
Carbon tetrachloride	ug/L	20	16.2	81	67-130	
Chlorobenzene	ug/L	20	18.8	94	75-125	
Chloroethane	ug/L	20	18.4	92	63-137	
Chloroform	ug/L	20	17.1	85	68-128	
Chloromethane	ug/L	20	20.6	103	46-145	
cis-1,2-Dichloroethene	ug/L	20	18.0	90	75-125	
cis-1,3-Dichloropropene	ug/L	20	18.9	95	73-125	
Dibromochloromethane	ug/L	20	19.2	96	75-125	
Dibromomethane	ug/L	20	19.3	97	73-125	
Dichlorodifluoromethane	ug/L	20	17.5	88	36-150	
Dichlorofluoromethane	ug/L	20	17.7	89	75-125	
Diethyl ether (Ethyl ether)	ug/L	20	18.0	90	62-136	
Ethylbenzene	ug/L	20	20.0	100	73-125	
Hexachloro-1,3-butadiene	ug/L	20	22.7	114	69-141	
Isopropylbenzene (Cumene)	ug/L	20	21.9	109	75-126	
Methyl-tert-butyl ether	ug/L	20	17.6	88	70-130	
Methylene Chloride	ug/L	20	17.9	89	74-125	
n-Butylbenzene	ug/L	20	23.0	115	69-133	
n-Propylbenzene	ug/L	20	21.5	108	75-125	
Naphthalene	ug/L	20	19.9	99	66-129	
p-Isopropyltoluene	ug/L	20	23.9	119	73-127	
sec-Butylbenzene	ug/L	20	23.0	115	75-131	
Styrene	ug/L	20	20.5	102	75-128	
tert-Butylbenzene	ug/L	20	22.2	111	75-127	

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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Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

LABORATORY CONTROL SAMPLE: 2652582

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	ug/L	20	21.5	108	71-127	
Tetrahydrofuran	ug/L	200	214	107	75-132	
Toluene	ug/L	20	19.4	97	75-125	
trans-1,2-Dichloroethene	ug/L	20	17.2	86	69-127	
trans-1,3-Dichloropropene	ug/L	20	19.1	96	70-128	
Trichloroethene	ug/L	20	19.4	97	70-125	
Trichlorofluoromethane	ug/L	20	18.3	91	71-125	
Vinyl chloride	ug/L	20	17.4	87	69-133	
Xylene (Total)	ug/L	60	66.2	110	75-125	
1,2-Dichloroethane-d4 (S)	%.			96	75-137	
4-Bromofluorobenzene (S)	%.			98	75-125	
Toluene-d8 (S)	%.			104	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2652746 2652747

Parameter	Units	10396486008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1,2-Tetrachloroethane	ug/L	ND	20	20	18.3	19.4	91	97	75-138	6	30	
1,1,1-Trichloroethane	ug/L	ND	20	20	18.1	18.6	91	93	75-145	2	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	20	20	20.4	22.2	102	111	73-150	8	30	
1,1,2-Trichloroethane	ug/L	ND	20	20	18.9	20.2	95	101	75-140	7	30	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	20	20	20.2	19.7	101	99	74-150	2	30	
1,1-Dichloroethane	ug/L	ND	20	20	17.1	17.4	86	87	75-140	2	30	
1,1-Dichloroethene	ug/L	ND	20	20	18.5	19.0	92	95	73-150	3	30	
1,1-Dichloropropene	ug/L	ND	20	20	18.5	19.2	93	96	75-150	4	30	
1,2,3-Trichlorobenzene	ug/L	ND	20	20	20.5	20.8	103	104	57-147	1	30	
1,2,3-Trichloropropane	ug/L	ND	20	20	20.1	21.7	101	108	75-147	7	30	
1,2,4-Trichlorobenzene	ug/L	ND	20	20	19.3	20.1	97	101	59-142	4	30	
1,2,4-Trimethylbenzene	ug/L	ND	20	20	19.0	19.8	95	99	73-141	4	30	
1,2-Dibromo-3-chloropropane	ug/L	ND	50	50	46.5	50.1	93	100	65-136	7	30	
1,2-Dibromoethane (EDB)	ug/L	ND	20	20	17.9	19.9	90	100	75-131	11	30	
1,2-Dichlorobenzene	ug/L	ND	20	20	19.7	20.7	98	104	75-141	5	30	
1,2-Dichloroethane	ug/L	ND	20	20	15.4	15.9	77	80	75-125	3	30	
1,2-Dichloropropane	ug/L	ND	20	20	18.1	18.4	90	92	71-147	2	30	
1,3,5-Trimethylbenzene	ug/L	ND	20	20	21.2	22.1	106	110	75-139	4	30	
1,3-Dichlorobenzene	ug/L	ND	20	20	20.0	20.9	100	104	75-142	5	30	
1,3-Dichloropropane	ug/L	ND	20	20	19.4	19.9	97	99	75-141	2	30	
1,4-Dichlorobenzene	ug/L	ND	20	20	19.3	20.5	97	102	75-139	6	30	
2,2-Dichloropropane	ug/L	ND	20	20	14.2	14.0	71	70	60-150	1	30	
2-Butanone (MEK)	ug/L	ND	100	100	77.4	81.2	77	81	68-133	5	30	
2-Chlorotoluene	ug/L	ND	20	20	18.8	19.4	94	97	75-146	3	30	
4-Chlorotoluene	ug/L	ND	20	20	19.9	20.9	100	104	75-149	5	30	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	100	98.1	105	98	105	67-150	7	30	
Acetone	ug/L	ND	100	100	130	133	120	123	56-150	2	30	

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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2652746 2652747

Parameter	Units	10396486008 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Allyl chloride	ug/L	ND	20	20	16.9	16.7	84	83	66-134	1	30	
Benzene	ug/L	ND	20	20	16.4	16.9	82	84	74-134	3	30	
Bromobenzene	ug/L	ND	20	20	19.5	20.3	97	101	75-138	4	30	
Bromochloromethane	ug/L	ND	20	20	16.7	17.5	83	87	75-145	5	30	
Bromodichloromethane	ug/L	ND	20	20	17.0	17.6	85	88	75-143	4	30	
Bromoform	ug/L	ND	20	20	18.1	18.7	90	94	67-125	3	30	
Bromomethane	ug/L	ND	20	20	15.6	17.8	78	89	30-150	13	30	
Carbon tetrachloride	ug/L	ND	20	20	16.0	16.8	80	84	75-150	5	30	
Chlorobenzene	ug/L	ND	20	20	18.1	18.8	91	94	75-133	4	30	
Chloroethane	ug/L	ND	20	20	17.1	19.1	85	95	53-150	11	30	
Chloroform	ug/L	ND	20	20	15.8	16.6	79	83	75-134	5	30	
Chloromethane	ug/L	ND	20	20	19.4	21.6	97	108	41-150	11	30	
cis-1,2-Dichloroethene	ug/L	ND	20	20	16.8	18.1	84	91	73-140	8	30	
cis-1,3-Dichloropropene	ug/L	ND	20	20	17.6	17.6	88	88	72-140	0	30	
Dibromochloromethane	ug/L	ND	20	20	18.0	19.0	90	95	74-130	5	30	
Dibromomethane	ug/L	ND	20	20	17.8	18.5	89	93	70-141	4	30	
Dichlorodifluoromethane	ug/L	ND	20	20	17.8	20.1	89	100	50-150	12	30	
Dichlorofluoromethane	ug/L	ND	20	20	16.0	18.1	80	91	62-150	13	30	
Diethyl ether (Ethyl ether)	ug/L	ND	20	20	17.1	17.7	85	88	71-141	3	30	
Ethylbenzene	ug/L	ND	20	20	19.3	20.4	97	102	75-136	6	30	
Hexachloro-1,3-butadiene	ug/L	ND	20	20	25.4	24.6	127	123	47-150	3	30	
Isopropylbenzene (Cumene)	ug/L	ND	20	20	21.2	22.3	106	111	75-138	5	30	
Methyl-tert-butyl ether	ug/L	ND	20	20	16.5	16.9	82	84	75-128	3	30	
Methylene Chloride	ug/L	ND	20	20	16.4	17.0	82	85	69-150	3	30	
n-Butylbenzene	ug/L	ND	20	20	22.2	22.3	111	112	68-150	1	30	
n-Propylbenzene	ug/L	ND	20	20	20.5	21.4	103	107	74-150	4	30	
Naphthalene	ug/L	ND	20	20	18.4	19.4	92	97	61-138	5	30	
p-Isopropyltoluene	ug/L	ND	20	20	23.2	24.2	116	121	70-142	4	30	
sec-Butylbenzene	ug/L	ND	20	20	22.7	23.1	114	116	74-150	2	30	
Styrene	ug/L	ND	20	20	19.2	20.0	96	100	70-140	4	30	
tert-Butylbenzene	ug/L	ND	20	20	21.4	22.1	107	110	73-140	3	30	
Tetrachloroethene	ug/L	ND	20	20	21.2	21.8	106	109	72-141	3	30	
Tetrahydrofuran	ug/L	ND	200	200	288	328	144	164	53-150	13	30	M1
Toluene	ug/L	ND	20	20	18.7	19.5	94	98	71-138	4	30	
trans-1,2-Dichloroethene	ug/L	ND	20	20	16.8	17.0	84	85	74-149	1	30	
trans-1,3-Dichloropropene	ug/L	ND	20	20	17.9	17.9	89	90	74-138	0	30	
Trichloroethene	ug/L	ND	20	20	18.8	19.5	94	98	70-150	3	30	
Trichlorofluoromethane	ug/L	ND	20	20	17.7	20.3	89	102	57-150	14	30	
Vinyl chloride	ug/L	ND	20	20	17.3	19.3	86	96	59-150	11	30	
Xylene (Total)	ug/L	ND	60	60	62.1	65.9	104	110	75-131	6	30	
1,2-Dichloroethane-d4 (S)	%.						96	95	75-137			
4-Bromofluorobenzene (S)	%.						95	95	75-125			
Toluene-d8 (S)	%.						105	105	75-125			

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1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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 decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

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

BATCH QUALIFIERS

Batch: 486277

[M5]	A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
CL	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.
L2	Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results for this analyte in associated samples may be biased low.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
MN	The reporting limit has been raised in accordance with Minnesota Statutes 4740.2100 Subpart 8. C, D. Reporting Limit Evaluation Rule.
R1	RPD value was outside control limits.

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(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 60539836-310 BNSF Mission Wye
Pace Project No.: 10395793

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10395793017	**Gravel Pit Well /071317**	EPA 524.2	486277		
10395793018	**Harris Stock Well /071317**	EPA 524.2	486277		
10395793001	**MW-1 / 071217**	EPA 8260B	486905		
10395793002	**MW-3 / 071217**	EPA 8260B	486905		
10395793003	**MW-4 / 071217**	EPA 8260B	486905		
10395793004	**MW-5 / 071217**	EPA 8260B	486905		
10395793005	**MW-9 / 071217**	EPA 8260B	486905		
10395793006	**MW-14 / 071217**	EPA 8260B	486905		
10395793007	**MW-30 / 071217**	EPA 8260B	486905		
10395793008	**MW-32 / 071217**	EPA 8260B	486905		
10395793009	**MW-33 / 071217**	EPA 8260B	486905		
10395793010	**Trip Blank / 071217**	EPA 8260B	486905		
10395793011	**MW-12 / 071317**	EPA 8260B	486905		
10395793012	**MW-18 / 071317**	EPA 8260B	486905		
10395793013	**MW-19 / 071317**	EPA 8260B	486905		
10395793014	**MW-21 / 071317**	EPA 8260B	486905		
10395793015	**MW-22 / 071317**	EPA 8260B	486905		
10395793016	**Gravel Pit Pond /071317**	EPA 8260B	487356		

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

10395793

2207143

Section A Required Client Information:

Company: BNSF / AECOM
Address: 207 N Broadway Ste 315; Billings, MT 59101
Email To: Shelly.young@aecom.com
Phone: 406 896 4582 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: margaret.zeblay@aecom.com
Copy To: Shelly.young@aecom.com
Purchase Order No.:
Project Name: BNSF Mission Way 2017 GW
Project Number: 60539836-310

Section C Invoice Information:

Attention: Yueh Chuang
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager: Carol Darr
Pace Profile #: 32799

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☑ OTHER CERCLA

Site Location STATE: MT

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N): Y

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start Date	Composite Start Time	Composite End/Grab Date	Composite End/Grab Time	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test: VOC 8260B	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-1 / 071217	W	G			7/12/17	1145		3				X					X	N	001
2	MW-3 / 071217						1530						X					X		002
3	MW-4 / 071217						1650						X					X		003
4	MW-5 / 071217						1735						X					X		004
5	MW-9 / 071217						1330						X					X		005
6	MW-14 / 071217						1435						X					X		006
7	MW-30 / 071217						1100						X					X		007
8	MW-32 / 071217						1030						X					X		008
9	MW-33 / 071217						1545						X					X		009
10	Trip Blank / 071217						NA						X					X		010
11																				
12																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
VOC analysis only.	Shelly Young / AECOM	7/13/17	1630	FedEx 736753261732	7/13/17	1630
				PACE	7/14/17	9305

SAMPLE CONDITIONS	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	16	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Shelly Young
SIGNATURE of SAMPLER:
DATE Signed (MM/DD/YY): 07/13/17

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

2207159

Section A Required Client Information:

Company: AECom
Address: 207 N Broadway Ste 315
Billings, MT 59101
Email To: Shelly.Young@AECom.com
Phone: 406 896 4582 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: MARGARET.ZEBLEY@AECom.com
Copy To: SHELLY.YOUNG@AECom.com
Purchase Order No.:
Project Name: BNSF Mission Wye
Project Number: 60539836-310

Section C Invoice Information:

Attention: ~~Yuch~~ Yueh Chuang
Company Name: BNSF
Address:
Pace Quote Reference:
Pace Project Manager: Carol Darr
Pace Profile #: 32797

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☑ OTHER CERCLA

Site Location STATE: MT

Section D Required Client Information

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N): VOC 8260B; VOC 524.2

ITEM #	SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED Composite Start DATE	Composite Start TIME	Composite End/Grab DATE	Composite End/Grab TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other Ascorbic Acid	VOC 8260B	VOC 524.2	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-12/071317	W	G			7/13/17	1155		3									X			011
2	MW-18/071317						1110											X			012
3	MW-19/071317						0955											X			013
4	MW-21/071317						1330											X			014
5	MW-22/071317						1255											X			015
6	Gravel At Pond/071317						1535											X			016
7	Gravel At Well/071317						1510										X		X		017
8	~~Gravel At P~~ Harris Stock Well/071317						0905										X		X		018
9	Trip Blank						NA		2									X			019
10	~~MS/MSD@MW-18~~	W	G				1115		3				X					X			
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
Voc analysis only.	Shelly Young / AECom	7/13/17	1630	FedEx 736753261732	7/13/17	1630				
Please perform lab dup.				[signature] PACE	7/14/17	930	5.6	Y	Y	Y
on 524.2 sample if										
sufficient volume.										
MS/MSD collected at MW-18/071317										

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Shelly Young
SIGNATURE of SAMPLER: [signature]
DATE Signed (MM/DD/YY): 07/13/17

ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pace Analytical	Document Name: **Sample Condition Upon Receipt Form - ESI**	Document Revised: 21Dec2016 Page 1 of 2
	Document No.: **F-MN-L-210-rev.22**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt – ESI Tech Specs

Client Name: AECOM

Project #: WO# : 10395793

10395793

Courier: ☑ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace ☐ SpeeDee ☐ Other:

Tracking Number: 7367 5326 1732

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

Thermometer Used: ☑ 151401163 ☐ 151401164 **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:** TRUE **Date and Initials of Person Examining Contents:** MC 7-14-17

USDA Regulated Soil (☑ N/A, water sample)

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA. MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

				COMMENTS:
Chain of Custody Present?	☑ Yes	☐ No		1.
Chain of Custody Filled Out?	☑ Yes	☐ No		2.
Chain of Custody Relinquished?	☑ Yes	☐ No		3.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☑ Yes	☐ No		5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		6.
Rush Turn Around Time Requested?	☐ Yes	☑ No		7.
Sufficient Volume (triple volume provided for MS/MSD)? MC 7-14-17	~~☑ Yes~~	☑ No		8. Only double sample MW-18/071317
Correct Containers Used?	☑ Yes	☐ No		9.
-Pace Containers Used?	☑ Yes	☐ No		
Containers Intact?	☑ Yes	☐ No		10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	11. Note if sediment is visible in the dissolved container.
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: Wt	☑ Yes	☐ No		12.
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH Positive for Res. Chlorine? Y N
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, NaOH>9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC/DOC, Oil and Grease, DRO/8015 (water) and Dioxin. Per method, VOA pH is checked after analysis	☐ Yes ☑ Yes	☐ No ☐ No	☑ N/A ☐ N/A	Sample # Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☑ Yes	☐ No	☐ N/A	14. 2/2 Trip Blank
3 Trip Blanks Present?	☐ Yes	☑ No	☐ N/A	15. 2 Trip Blanks
Trip Blank Custody Seals Present?	☑ Yes	☐ No	☐ N/A	
Pace Trip Blank Lot # (if purchased): B-7-158-0168				

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: Margaret Zebley Date/Time: 7/17/17

Comments/Resolution:

Analyze TB. Note HS amount on report.
Per Erik Torkelson, 7/18/17, one TB vial contained 7mm of HS and the other TB vial contained 8mm. The second TB did not exist.

Temp Log: Temp must be maintained at <6°C during login, record temp every 20 mins			
Opened Time: 1650	Temp: 5.6	Corrected Temp: 5.6	
Time:	put in cooler		
Time: 1655	Temp:	Corrected Temp:	

Project Manager Review: [signature] **Date:** 7/17/17

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)

ANALYTICAL SUMMARY REPORT

July 21, 2017

MT DEQ Remediation Division
PO Box 200901
Helena, MT 59620-0901

Work Order: H17070214

Project Name: Mission Waye: 483710

Energy Laboratories Inc Helena MT received the following 4 samples for MT DEQ Remediation Division on 7/13/2017 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H17070214-001	MW-3	07/12/17 15:30	07/13/17	Aqueous	8260-Volatile Organic Compounds-Short List
H17070214-002	MW-9	07/12/17 13:30	07/13/17	Aqueous	Same As Above
H17070214-003	MW-14	07/12/17 14:35	07/13/17	Aqueous	Same As Above
H17070214-004	TB 6476	07/12/17 13:30	07/13/17	Trip Blank	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 3161 E. Lyndale Ave., Helena, MT 59604, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: MT DEQ Remediation Division
Client Sample ID: MW-3
Project: Mission Waye: 483710
Matrix: Aqueous

Lab ID: H17070214-001
Collection Date: 07/12/17 15:30
DateReceived: 07/13/17
Report Date: 07/21/17

Analyses	Result	Units	QUAL	RL	MCL	Method	Analysis Date / By	Prep Date	Prep Method	RunID	Run Order	BatchID
VOLATILE ORGANIC COMPOUNDS												
Benzene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Bromobenzene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Bromochloromethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Bromodichloromethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Bromoform	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Bromomethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Carbon tetrachloride	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Chlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Chlorodibromomethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Chloroethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Chloroform	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Chloromethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,2-Dibromoethane	ND	ug/L		0.30		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
2-Chlorotoluene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
4-Chlorotoluene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Dibromomethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,2-Dichlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,3-Dichlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,4-Dichlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Dichlorodifluoromethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,1-Dichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,2-Dichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,1-Dichloroethene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
cis-1,2-Dichloroethene	0.10	ug/L	J	0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
trans-1,2-Dichloroethene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,2-Dichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,3-Dichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
2,2-Dichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,1-Dichloropropene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
cis-1,3-Dichloropropene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
trans-1,3-Dichloropropene	ND	ug/L		0.30		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Ethylbenzene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Methyl ethyl ketone	ND	ug/L		20		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Methyl tert-butyl ether (MTBE)	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840

Report Definitions:
RL - Analyte reporting limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
J - Estimated value. The analyte was present but less than the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: MT DEQ Remediation Division
Client Sample ID: MW-3
Project: Mission Waye: 483710
Matrix: Aqueous

Lab ID: H17070214-001
Collection Date: 07/12/17 15:30
DateReceived: 07/13/17
Report Date: 07/21/17

Analyses	Result	Units	QUAL	RL	MCL	Method	Analysis Date / By	Prep Date	Prep Method	RunID	Run Order	BatchID
VOLATILE ORGANIC COMPOUNDS												
Methylene chloride	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Styrene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,1,1,2-Tetrachloroethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,1,2,2-Tetrachloroethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Tetrachloroethene	4.5	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Toluene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,1,1-Trichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,1,2-Trichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Trichloroethene	0.36	ug/L	J	0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Trichlorofluoromethane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
1,2,3-Trichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Vinyl chloride	ND	ug/L		0.40		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
m+p-Xylenes	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
o-Xylene	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Xylenes, Total	ND	ug/L		0.50		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Surr: Dibromofluoromethane	94.0	%REC		70-125		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Surr: 1,2-Dichloroethane-d4	93.0	%REC		69-131		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Surr: Toluene-d8	102	%REC		80-119		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840
Surr: p-Bromofluorobenzene	105	%REC		76-123		SW8260B	07/18/17 15:36 / kjw			5973MSD_170718A	14	R126840

Report Definitions:
RL - Analyte reporting limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
J - Estimated value. The analyte was present but less than the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: MT DEQ Remediation Division
Client Sample ID: MW-9
Project: Mission Waye: 483710
Matrix: Aqueous

Lab ID: H17070214-002
Collection Date: 07/12/17 13:30
DateReceived: 07/13/17
Report Date: 07/21/17

Analyses	Result	Units	QUAL	RL	MCL	Method	Analysis Date / By	Prep Date	Prep Method	RunID	Run Order	BatchID
VOLATILE ORGANIC COMPOUNDS												
Benzene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Bromobenzene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Bromochloromethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Bromodichloromethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Bromoform	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Bromomethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Carbon tetrachloride	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Chlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Chlorodibromomethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Chloroethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Chloroform	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Chloromethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,2-Dibromoethane	ND	ug/L		0.30		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
2-Chlorotoluene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
4-Chlorotoluene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Dibromomethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,2-Dichlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,3-Dichlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,4-Dichlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Dichlorodifluoromethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,1-Dichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,2-Dichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,1-Dichloroethene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
cis-1,2-Dichloroethene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
trans-1,2-Dichloroethene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,2-Dichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,3-Dichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
2,2-Dichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,1-Dichloropropene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
cis-1,3-Dichloropropene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
trans-1,3-Dichloropropene	ND	ug/L		0.30		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Ethylbenzene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Methyl ethyl ketone	ND	ug/L		20		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Methyl tert-butyl ether (MTBE)	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840

Report Definitions: RL - Analyte reporting limit. MCL - Maximum contaminant level. ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: MT DEQ Remediation Division
Client Sample ID: MW-9
Project: Mission Waye: 483710
Matrix: Aqueous

Lab ID: H17070214-002
Collection Date: 07/12/17 13:30
DateReceived: 07/13/17
Report Date: 07/21/17

Analyses	Result	Units	QUAL	RL	MCL	Method	Analysis Date / By	Prep Date	Prep Method	RunID	Run Order	BatchID
VOLATILE ORGANIC COMPOUNDS												
Methylene chloride	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Styrene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,1,1,2-Tetrachloroethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,1,2,2-Tetrachloroethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Tetrachloroethene	0.53	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Toluene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,1,1-Trichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,1,2-Trichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Trichloroethene	0.25	ug/L	J	0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Trichlorofluoromethane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
1,2,3-Trichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Vinyl chloride	ND	ug/L		0.40		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
m+p-Xylenes	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
o-Xylene	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Xylenes, Total	ND	ug/L		0.50		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Surr: Dibromofluoromethane	99.0	%REC		70-125		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Surr: 1,2-Dichloroethane-d4	100	%REC		69-131		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Surr: Toluene-d8	99.0	%REC		80-119		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840
Surr: p-Bromofluorobenzene	103	%REC		76-123		SW8260B	07/18/17 16:04 / kjw			5973MSD_170718A	15	R126840

Report Definitions:
RL - Analyte reporting limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
J - Estimated value. The analyte was present but less than the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: MT DEQ Remediation Division
Client Sample ID: MW-14
Project: Mission Waye: 483710
Matrix: Aqueous

Lab ID: H17070214-003
Collection Date: 07/12/17 14:35
DateReceived: 07/13/17
Report Date: 07/21/17

Analyses	Result	Units	QUAL	RL	MCL	Method	Analysis Date / By	Prep Date	Prep Method	RunID	Run Order	BatchID
VOLATILE ORGANIC COMPOUNDS												
Benzene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Bromobenzene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Bromochloromethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Bromodichloromethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Bromoform	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Bromomethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Carbon tetrachloride	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Chlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Chlorodibromomethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Chloroethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Chloroform	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Chloromethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,2-Dibromoethane	ND	ug/L		0.30		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
2-Chlorotoluene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
4-Chlorotoluene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Dibromomethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,2-Dichlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,3-Dichlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,4-Dichlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Dichlorodifluoromethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,1-Dichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,2-Dichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,1-Dichloroethene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
cis-1,2-Dichloroethene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
trans-1,2-Dichloroethene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,2-Dichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,3-Dichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
2,2-Dichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,1-Dichloropropene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
cis-1,3-Dichloropropene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
trans-1,3-Dichloropropene	ND	ug/L		0.30		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Ethylbenzene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Methyl ethyl ketone	ND	ug/L		20		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Methyl tert-butyl ether (MTBE)	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840

Report Definitions: RL - Analyte reporting limit. MCL - Maximum contaminant level. ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: MT DEQ Remediation Division
Client Sample ID: MW-14
Project: Mission Waye: 483710
Matrix: Aqueous

Lab ID: H17070214-003
Collection Date: 07/12/17 14:35
DateReceived: 07/13/17
Report Date: 07/21/17

Analyses	Result	Units	QUAL	RL	MCL	Method	Analysis Date / By	Prep Date	Prep Method	RunID	Run Order	BatchID
VOLATILE ORGANIC COMPOUNDS												
Methylene chloride	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Styrene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,1,1,2-Tetrachloroethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,1,2,2-Tetrachloroethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Tetrachloroethene	0.38	ug/L	J	0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Toluene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,1,1-Trichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,1,2-Trichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Trichloroethene	0.17	ug/L	J	0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Trichlorofluoromethane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
1,2,3-Trichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Vinyl chloride	ND	ug/L		0.40		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
m+p-Xylenes	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
o-Xylene	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Xylenes, Total	ND	ug/L		0.50		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Surr: Dibromofluoromethane	101	%REC		70-125		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Surr: 1,2-Dichloroethane-d4	104	%REC		69-131		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Surr: Toluene-d8	99.0	%REC		80-119		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840
Surr: p-Bromofluorobenzene	102	%REC		76-123		SW8260B	07/18/17 16:31 / kjw			5973MSD_170718A	16	R126840

Report Definitions:
RL - Analyte reporting limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
J - Estimated value. The analyte was present but less than the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: MT DEQ Remediation Division
Client Sample ID: TB 6476
Project: Mission Waye: 483710
Matrix: Trip Blank

Lab ID: H17070214-004
Collection Date: 07/12/17 13:30
DateReceived: 07/13/17
Report Date: 07/21/17

Analyses	Result	Units	QUAL	RL	MCL	Method	Analysis Date / By	Prep Date	Prep Method	RunID	Run Order	BatchID
VOLATILE ORGANIC COMPOUNDS												
Benzene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Bromobenzene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Bromochloromethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Bromodichloromethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Bromoform	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Bromomethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Carbon tetrachloride	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Chlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Chlorodibromomethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Chloroethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Chloroform	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Chloromethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,2-Dibromoethane	ND	ug/L		0.30		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
2-Chlorotoluene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
4-Chlorotoluene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Dibromomethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,2-Dichlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,3-Dichlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,4-Dichlorobenzene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Dichlorodifluoromethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,1-Dichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,2-Dichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,1-Dichloroethene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
cis-1,2-Dichloroethene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
trans-1,2-Dichloroethene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,2-Dichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,3-Dichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
2,2-Dichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,1-Dichloropropene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
cis-1,3-Dichloropropene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
trans-1,3-Dichloropropene	ND	ug/L		0.30		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Ethylbenzene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Methyl ethyl ketone	ND	ug/L		20		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Methyl tert-butyl ether (MTBE)	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840

Report Definitions: RL - Analyte reporting limit. MCL - Maximum contaminant level. ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: MT DEQ Remediation Division
Client Sample ID: TB 6476
Project: Mission Waye: 483710
Matrix: Trip Blank

Lab ID: H17070214-004
Collection Date: 07/12/17 13:30
DateReceived: 07/13/17
Report Date: 07/21/17

Analyses	Result	Units	QUAL	RL	MCL	Method	Analysis Date / By	Prep Date	Prep Method	RunID	Run Order	BatchID
VOLATILE ORGANIC COMPOUNDS												
Methylene chloride	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Styrene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,1,1,2-Tetrachloroethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,1,2,2-Tetrachloroethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Tetrachloroethene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Toluene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,1,1-Trichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,1,2-Trichloroethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Trichloroethene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Trichlorofluoromethane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
1,2,3-Trichloropropane	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Vinyl chloride	ND	ug/L		0.40		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
m+p-Xylenes	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
o-Xylene	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Xylenes, Total	ND	ug/L		0.50		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Surr: Dibromofluoromethane	99.0	%REC		70-125		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Surr: 1,2-Dichloroethane-d4	103	%REC		69-131		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Surr: Toluene-d8	98.0	%REC		80-119		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840
Surr: p-Bromofluorobenzene	105	%REC		76-123		SW8260B	07/18/17 13:58 / kjw			5973MSD_170718A	13	R126840

Report Definitions: RL - Analyte reporting limit. MCL - Maximum contaminant level. ND - Not detected at the reporting limit.

Client: MT DEQ Remediation Division
Work Order: H17070214
Project: Mission Waye: 483710

ANALYTICAL QC SUMMARY REPORT

Prepared by Helena, MT Branch

BatchID: R126840

Date: *21-Jul-17*

Run ID :Run Order: **5973MSD_170718A: 2** SampType: **Continuing Calibration Verification Standar** Lab ID: **071817_CCV_05** Method: **SW8260B**

Analysis Date: **07/18/17 11:41** Units: **ug/L** **Prep Info:** Prep Date: Prep Method:

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	4.89	0.50	5	0	98	70	130				
Bromobenzene	5.24	0.50	5	0	105	70	130				
Bromochloromethane	4.59	0.50	5	0	92	70	130				
Bromodichloromethane	5.05	0.50	5	0	101	70	130				
Bromoform	4.91	0.50	5	0	98	70	130				
Bromomethane	6.24	0.50	5	0	125	70	130				
Carbon tetrachloride	5.35	0.50	5	0	107	70	130				
Chlorobenzene	5.22	0.50	5	0	104	70	130				
Chlorodibromomethane	4.86	0.50	5	0	97	70	130				
Chloroethane	5.22	0.50	5	0	104	70	130				
Chloroform	4.81	0.50	5	0	96	80	120				
Chloromethane	5.09	0.50	5	0	102	70	130				
2-Chlorotoluene	5.70	0.50	5	0	114	70	130				
4-Chlorotoluene	5.58	0.50	5	0	112	70	130				
1,2-Dibromoethane	4.60	0.50	5	0	92	70	130				
Dibromomethane	4.66	0.50	5	0	93	70	130				
1,2-Dichlorobenzene	5.02	0.50	5	0	100	70	130				
1,3-Dichlorobenzene	5.32	0.50	5	0	106	70	130				
1,4-Dichlorobenzene	5.13	0.50	5	0	103	70	130				
Dichlorodifluoromethane	5.10	0.50	5	0	102	70	130				
1,1-Dichloroethane	5.09	0.50	5	0	102	70	130				
1,2-Dichloroethane	4.44	0.50	5	0	89	70	130				
1,1-Dichloroethene	5.48	0.50	5	0	110	80	120				
cis-1,2-Dichloroethene	4.93	0.50	5	0	99	70	130				
trans-1,2-Dichloroethene	5.24	0.50	5	0	105	70	130				
1,2-Dichloropropane	5.08	0.50	5	0	102	80	120				
1,3-Dichloropropane	4.63	0.50	5	0	93	70	130				
2,2-Dichloropropane	5.43	0.50	5	0	109	70	130				
1,1-Dichloropropene	5.21	0.50	5	0	104	70	130				
cis-1,3-Dichloropropene	4.95	0.50	5	0	99	70	130				
trans-1,3-Dichloropropene	4.71	0.50	5	0	94	70	130				
Ethylbenzene	5.50	0.50	5	0	110	80	120				
Methyl tert-butyl ether (MTBE)	3.71	0.50	5	0	74	70	130				
Methyl ethyl ketone	36.4	10	50	0	73	70	130				

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limit
R - RPD outside accepted recovery limits
N - Analyte concentration was not sufficiently high to calculate RPD
A - Analyte concentration greater than four times the spike amount

Client: MT DEQ Remediation Division
Work Order: H17070214
Project: Mission Waye: 483710

ANALYTICAL QC SUMMARY REPORT

Prepared by Helena, MT Branch

BatchID: R126840

Date: *21-Jul-17*

Run ID :Run Order: **5973MSD_170718A: 2** SampType: **Continuing Calibration Verification Standar** Lab ID: **071817_CCV_05** Method: **SW8260B**

Analysis Date: **07/18/17 11:41** Units: **ug/L** **Prep Info:** Prep Date: Prep Method:

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methylene chloride	4.65	0.50	5	0	93	70	130				
Styrene	5.11	0.50	5	0	102	70	130				
1,1,1,2-Tetrachloroethane	4.90	0.50	5	0	98	70	130				
1,1,2,2-Tetrachloroethane	4.45	0.50	5	0	89	70	130				
Tetrachloroethene	5.61	0.50	5	0	112	70	130				
Toluene	5.52	0.50	5	0	110	80	120				
1,1,1-Trichloroethane	5.27	0.50	5	0	105	70	130				
1,1,2-Trichloroethane	4.52	0.50	5	0	90	70	130				
Trichloroethene	5.62	0.50	5	0	112	70	130				
Trichlorofluoromethane	5.29	0.50	5	0	106	70	130				
1,2,3-Trichloropropane	4.49	0.50	5	0	90	70	130				
Vinyl chloride	5.14	0.50	5	0	103	80	120				
m+p-Xylenes	11.0	0.50	10	0	110	70	130				
o-Xylene	5.27	0.50	5	0	105	70	130				
Xylenes, Total	16.2	0.50	15	0	108	70	130				
Surr: 1,2-Dichloroethane-d4	8.26	1.0	10	0	83	69	131				
Surr: Dibromofluoromethane	9.14	1.0	10	0	91	70	125				
Surr: p-Bromofluorobenzene	10.1	1.0	10	0	101	76	123				
Surr: Toluene-d8	10.6	1.0	10	0	106	80	119				

Associated samples: **H17070214-001A, H17070214-002A, H17070214-003A, H17070214-004A**

Run ID :Run Order: **5973MSD_170718A: 3** SampType: **Laboratory Control Sample** Lab ID: **071817_LCS_06** Method: **SW8260B**

Analysis Date: **07/18/17 12:24** Units: **ug/L** **Prep Info:** Prep Date: Prep Method:

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	5.03	0.50	5	0	101	78	115				
Bromobenzene	5.32	0.50	5	0	106	79	120				
Bromochloromethane	4.56	0.50	5	0	91	62	111				
Bromodichloromethane	4.95	0.50	5	0	99	77	109				
Bromoform	4.61	0.50	5	0	92	65	130				
Bromomethane	6.42	0.50	5	0	128	51	136				
Carbon tetrachloride	5.38	0.50	5	0	108	77	114				
Chlorobenzene	5.40	0.50	5	0	108	77	127				
Chlorodibromomethane	4.85	0.50	5	0	97	70	122				

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limit
R - RPD outside accepted recovery limits
N - Analyte concentration was not sufficiently high to calculate RPD
A - Analyte concentration greater than four times the spike amount

Client: MT DEQ Remediation Division
Work Order: H17070214
Project: Mission Waye: 483710

ANALYTICAL QC SUMMARY REPORT

Prepared by Helena, MT Branch

BatchID: R126840

Date: *21-Jul-17*

Run ID :Run Order: **5973MSD_170718A: 3** SampType: **Laboratory Control Sample** Lab ID: **071817_LCS_06** Method: **SW8260B**

Analysis Date: **07/18/17 12:24** Units: **ug/L** **Prep Info:** Prep Date: Prep Method:

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chloroethane	5.69	0.50	5	0	114	62	135				
Chloroform	4.89	0.50	5	0	98	70	115				
Chloromethane	5.41	0.50	5	0	108	72	146				
2-Chlorotoluene	5.79	0.50	5	0	116	78	125				
4-Chlorotoluene	5.76	0.50	5	0	115	76	126				
1,2-Dibromoethane	4.65	0.50	5	0	93	68	116				
Dibromomethane	4.74	0.50	5	0	95	69	118				
1,2-Dichlorobenzene	5.24	0.50	5	0	105	74	122				
1,3-Dichlorobenzene	5.42	0.50	5	0	108	78	120				
1,4-Dichlorobenzene	5.35	0.50	5	0	107	70	116				
Dichlorodifluoromethane	4.73	0.50	5	0	95	57	143				
1,1-Dichloroethane	5.03	0.50	5	0	101	63	121				
1,2-Dichloroethane	4.53	0.50	5	0	91	69	131				
1,1-Dichloroethene	5.50	0.50	5	0	110	67	121				
cis-1,2-Dichloroethene	5.02	0.50	5	0	100	73	118				
trans-1,2-Dichloroethene	5.19	0.50	5	0	104	75	124				
1,2-Dichloropropane	5.18	0.50	5	0	104	75	124				
1,3-Dichloropropane	4.82	0.50	5	0	96	72	119				
2,2-Dichloropropane	5.31	0.50	5	0	106	83	122				
1,1-Dichloropropene	5.31	0.50	5	0	106	63	114				
cis-1,3-Dichloropropene	5.21	0.50	5	0	104	73	124				
trans-1,3-Dichloropropene	4.63	0.50	5	0	93	69	120				
Ethylbenzene	5.61	0.50	5	0	112	74	125				
Methyl tert-butyl ether (MTBE)	4.04	0.50	5	0	81	66	113				
Methyl ethyl ketone	39.3	10	50	0	79	63	110				
Methylene chloride	4.81	0.50	5	0	96	61	125				
Styrene	5.09	0.50	5	0	102	75	120				
1,1,1,2-Tetrachloroethane	5.03	0.50	5	0	101	76	122				
1,1,2,2-Tetrachloroethane	4.58	0.50	5	0	92	67	124				
Tetrachloroethene	5.75	0.50	5	0	115	75	126				
Toluene	5.51	0.50	5	0	110	80	120				
1,1,1-Trichloroethane	5.40	0.50	5	0	108	75	121				
1,1,2-Trichloroethane	4.57	0.50	5	0	91	70	114				
Trichloroethene	5.59	0.50	5	0	112	72	126				

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limit
R - RPD outside accepted recovery limits
N - Analyte concentration was not sufficiently high to calculate RPD
A - Analyte concentration greater than four times the spike amount

Client: MT DEQ Remediation Division
Work Order: H17070214
Project: Mission Waye: 483710

ANALYTICAL QC SUMMARY REPORT

Prepared by Helena, MT Branch

BatchID: R126840

Date: *21-Jul-17*

Run ID :Run Order: **5973MSD_170718A: 3** SampType: **Laboratory Control Sample** Lab ID: **071817_LCS_06** Method: **SW8260B**

Analysis Date: **07/18/17 12:24** Units: **ug/L** **Prep Info:** Prep Date: Prep Method:

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Trichlorofluoromethane	5.49	0.50	5	0	110	78	134				
1,2,3-Trichloropropane	4.50	0.50	5	0	90	62	118				
Vinyl chloride	5.69	0.50	5	0	114	72	134				
m+p-Xylenes	11.2	0.50	10	0	112	80	120				
o-Xylene	5.46	0.50	5	0	109	74	123				
Xylenes, Total	16.7	0.50	15	0	111	72	124				
Surr: 1,2-Dichloroethane-d4	8.55	1.0	10	0	86	69	131				
Surr: Dibromofluoromethane	9.22	1.0	10	0	92	70	125				
Surr: p-Bromofluorobenzene	10.3	1.0	10	0	103	76	123				
Surr: Toluene-d8	10.5	1.0	10	0	105	80	119				

Associated samples: **H17070214-001A, H17070214-002A, H17070214-003A, H17070214-004A**

Run ID :Run Order: **5973MSD_170718A: 4** SampType: **Method Blank** Lab ID: **071817_MBLK_08** Method: **SW8260B**

Analysis Date: **07/18/17 13:30** Units: **ug/L** **Prep Info:** Prep Date: Prep Method:

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.50									
Bromobenzene	ND	0.50									
Bromochloromethane	ND	0.50									
Bromodichloromethane	ND	0.50									
Bromoform	ND	0.50									
Bromomethane	ND	0.50									
Carbon tetrachloride	ND	0.50									
Chlorobenzene	ND	0.50									
Chlorodibromomethane	ND	0.50									
Chloroethane	ND	0.50									
Chloroform	ND	0.50									
Chloromethane	ND	0.50									
2-Chlorotoluene	ND	0.50									
4-Chlorotoluene	ND	0.50									
1,2-Dibromoethane	ND	0.30									
Dibromomethane	ND	0.50									
1,2-Dichlorobenzene	ND	0.50									
1,3-Dichlorobenzene	ND	0.50									

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limit
R - RPD outside accepted recovery limits
N - Analyte concentration was not sufficiently high to calculate RPD
A - Analyte concentration greater than four times the spike amount

Client: MT DEQ Remediation Division
Work Order: H17070214
Project: Mission Waye: 483710

ANALYTICAL QC SUMMARY REPORT

Prepared by Helena, MT Branch

BatchID: R126840

Date: *21-Jul-17*

Run ID :Run Order: **5973MSD_170718A: 4** SampType: **Method Blank** Lab ID: **071817_MBLK_08** Method: **SW8260B**

Analysis Date: **07/18/17 13:30** Units: **ug/L** **Prep Info:** Prep Date: Prep Method:

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,4-Dichlorobenzene	ND	0.50									
Dichlorodifluoromethane	ND	0.50									
1,1-Dichloroethane	ND	0.50									
1,2-Dichloroethane	ND	0.50									
1,1-Dichloroethene	ND	0.50									
cis-1,2-Dichloroethene	ND	0.50									
trans-1,2-Dichloroethene	ND	0.50									
1,2-Dichloropropane	ND	0.50									
1,3-Dichloropropane	ND	0.50									
2,2-Dichloropropane	ND	0.50									
1,1-Dichloropropene	ND	0.50									
cis-1,3-Dichloropropene	ND	0.50									
trans-1,3-Dichloropropene	ND	0.30									
Ethylbenzene	ND	0.50									
Methyl tert-butyl ether (MTBE)	ND	0.50									
Methyl ethyl ketone	ND	10									
Methylene chloride	ND	0.50									
Styrene	ND	0.50									
1,1,1,2-Tetrachloroethane	ND	0.50									
1,1,2,2-Tetrachloroethane	ND	0.50									
Tetrachloroethene	ND	0.50									
Toluene	ND	0.50									
1,1,1-Trichloroethane	ND	0.50									
1,1,2-Trichloroethane	ND	0.50									
Trichloroethene	ND	0.50									
Trichlorofluoromethane	ND	0.50									
1,2,3-Trichloropropane	ND	0.50									
Vinyl chloride	ND	0.40									
m+p-Xylenes	ND	0.50									
o-Xylene	ND	0.50									
Xylenes, Total	ND	0.50									
Surr: 1,2-Dichloroethane-d4	9.76	1.0	10	0	98	69	131				
Surr: Dibromofluoromethane	9.75	1.0	10	0	97	70	125				
Surr: p-Bromofluorobenzene	10.4	1.0	10	0	104	76	123				

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limit
R - RPD outside accepted recovery limits
N - Analyte concentration was not sufficiently high to calculate RPD
A - Analyte concentration greater than four times the spike amount

Client: MT DEQ Remediation Division
Work Order: H17070214
Project: Mission Waye: 483710

ANALYTICAL QC SUMMARY REPORT

Prepared by Helena, MT Branch

BatchID: R126840

Date: *21-Jul-17*

Run ID :Run Order: **5973MSD_170718A: 4** SampType: **Method Blank** Lab ID: **071817_MBLK_08** Method: **SW8260B**

Analysis Date: **07/18/17 13:30** Units: **ug/L** **Prep Info:** Prep Date: Prep Method:

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Toluene-d8	9.97	1.0	10	0	100	80	119				

Associated samples: **H17070214-001A, H17070214-002A, H17070214-003A, H17070214-004A**

Run ID :Run Order: **5973MSD_170718A: 11** SampType: **Sample Matrix Spike** Lab ID: **H17070214-001AMS** Method: **SW8260B**

Analysis Date: **07/18/17 21:39** Units: **ug/L** **Prep Info:** Prep Date: Prep Method:

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	9.67	0.50	10	0	97	78	115				
Bromobenzene	10.1	0.50	10	0	101	79	120				
Bromochloromethane	10.2	0.50	10	0	102	62	111				
Bromodichloromethane	10.2	0.50	10	0	102	77	109				
Bromoform	10.1	0.50	10	0	101	65	130				
Bromomethane	11.1	0.50	10	0	111	51	136				
Carbon tetrachloride	9.75	0.50	10	0	97	77	114				
Chlorobenzene	10.3	0.50	10	0	103	77	127				
Chlorodibromomethane	10.5	0.50	10	0	105	70	122				
Chloroethane	11.3	0.50	10	0	113	62	135				
Chloroform	10.0	0.50	10	0	100	70	115				
Chloromethane	9.90	0.50	10	0	99	72	146				
2-Chlorotoluene	9.91	1.0	10	0	99	78	125				
4-Chlorotoluene	10.4	1.0	10	0	104	76	126				
1,2-Dibromoethane	10.3	0.50	10	0	103	68	116				
Dibromomethane	10.6	0.50	10	0	106	69	118				
1,2-Dichlorobenzene	10.6	0.50	10	0	106	74	122				
1,3-Dichlorobenzene	9.97	0.50	10	0	100	78	120				
1,4-Dichlorobenzene	10.2	0.50	10	0	102	70	116				
Dichlorodifluoromethane	8.53	0.50	10	0	85	57	143				
1,1-Dichloroethane	9.51	0.50	10	0	95	63	121				
1,2-Dichloroethane	10.3	0.50	10	0	103	69	131				
1,1-Dichloroethene	9.95	0.50	10	0	99	67	121				
cis-1,2-Dichloroethene	9.81	0.50	10	0.1027	97	73	118				
trans-1,2-Dichloroethene	9.68	0.50	10	0	97	75	124				
1,2-Dichloropropane	10.00	0.50	10	0	100	75	124				
1,3-Dichloropropane	11.1	0.50	10	0	111	72	119				

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limit
R - RPD outside accepted recovery limits
N - Analyte concentration was not sufficiently high to calculate RPD
A - Analyte concentration greater than four times the spike amount

Client: MT DEQ Remediation Division
Work Order: H17070214
Project: Mission Waye: 483710

ANALYTICAL QC SUMMARY REPORT

Prepared by Helena, MT Branch

BatchID: R126840

Date: *21-Jul-17*

Run ID :Run Order: **5973MSD_170718A: 11** SampType: **Sample Matrix Spike** Lab ID: **H17070214-001AMS** Method: **SW8260B**

Analysis Date: **07/18/17 21:39** Units: **ug/L** **Prep Info:** Prep Date: Prep Method:

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
2,2-Dichloropropane	9.10	1.0	10	0	91	83	122				
1,1-Dichloropropene	9.91	0.50	10	0	99	63	114				
cis-1,3-Dichloropropene	10.6	0.50	10	0	106	73	124				
trans-1,3-Dichloropropene	10.0	0.50	10	0	100	69	120				
Ethylbenzene	10.0	0.50	10	0	100	74	125				
Methyl tert-butyl ether (MTBE)	10.4	0.50	10	0	104	66	113				
Methyl ethyl ketone	103	20	100	0	103	63	110				
Methylene chloride	10.2	1.0	10	0	102	61	125				
Styrene	10.0	0.50	10	0	100	75	120				
1,1,1,2-Tetrachloroethane	9.79	0.50	10	0	98	76	122				
1,1,2,2-Tetrachloroethane	10.5	0.50	10	0	105	67	124				
Tetrachloroethene	14.2	0.50	10	4.472	97	75	126				
Toluene	10.1	0.50	10	0	101	80	120				
1,1,1-Trichloroethane	10.3	0.50	10	0	103	75	121				
1,1,2-Trichloroethane	10.3	0.50	10	0	103	70	114				
Trichloroethene	10.4	0.50	10	0.3598	100	72	126				
Trichlorofluoromethane	10.0	0.50	10	0	100	78	134				
1,2,3-Trichloropropane	11.5	0.50	10	0	115	62	118				
Vinyl chloride	10.1	0.50	10	0	101	72	134				
m+p-Xylenes	20.4	1.0	20	0	102	80	120				
o-Xylene	10.3	0.50	10	0	103	74	123				
Xylenes, Total	30.7	0.50	30	0	102	72	124				
Surr: 1,2-Dichloroethane-d4	20.4	2.0	20	0	102	69	131				
Surr: Dibromofluoromethane	20.3	2.0	20	0	102	70	125				
Surr: p-Bromofluorobenzene	20.6	2.0	20	0	103	76	123				
Surr: Toluene-d8	20.0	2.0	20	0	100	80	119				

Associated samples: **H17070214-001A, H17070214-002A, H17070214-003A, H17070214-004A**

Run ID :Run Order: **5973MSD_170718A: 12** SampType: **Sample Matrix Spike Duplicate** Lab ID: **H17070214-001AMSD** Method: **SW8260B**

Analysis Date: **07/18/17 22:07** Units: **ug/L** **Prep Info:** Prep Date: Prep Method:

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	9.56	0.50	10	0	96	78	115	9.665	1.1	20	
Bromobenzene	10.1	0.50	10	0	101	79	120	10.12	0.2	20	

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limit
R - RPD outside accepted recovery limits
N - Analyte concentration was not sufficiently high to calculate RPD
A - Analyte concentration greater than four times the spike amount

Client: MT DEQ Remediation Division
Work Order: H17070214
Project: Mission Waye: 483710

ANALYTICAL QC SUMMARY REPORT

Prepared by Helena, MT Branch

BatchID: R126840

Date: *21-Jul-17*

Run ID :Run Order: **5973MSD_170718A: 12** SampType: **Sample Matrix Spike Duplicate** Lab ID: **H17070214-001AMSD** Method: **SW8260B**

Analysis Date: **07/18/17 22:07** Units: **ug/L** **Prep Info:** Prep Date: Prep Method:

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Bromochloromethane	10.2	0.50	10	0	102	62	111	10.17	0.1	20	
Bromodichloromethane	10.0	0.50	10	0	100	77	109	10.17	1.5	20	
Bromoform	10.2	0.50	10	0	102	65	130	10.11	0.6	20	
Bromomethane	12.7	0.50	10	0	127	51	136	11.14	13	20	
Carbon tetrachloride	9.72	0.50	10	0	97	77	114	9.746	0.2	20	
Chlorobenzene	10.1	0.50	10	0	101	77	127	10.26	1.3	20	
Chlorodibromomethane	10.0	0.50	10	0	100	70	122	10.48	4.2	20	
Chloroethane	10.3	0.50	10	0	103	62	135	11.32	9.9	20	
Chloroform	9.72	0.50	10	0	97	70	115	10.04	3.2	20	
Chloromethane	9.71	0.50	10	0	97	72	146	9.903	2.0	20	
2-Chlorotoluene	9.89	1.0	10	0	99	78	125	9.906	0.2	20	
4-Chlorotoluene	10.2	1.0	10	0	102	76	126	10.36	1.5	20	
1,2-Dibromoethane	10.1	0.50	10	0	101	68	116	10.32	1.8	20	
Dibromomethane	10.5	0.50	10	0	105	69	118	10.59	1.1	20	
1,2-Dichlorobenzene	10.4	0.50	10	0	104	74	122	10.56	1.4	20	
1,3-Dichlorobenzene	10.00	0.50	10	0	100	78	120	9.97	0.3	20	
1,4-Dichlorobenzene	10.1	0.50	10	0	101	70	116	10.18	0.8	20	
Dichlorodifluoromethane	8.23	0.50	10	0	82	57	143	8.532	3.5	20	
1,1-Dichloroethane	9.49	0.50	10	0	95	63	121	9.51	0.2	20	
1,2-Dichloroethane	9.97	0.50	10	0	100	69	131	10.31	3.4	20	
1,1-Dichloroethene	9.88	0.50	10	0	99	67	121	9.95	0.7	20	
cis-1,2-Dichloroethene	9.71	0.50	10	0.1027	96	73	118	9.81	1.0	20	
trans-1,2-Dichloroethene	9.60	0.50	10	0	96	75	124	9.683	0.9	20	
1,2-Dichloropropane	9.83	0.50	10	0	98	75	124	9.999	1.7	20	
1,3-Dichloropropane	10.5	0.50	10	0	105	72	119	11.08	5.2	20	
2,2-Dichloropropane	8.94	1.0	10	0	89	83	122	9.104	1.9	20	
1,1-Dichloropropene	9.94	0.50	10	0	99	63	114	9.911	0.2	20	
cis-1,3-Dichloropropene	10.4	0.50	10	0	104	73	124	10.57	2.0	20	
trans-1,3-Dichloropropene	9.84	0.50	10	0	98	69	120	10.01	1.7	20	
Ethylbenzene	9.80	0.50	10	0	98	74	125	10.04	2.4	20	
Methyl tert-butyl ether (MTBE)	10.2	0.50	10	0	102	66	113	10.36	1.6	20	
Methyl ethyl ketone	96.6	20	100	0	97	63	110	103.4	6.9	20	
Methylene chloride	10.0	1.0	10	0	100	61	125	10.16	1.3	20	
Styrene	9.74	0.50	10	0	97	75	120	10.05	3.1	20	

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limit
R - RPD outside accepted recovery limits
N - Analyte concentration was not sufficiently high to calculate RPD
A - Analyte concentration greater than four times the spike amount

Client: MT DEQ Remediation Division
Work Order: H17070214
Project: Mission Waye: 483710

ANALYTICAL QC SUMMARY REPORT

Prepared by Helena, MT Branch

BatchID: R126840

Date: *21-Jul-17*

Run ID :Run Order: **5973MSD_170718A: 12** SampType: **Sample Matrix Spike Duplicate** Lab ID: **H17070214-001AMSD** Method: **SW8260B**

Analysis Date: **07/18/17 22:07** Units: **ug/L** **Prep Info:** Prep Date: Prep Method:

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	9.68	0.50	10	0	97	76	122	9.788	1.1	20	
1,1,2,2-Tetrachloroethane	10.5	0.50	10	0	105	67	124	10.48	0.4	20	
Tetrachloroethene	13.6	0.50	10	4.472	92	75	126	14.2	4.0	20	
Toluene	9.85	0.50	10	0	99	80	120	10.05	2.0	20	
1,1,1-Trichloroethane	10.3	0.50	10	0	103	75	121	10.28	0.2	20	
1,1,2-Trichloroethane	9.95	0.50	10	0	99	70	114	10.31	3.6	20	
Trichloroethene	10.1	0.50	10	0.3598	97	72	126	10.4	3.0	20	
Trichlorofluoromethane	9.72	0.50	10	0	97	78	134	10.03	3.1	20	
1,2,3-Trichloropropane	10.8	0.50	10	0	108	62	118	11.54	6.3	20	
Vinyl chloride	9.77	0.50	10	0	98	72	134	10.1	3.3	20	
m+p-Xylenes	20.1	1.0	20	0	100	80	120	20.42	1.7	20	
o-Xylene	10.0	0.50	10	0	100	74	123	10.3	2.7	20	
Xylenes, Total	30.1	0.50	30	0	100	72	124	30.71	2.0	20	
Surr: 1,2-Dichloroethane-d4	20.1	2.0	20	0	101	69	131	0			
Surr: Dibromofluoromethane	20.0	2.0	20	0	100	70	125	0			
Surr: p-Bromofluorobenzene	20.4	2.0	20	0	102	76	123	0			
Surr: Toluene-d8	19.9	2.0	20	0	99	80	119	0			

Associated samples: **H17070214-001A, H17070214-002A, H17070214-003A, H17070214-004A**

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limit
R - RPD outside accepted recovery limits
N - Analyte concentration was not sufficiently high to calculate RPD
A - Analyte concentration greater than four times the spike amount

Work Order Receipt Checklist

MT DEQ Remediation Division

H17070214

Login completed by: Tracy L. Lorash

Reviewed by: BL2000\rtooke

Reviewed Date: 7/18/2017

Date Received: 7/13/2017

Received by: TLL

Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☐	No ☑	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	1.0°C On Ice		
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Not Applicable ☑

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

Collection time on COC for MW-14 is 14:35 - one vial has time have time of 14:30. Logged in with time from COC. tl 7/13/17

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Chain of Custody & Analytical Request Record

www.energylab.com

Account Information (Billing information)

Company/Name	DEQ
Contact	Heather Foslund
Phone	406-444-6745
Mailing Address	1225 Cedar st
City, State, Zip	Helena, MT 59601
Email	hfoslund@mt.gov
Receive Invoice	☒ Hard Copy ☐ Email
Receive Report	☐ Hard Copy ☒ Email
Purchase Order	
Quote	
Bottle Order	

Report Information (if different than Account Information)

Company/Name	DEQ
Contact	Heather Foslund
Phone	406-444-6745
Mailing Address	1225 Cedar St
City, State, Zip	Helena, MT 59601
Email	hfoslund@mt.gov
Receive Report	☐ Hard Copy ☒ Email

Special Report/Formats: ☒ LEVEL IV ☐ NELAC ☒ EDD/EDT (contact laboratory) ☐ Other _____

Comments

Project Information

Project Name, PWSID, Permit, etc.	Mission Wave : 483710
Sampler Name	Heather Foslund
Sampler Phone	406-444-6745
Sample Origin State	MT
EPA/State Compliance	☒ Yes ☐ No

MINING CLIENTS, please indicate sample type.
*If ore has been processed or refined, call before sending.
☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

Analysis Requested

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	8260-Short list	See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
1	MW-3	7/12/17	15:30	3	W	X			H17070214
2	MW-9	7/12/17	13:30	3	W	X			
3	MW-14	7/12/17	14:35	3	W	X			
4	TB1	7/12/17	0:00	1	O	X			
5									
6									
7									
8									
9									
10									

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Heather Foslund	7/13/2017 9:19	Heather Foslund	Tracy Wood		
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
				Tracy Wood	7/13/17 9:19	

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals	Intact	Receipt Temp	Temp Blank	On Ice	Payment Type	Amount	Receipt Number (cash/check only)
Hand	329	Y (N) C B	Y N	1.0 °C	(Y) N	(Y) N	CC Cash Check_____	$	

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested.

Submitted to:
BNSF

Submitted by:
AECOM
Seattle, WA
August 7, 2017

Organic
Limited Data Validation Report

BNSF – Mission Wye, Montana
2017 Annual Groundwater Monitoring
Pace Analytical Laboratory Data
Energy Laboratory Data
July 2017

Prepared By Lucy Panteleeff, Chemist
Reviewed By Jennifer B. Garner, Chemist

ANALYTICAL DATA VALIDATION CHECKLIST

Overview

The samples analyzed for the BNSF – Mission Wye, Montana, July 2017 Annual Groundwater Monitoring event are listed in the Table of Samples Analyzed (page 2). Limited data validation was performed on a total of 15 groundwater samples, 1 equipment blank, 1 field blank, and 2 trip blank samples.

All samples were analyzed by Pace Analytical laboratory located in Minneapolis, Minnesota and three split samples were analyzed by Energy Laboratory located in Helena, Montana for volatile organic compounds (VOCs) by EPA Method 8260B and/or EPA Method 524.2.

The Analytical Data Validation Checklist (updated by the Montana Department of Environmental Quality on November 4, 2016) is presented as pages 3-8. Data were evaluated based on validation criteria set forth in the *National Functional Guidelines for Organic Superfund Methods Data Review*, USEPA Office of Superfund Remediation and Technology Innovation (OSRTI), document number EPA-540-R-014-002, January 2017 (with additional guidance from the *USEPA CLP National Functional Guidelines for Superfund Organic Methods Data Review*, document number USEPA-540-R-08-01, June 2008) as applied to the reported methodology. Field duplicate relative percent difference (RPD) reviews and applicable control limits were taken from Montana Department of Environmental Qualities' Data Evaluation Guidelines (MDEQ 2010).

The following data components were reviewed during the limited data validation procedure:

Submitted Deliverables
Case Narrative (report cover letters; laboratory notes)
Chain-of-Custody forms and sample integrity
Sample results, reporting limits, dilution factors
Holding times
Method blank, field blanks and trip blank results
Organic surrogate recoveries
LCS (blank spike) results
MS, MSD (matrix spike, matrix spike duplicate) results
Laboratory duplicate (or spiked duplicate) results
Electronic data deliverables (EDDs) – EQuIS format

Data Validation Qualifiers Assigned During this Review

J Estimated concentration

U Analytical result reported as detected by the laboratory was qualified as not detected based on blank contamination

UJ The analyte was not detected above the reported sample quantitation limit or was qualified as not detected due to blank contamination. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Assigned qualifiers are detailed in the Analytical Data Validation Checklist and are summarized in the Table of Qualified Analytical Results (pages 9-11).

ANALYTICAL DATA VALIDATION CHECKLIST

Overall Data Assessment

Field and laboratory precision, laboratory accuracy, method compliance, and completeness of the data set are determined to be acceptable for all methods based on the data reported. No data were missing or rejected. All reported data are suitable for their intended use with qualification.

Table of Samples Analyzed
BNSF – Mission Wye
2017 Annual Groundwater Monitoring
Pace Analytical Laboratory Report 10395793
July 2017

Matrix	Sample ID	Sample Date	Laboratory ID
Water	MW-1 / 071217	7/12/2017	10395793001
Water	MW-3 / 071217	7/12/2017	10395793002
Water	MW-4 / 071217	7/12/2017	10395793003
Water	MW-5 / 071217	7/12/2017	10395793004
Water	MW-9 / 071217	7/12/2017	10395793005
Water	MW-14 / 071217	7/12/2017	10395793006
Water	MW-30 / 071217 (Field blank)	7/12/2017	10395793007
Water	MW-32 / 071217 (Equipment blank)	7/12/2017	10395793008
Water	MW-33 / 071217 (Duplicate of MW-3 / 072117)	7/12/2017	10395793009
Water	Trip Blank / 071217	7/12/2017	10395793010
Water	MW-12 / 071317	7/13/2017	10395793011
Water	MW-18 / 071317	7/13/2017	10395793012
Water	MW-19 / 071317	7/13/2017	10395793013
Water	MW-21 / 071317	7/13/2017	10395793014
Water	MW-22 / 071317	7/13/2017	10395793015
Water	Gravel Pit Pond /071317	7/13/2017	10395793016
Water	Gravel Pit Well /071317	7/13/2017	10395793017
Water	Harris Stock Well /071317	7/13/2017	10395793018

Note:
The sample date suffixes (/071217 and/or /071317) are presented on this table for clarity; however, they will not be used in the discussions below.

Table of Samples Analyzed
BNSF – Mission Wye
2017 Annual Groundwater Monitoring
Energy Laboratory Report H17070214
July 2017

Matrix	Sample ID	Sample Date	Laboratory ID
Water	MW-3	7/12/2017	H17070214-001
Water	MW-9	7/12/2017	H17070214-002
Water	MW-14	7/12/2017	H17070214-003
Water	TB 6476 (Trip blank)	7/12/2017	H17070214-004

Montana DEQ - Remediation Division

Data Validation Summary Form (Version 1.2, Revised 11/4/16)

Please fill out the information below, using one form for each lab batch (one form can be used for multiple analytical methods). The form will grow and adjust, based on your responses. Please include a discussion regarding the sampling event in the report that is sent to DEQ with this form. For additional instructions, please click the Open Complete Instructions button.

Open Complete Instructions

Basic Questions

1. Site/Facility name	BNSF
2. Site code or facility ID (if applicable)	Mission Wye
3. Release ID (if applicable)	Not applicable
4. Project name	Mission Wye 2017 Annual Groundwater Monitoring
5. Name of DEQ-approved sampling plan	Groundwater Sampling Plan, dated November 7, 2007. Revised July 9, 2008 (revised pages sent to MDEQ)
6. Date DEQ approved the sampling plan	11/7/2007 M/D/YY
7. Name of data validator	Lucy A. Panteleeff, Jennifer B. Garner (Peer Reviewer)
8. Phone	206-428-2277
9. Date validated	Aug 7, 2017 M/D/YY

Field Collection Questions

10. Sample matrix	☐ Soil ☐ Sediment ☐ Surface water ☒ Groundwater ☐ Tap water ☐ Air (including soil gas) ☐ Other
11. Sample collection start date	Jul 12, 2017 M/D/YY
12. Sample collection end date	Jul 13, 2017 M/D/YY
13. Analytical methods used *Use Add Method button to list multiple methods. Enter any other methods in the field manually.*	Add Method / Analytical Method(s) Delete Method: "E8260B Volatile Organic Compounds By Gas Chromatography Delete Method: E524.2 Volatile Organic Compounds By Purge & Trap Capillary Column GC/MS

Laboratory-related Questions

14. Laboratory name and location	Pace Analytical Laboratory, Minneapolis, Minnesota Energy Laboratories, Helena, Montana (split sample)		
15. Laboratory project ID	10395793 and H17070214		
16. Does all data conform to analytical methods and data quality objectives specified for this project?	Yes ●	No ○	Comments: The reported methods met the requested methods indicated on the chains of custody (COCs) and were compliant with the requested analytes and matrix.
17. Were samples received in good condition and at appropriate temperature, chain-of-custody forms complete, and all samples analyzed within holding times?	Yes ○	No ●	Comments: Samples were received intact and in good condition and all samples were analyzed within the method-specified holding times. Sample receiving issues are described in Section 17b.

	Yes	No	Comments
17a. Were chain-of-custody forms complete?	●	○	The chain of custody was completed as required, including the proper signatures and dates.
17b. Were samples received in good condition, preserved, and at appropriate temperature (VOA no headspace, appropriate pH, temperature 4° C +/- 2° for most samples)?	○	●	Samples were received in good condition and properly preserved. Outliers are described below.

If no, explain

The vials for the trip blank associated with laboratory group 10395793 had headspace greater than 6 millimeters. The results for all VOCs in the trip blank were qualified as estimated and flagged "'J' or 'UJ' based on headspace in the sample vials. The laboratory noted that one trip blank on the COC was not received.

Energy Laboratories noted that the sample time on the label for one of two vials submitted for the split sample collected at MW-14 did not match the COC or other vial. The laboratory logged the sample using the time recorded on the COC.

Energy Laborartories noted that custody seals were not present on the cooler or sample bottles for laboratory group H17070214. No discrepancies related to sample condition were noted by the laboratory.

	Yes	No	Comments
17c. Were the samples analyzed within method-specified or technical holding times?	●	○	All samples were analyzed within the method-specified holding times.
18. Were all laboratory quality control procedures complied with and is data validated without qualifiers? Note: non-QA/QC related U and J flags do not require additional qualification in this section.	○	●	Data were qualified based on the presence of headspace, continuing calibration verification (CCV) outliers, laboratory and/or field blank contamination, and/or laboratory control sample (LCS) outliers, as described in Sections 17b, 18a, 18b, 18e, and 28a.
18a. Were all calibration verification results within acceptable limits?	○	●	Not applicable for this level of limited data validation; however, the laboratory noted CCV outliers in the case narrative and sample results were qualified as described below.

If no, explain

VOCs by EPA Method 8260B - The percent differences (%Ds) for bromomethane and chloroethane were outside the method limits of +/- 20% (low) in the CCV analyzed on July 24, 2017. The results for bromomethane and chloroethane in MW-1, MW-3, MW-4, MW-5, MW-9, MW-14, MW-30, MW-32, MW-33, MW-12, MW-18, MW-19, MW-21, and MW-22 were qualified as estimated and flagged 'UJ.' The trip blank was also associated with this CCV; however, the results for bromomethane and chloroethane were previously qualified in the trip blank due to the presence of air bubbles. No further qualifications based on the CCV were required.

	Yes	No	Comments
18b. Were laboratory blank samples free of contamination?	○	●	Laboratory blanks were free of contamination except as described below.

If no, explain

VOCs by EPA Method 8260B - Acetone (3.0 ug/L) and diethyl ether (0.37 ug/L) were detected in the method blank analyzed on July 24, 2017, at concentrations less than the laboratory reporting limits, but above the method detection limits (MDLs). Diethyl ether was not detected in the samples associated with this method blank; therefore, the results for diethyl ether were not qualified based on this method blank result. The results for acetone in MW-3, MW-30, MW-32, and MW-33 were reported at concentrations between the MDLs and the laboratory reporting limits; therefore, these results were qualified as not detected and flagged 'U' at the reporting limits.

VOCs by EPA Method 524.2 - Naphthalene (1.4 ug/L) was detected in the method blank analyzed on July 20, 2017, at a concentration less than the laboratory reporting limit, but above the MDL. Naphthalene was not detected in the samples associated with this method blank; therefore, the results for naphthalene were not qualified based on this method blank result.

	Yes	No	Comments
18c. Are the percent recoveries and relative percent differences of matrix spike and matrix spike duplicates within quality control limits?	○	●	The percent recoveries and/or relative percent differences (RPDs) for matrix spikes and matrix spike duplicates (MS/MSDs) were acceptable except as described below.

If no, explain

An MS/MSD by EPA Method 8260B was performed by Pace Laboratories using MW-18. The percent recoveries for 1,2-dibromoethane in the MS (72%), tetrahydrofuran in the MSD (156%), and the RPD for chloromethane (34%) were outside the control limits of 75-131%, 53-153%, and 30%, respectively. As two of the three quality control parameters were acceptable (MS, MSD, and/or RPD), data were not qualified based on the outliers noted above.

An MS/MSD by EPA Method 8260B was performed by Pace Laboratories using a sample unrelated to the Mission Wye Annual Groundwater Monitoring event. The percent recovery for tetrahydrofuran in the MSD (164%) exceeded the control limits of 53-153%, Data were not qualified based on quality control sample results from non-project samples.

An MS/MSD by EPA Method 8260B was performed by Energy Laboratories using MW-3. Results were acceptable.

An MS/MSD by EPA Method 524.2 was performed by Pace Laboratories using Gravel Pit Well. Results were acceptable.

	Yes	No	Comments
18d. Are the control samples the same matrix as the samples, and prepared the same as associated samples?	●	○	Quality control samples were performed using an aqueous matrix.
18e. Were laboratory control samples and laboratory control sample duplicate percent recoveries and relative percent differences within laboratory control limits?	○	●	LCS/LCSD percent recoveries and RPDs were acceptable except as described below.

If no, explain

VOCs by EPA Method 8260B - The percent recoveries for chloroethane (56%), dichlorofluoromethane (72%), and trichlorofluoromethane (62%) in the LCS analyzed by Pace Analytical Laboratory on July 24, 2017, were below the control limits of 63-137%, 75-125%, and 71-125%, respectively. Chloroethane was qualified based on the associated CCV outlier as described in Section 18a; therefore, no further qualification based on the LCS was necessary. The results for dichlorofluoromethane and trichlorofluoromethane in MW-1, MW-3, MW-4, MW-5, MW-9, MW-14, MW-30, MW-32, MW-33, MW-12, MW-18, MW-19, MW-21, and MW-22 were qualified as estimated and flagged 'UJ' based on these LCS results. The trip blank was also associated with this LCS; however, the results for dichlorofluoromethane and trichlorofluoromethane were qualified based on the presence of air bubbles in the sample vial and no further qualifications were required.

	Yes	No	Comments
18f. Were surrogate recoveries within laboratory quality control limits?	●	○	Surrogates recoveries were within control limits.
18g. Were the laboratory duplicate relative percent differences within data validation quality control limits?	●	○	VOCs by EPA Method 8260B - Laboratory duplicates were not performed in association with this analysis. Precision was assessed using the MS/MSD and/or the field duplicate results. VOCs by EPA Method 524.2 - A duplicate was performed using Harris Stock Well. Results were comparable.
19. Were the total number of lab method blanks at least 5% of the total number of samples, or as required by the method?	●	○	Method blanks were performed at the required frequency.
20. Were the total number of lab matrix spike samples prepared at least 5% of the total number of samples, or as required by the method?	●	○	Matrix spike samples were prepared as required by the methods.

21. Please list any project samples used for matrix spike/matrix spike duplicates.

Add Sample	Lab ID	Field Sample ID	Comments
Delete Sample	10395793012	MW-18	See Section 18c for details
Delete Sample	M17070214-001	MW-3	Acceptable
Delete Sample	10395793012	Gravel Pit Well	Acceptable

	Yes	No	Comments
22. Is the total number of laboratory control samples at least 5% of the total number of samples?	●	○	Laboratory control samples were prepared as required by the methods.

Consultant/Validator Questions

	Yes	No	Comments
23. Are the detection limits appropriate for the project (i.e. at or below screening levels)?	●	○	One or more sample results were flagged 'J' by the laboratory to indicate that the concentrations were less than the laboratory reporting limits but above the MDLs. Laboratory J-flagged results are considered estimated results unless qualified as not detected and flagged 'U' based on blank contamination as described in Sections 18b and 28a. As the results are between the MDLs and the reporting limits, there are greater levels of uncertainty associated with the numerical results.
24. Are the reported units appropriate for the sample matrix (i.e. water results in ug/L, not mg/kg)?	●	○	Correct concentration units were reported. All VOC results were reported as ug/L.

25. Do the analytical methods comply with project requirements (e.g. in the SAP, work plan, or QAPP)?	Yes ●	No ○	Comments The reported method met project requirements.
26. Do the laboratory reports include all constituents requested to be analyzed on the chain-of-custody or under the sampling plan or other applicable document?	Yes ●	No ○	Comments Only analytes applicable to the requested method were reported.
27. Is the number of sample blanks (e.g. equipment, trip, or field blanks) equal to at least 10% of the total number of samples, or as otherwise required?	Yes ●	No ○	Comments One equipment blank, one field blank, and two trip blanks were submitted in association with these samples.
28. Are field blanks free from contamination, duplicates collected as required, and field duplicate percent differences within data validation quality control limits?	Yes ○	No ●	Comments A field duplicate was submitted for MW-3 and identified as MW-33. The field duplicate RPDs were within data validation control limits of 30% for analytes reported at concentrations greater than five times the reporting limits. See Table 3 for details regarding field duplicate RPDs. Field and equipment blank outliers are discussed in Section 28a.
28a. Were all blank samples free of analyte contamination?	Yes ○	No ●	Comments The equipment blank, field blank, and trip blank were free of contamination except as described below. See Table 2 for blank details.

If no, explain

Methylene chloride (0.69 ug/L) was detected in the trip blank at a concentration less than the laboratory reporting limit but above the MDL. Methylene chloride was not detected in the samples associated with this trip blank; therefore, no data were qualified based on this trip blank result.

Acetone (4.5 ug/L), chloroform (0.74 ug/L), and 1,2-dichloroethane (0.22 ug/L) were detected in the equipment blank at concentrations less than the laboratory reporting limits but above the MDLs. The results for acetone were qualified as not detected in the equipment blank and associated samples as described in Section18b and no further qualifications based on the equipment blank were required. Chloroform was not detected in the samples associated with the equipment blank; therefore, no data were qualified based on this result. The results for 1,2-dichloroethane in MW-4, MW-5, MW-14, MW-18, and MW-22 were reported at concentrations above the MDLs but below the laboratory reporting limits; therefore, the results for 1,2-dichloroethane in these samples were qualified as not detected and flagged 'U' at the reporting limits.

Acetone (2.1 ug/L), chloroform (0.86 ug/L), and 1,2-dichloroethane (0.19 ug/L) were detected in the field blank at concentrations less than the laboratory reporting limits but above the MDLs. The results for acetone and/or 1,2-dichloroethane were qualified as not detected based on method and/or equipment blank contamination and as described in Section18b. Chloroform was not detected in the samples associated with the field blank; therefore, no data were qualified based on this result.

28b. Were field duplicates collected as required?	Yes ●	No ○	Comments A field duplicate was submitted for MW-3 and identified as MW-33. The field duplicate was analyzed only by Pace Analytical Laboratory and analyzed by EPA Method 8260B.
28c. Are field duplicate relative percent differences within data validation quality control limits?	Yes ●	No ○	Comments

The field duplicate was within data validation control limits of 30% for analytes reported at concentrations greater than five time the reporting limits. See Table 3 for RPD results.

29. Please provide an Excel or CSV file to the DEQ project manager (via e-mail or CD) that lists all samples evaluated in this summary and lists any qualified data.
Please use the following format:

Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Example 48310-2.31E	Example GW-1	R	Sample dropped in lab and unrecoverable
Example 48310-2.32D	Example GW-2		

Please use the following format for qualifiers. See EPA's National Functional Guidelines for more information on qualifiers for unique samples such as dioxins.

Qualifier	Explanation
C	Pesticide and Arochlor results confirmed with GC/MS
J-	Estimated value, may be biased low
J	Analyte identified, but concentration is estimated
J+	Estimated value, may be biased high
NJ	Tentatively identified compound
R	Sample result rejected
U	Analyte analyzed for, but not detected above quantitation limit
UJ	Analyte not detected above CRQL, but CRQL may be inaccurate
X	Pesticide and Arochlor results attempted using GC/MS, but unsuccessful

If you wish to manually enter qualified sample results, please use the table below.

Add Sample	Lab ID	Field Sample ID	Qualifiers	Comments (indicate whether the issue biases the results high or low)
Delete Sample	MW-3	MW-33	none	Results were comparable.

30. What is the percent completeness (samples planned versus valid samples collected)? 100%

Comments: The data reported in this laboratory group, as qualified, are considered to be usable for meeting project objectives. No data were rejected; therefore, the percent completeness is 100%.

31. Was the completeness goal met? Yes ● No ○

Comments: Completeness of this data set was 100%

32. Other general comments or observations?

Split Samples

33. Did DEQ collect split samples? Yes ● No ○

Comments: MW-3, MW-9, and MW-14 were collected as a split samples by Department of Environmental Qualitly (DEQ) and submitted to Energy Laboratories.

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Table 1
Summary of Qualifiers Assigned to Sample Results
BNSF- Mission Wye
July 2017 Annual Groundwater Monitoring

SDG	Sample ID	Pace ID	Method	Analyte	Method Detection Limit	Laboratory Reporting Limit	Laboratory Result	Units	Final Result	Reason Code
10395793	MW-1 / 071217	10395793001	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	l
10395793	MW-1 / 071217	10395793001	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	l
10395793	MW-1 / 071217	10395793001	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	ug/l	0.34 UJ	cv
10395793	MW-1 / 071217	10395793001	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	cv
10395793	MW-3 / 071217	10395793002	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	l
10395793	MW-3 / 071217	10395793002	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	l
10395793	MW-3 / 071217	10395793002	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	ug/l	0.34 UJ	cv
10395793	MW-3 / 071217	10395793002	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	cv
10395793	MW-3 / 071217	10395793002	8260B	Acetone	2.0	20.0	2.7 J,B	ug/l	20.0 U	bl
10395793	MW-4 / 071217	10395793003	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	l
10395793	MW-4 / 071217	10395793003	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	l
10395793	MW-4 / 071217	10395793003	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	ug/l	0.34 UJ	cv
10395793	MW-4 / 071217	10395793003	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	cv
10395793	MW-4 / 071217	10395793003	8260B	1,2-Dichloroethane	0.17	1.0	0.22 J	ug/l	1.0 U	be
10395793	MW-5 / 071217	10395793004	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	l
10395793	MW-5 / 071217	10395793004	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	l
10395793	MW-5 / 071217	10395793004	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	ug/l	0.34 UJ	cv
10395793	MW-5 / 071217	10395793004	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	cv
10395793	MW-5 / 071217	10395793004	8260B	1,2-Dichloroethane	0.17	1.0	0.18 J	ug/l	1.0 U	be
10395793	MW-9 / 071217	10395793005	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	l
10395793	MW-9 / 071217	10395793005	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	l
10395793	MW-9 / 071217	10395793005	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	ug/l	0.34 UJ	cv
10395793	MW-9 / 071217	10395793005	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	cv
10395793	MW-14 / 071217	10395793006	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	l
10395793	MW-14 / 071217	10395793006	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	l
10395793	MW-14 / 071217	10395793006	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	ug/l	0.34 UJ	cv
10395793	MW-14 / 071217	10395793006	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	cv
10395793	MW-14 / 071217	10395793006	8260B	1,2-Dichloroethane	0.17	1.0	0.22 J	ug/l	1.0 U	be
10395793	MW-30 / 071217	10395793007	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	l
10395793	MW-30 / 071217	10395793007	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	l
10395793	MW-30 / 071217	10395793007	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	ug/l	0.34 UJ	cv
10395793	MW-30 / 071217	10395793007	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	cv
10395793	MW-30 / 071217	10395793007	8260B	Acetone	2.0	20.0	2.1 J,B	ug/l	20.0 U	bl
10395793	MW-32 / 071217	10395793008	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	l
10395793	MW-32 / 071217	10395793008	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	l
10395793	MW-32 / 071217	10395793008	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	ug/l	0.34 UJ	cv
10395793	MW-32 / 071217	10395793008	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	cv
10395793	MW-32 / 071217	10395793008	8260B	Acetone	2.0	20.0	4.5 J,B	ug/l	20.0 U	bl
10395793	MW-33 / 071217	10395793009	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	l
10395793	MW-33 / 071217	10395793009	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	l
10395793	MW-33 / 071217	10395793009	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	ug/l	0.34 UJ	cv
10395793	MW-33 / 071217	10395793009	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	cv
10395793	MW-33 / 071217	10395793009	8260B	Acetone	2.0	20.0	2.3 J,B	ug/l	20.0 U	bl
10395793	TRIP BLANK / 071217	10395793010	8260B	Ethylbenzene	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Isopropylbenzene	0.25	1.0	0.25 U	ug/l	0.25 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	4-Isopropyltoluene	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	tert-Butylbenzene	0.22	1.0	0.22 U	ug/l	0.22 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,2-Dibromo-3-chloropropane	0.60	4.0	0.60 U	ug/l	0.60 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,2,3-Trichloropropane	0.28	4.0	0.28 U	ug/l	0.28 UJ	hs

Table 1
Summary of Qualifiers Assigned to Sample Results
BNSF- Mission Wye
July 2017 Annual Groundwater Monitoring

SDG	Sample ID	Pace ID	Method	Analyte	Method Detection Limit	Laboratory Reporting Limit	Laboratory Result	Units	Final Result	Reason Code
10395793	TRIP BLANK / 071217	10395793010	8260B	1,2,4-Trimethylbenzene	0.18	1.0	0.18 U	ug/l	0.18 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	2-Chlorotoluene	0.30	1.0	0.30 U	ug/l	0.30 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,2-Dichlorobenzene	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Naphthalene	0.20	4.0	0.20 U	ug/l	0.20 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Hexachlorobutadiene	0.18	1.0	0.18 U	ug/l	0.18 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,1,2,2-Tetrachloroethane	0.22	1.0	0.22 U	ug/l	0.22 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,2,3-Trichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Trichloroethene	0.052	0.40	0.052 U	ug/l	0.052 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	2-Butanone	1.1	5.0	1.1 U	ug/l	1.1 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,1,2-Trichloroethane	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,2-Dichloropropane	0.22	4.0	0.22 U	ug/l	0.22 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Dichlorodifluoromethane	0.23	1.0	0.23 U	ug/l	0.23 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,1,2-Trichloro-1,2,2-trifluoroethane	0.32	1.0	0.32 U	ug/l	0.32 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,1-Dichloroethene	0.28	1.0	0.28 U	ug/l	0.28 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,1-Dichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Bromoform	0.27	4.0	0.27 U	ug/l	0.27 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Bromodichloromethane	0.24	1.0	0.24 U	ug/l	0.24 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Methylene chloride	0.29	4.0	0.69 J	ug/l	0.69 J	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Chloroethane	0.34	1.0	0.34 U,CL	ug/l	0.34 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Vinyl chloride	0.069	0.20	0.069 U	ug/l	0.069 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Bromochloromethane	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Chloromethane	0.25	4.0	0.25 U	ug/l	0.25 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Dibromomethane	0.19	4.0	0.19 U	ug/l	0.19 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Benzene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,1,1-Trichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Chloroform	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,1,1,2-Tetrachloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Acetone	2.0	20.0	2.0 U	ug/l	2.0 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Diethyl ether (Ethyl ether)	0.19	4.0	0.19 U	ug/l	0.19 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,1-Dichloropropene	0.23	1.0	0.23 U	ug/l	0.23 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	2,2-Dichloropropane	0.13	4.0	0.13 U	ug/l	0.13 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Carbon tetrachloride	0.20	1.0	0.20 U	ug/l	0.20 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Methyl tert-butyl ether	0.15	1.0	0.15 U	ug/l	0.15 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,3-Dichlorobenzene	0.12	1.0	0.12 U	ug/l	0.12 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	trans-1,2-Dichloroethene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,3-Dichloropropane	0.096	1.0	0.096 U	ug/l	0.096 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	cis-1,2-Dichloroethene	0.12	1.0	0.12 U	ug/l	0.12 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	sec-Butylbenzene	0.19	1.0	0.19 U	ug/l	0.19 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Tetrachloroethene	0.25	1.0	0.25 U	ug/l	0.25 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Xylenes, total	0.32	3.0	0.32 U	ug/l	0.32 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Dibromochloromethane	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Tetrahydrofuran	1.5	10.0	1.5 U	ug/l	1.5 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,2,4-Trichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Chlorobenzene	0.11	1.0	0.11 U	ug/l	0.11 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Bromobenzene	0.34	1.0	0.34 U	ug/l	0.34 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Toluene	0.14	1.0	0.14 U	ug/l	0.14 UJ	hs

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SDG	Sample ID	Pace ID	Method	Analyte	Method Detection Limit	Laboratory Reporting Limit	Laboratory Result	Units	Final Result	Reason Code
10395793	TRIP BLANK / 071217	10395793010	8260B	1,3,5-Trimethylbenzene	0.27	1.0	0.27 U	ug/l	0.27 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,2-Dichloroethane	0.17	1.0	0.17 U	ug/l	0.17 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	4-Methyl-2-pentanone	0.43	5.0	0.43 U	ug/l	0.43 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Allyl chloride	0.25	4.0	0.25 U	ug/l	0.25 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,4-Dichlorobenzene	0.21	1.0	0.21 U	ug/l	0.21 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	1,2-Dibromoethane	0.20	1.0	0.20 U	ug/l	0.20 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	4-Chlorotoluene	0.26	1.0	0.26 U	ug/l	0.26 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	n-Propylbenzene	0.23	1.0	0.23 U	ug/l	0.23 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	n-Butylbenzene	0.16	1.0	0.16 U	ug/l	0.16 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	trans-1,3-Dichloropropene	0.15	4.0	0.15 U	ug/l	0.15 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	Styrene	0.29	1.0	0.29 U	ug/l	0.29 UJ	hs
10395793	TRIP BLANK / 071217	10395793010	8260B	cis-1,3-Dichloropropene	0.15	4.0	0.15 U	ug/l	0.15 UJ	hs
10395793	MW-12 / 071317	10395793011	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	l
10395793	MW-12 / 071317	10395793011	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	l
10395793	MW-12 / 071317	10395793011	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	ug/l	0.34 UJ	cv
10395793	MW-12 / 071317	10395793011	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	cv
10395793	MW-18 / 071317	10395793012	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	l
10395793	MW-18 / 071317	10395793012	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	l
10395793	MW-18 / 071317	10395793012	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	ug/l	0.34 UJ	cv
10395793	MW-18 / 071317	10395793012	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	cv
10395793	MW-18 / 071317	10395793012	8260B	1,2-Dichloroethane	0.17	1.0	0.21 J	ug/l	1.0 U	be
10395793	MW-19 / 071317	10395793013	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	l
10395793	MW-19 / 071317	10395793013	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	l
10395793	MW-19 / 071317	10395793013	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	ug/l	0.34 UJ	cv
10395793	MW-19 / 071317	10395793013	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	cv
10395793	MW-21 / 071317	10395793014	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	l
10395793	MW-21 / 071317	10395793014	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	l
10395793	MW-21 / 071317	10395793014	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	ug/l	0.34 UJ	cv
10395793	MW-21 / 071317	10395793014	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	cv
10395793	MW-22 / 071317	10395793015	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	ug/l	0.33 UJ	l
10395793	MW-22 / 071317	10395793015	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	ug/l	0.21 UJ	l
10395793	MW-22 / 071317	10395793015	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	ug/l	0.34 UJ	cv
10395793	MW-22 / 071317	10395793015	8260B	Bromomethane	0.44	4.0	0.44 U,CL	ug/l	0.44 UJ	cv
10395793	MW-22 / 071317	10395793015	8260B	1,2-Dichloroethane	0.17	1.0	0.20 J	ug/l	1.0 U	be

Notes:
U - Compound was analyzed for, but not detected above the method detection limit (MDL) or reporting limit shown.
UJ - Compound was analyzed for, but not detected above the MDL or reporting limit shown. The MDL or reporting limit are estimated values.
ug/L - microgram per liter
hs - headspace present in sample vial
be - equipment blank contamination
bl - laboratory blank contamination
cv - calibrion verification outlier
J - estimated value
B - analyte was detected in associated method blank
CL - continuing calibration verification (low)
l - lcs recovery outlier
L2 - laboratory control sample (low)

Table 2
Summary of Blank Samples
BNSF- Mission Wye
July 2017 Annual Groundwater Monitoring

Blank ID	Blank Type	Method	Analyte	Method Detection Limit	Laboratory Reporting Limit	Laboratory Result	Final Result	Units
MW-30 / 071217	Field Blank	8260B	1,1,1,2-Tetrachloroethane	0.17	1.0	0.17 U	0.17 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,1,1-Trichloroethane	0.17	1.0	0.17 U	0.17 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,1,2,2-Tetrachloroethane	0.22	1.0	0.22 U	0.22 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,1,2-Trichloro-1,2,2-trifluoroethane	0.32	1.0	0.32 U	0.32 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,1,2-Trichloroethane	0.15	1.0	0.15 U	0.15 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,1-Dichloroethane	0.17	1.0	0.17 U	0.17 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,1-Dichloroethene	0.28	1.0	0.28 U	0.28 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,1-Dichloropropene	0.23	1.0	0.23 U	0.23 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,2,3-Trichlorobenzene	0.21	1.0	0.21 U	0.21 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,2,3-Trichloropropane	0.28	4.0	0.28 U	0.28 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,2,4-Trichlorobenzene	0.21	1.0	0.21 U	0.21 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,2,4-Trimethylbenzene	0.18	1.0	0.18 U	0.18 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,2-Dibromo-3-chloropropane	0.60	4.0	0.60 U	0.60 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,2-Dibromoethane	0.20	1.0	0.20 U	0.20 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,2-Dichlorobenzene	0.17	1.0	0.17 U	0.17 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,2-Dichloroethane	0.17	1.0	0.19 J	0.19 J	ug/l
MW-30 / 071217	Field Blank	8260B	1,2-Dichloropropane	0.22	4.0	0.22 U	0.22 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,3,5-Trimethylbenzene	0.27	1.0	0.27 U	0.27 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,3-Dichlorobenzene	0.12	1.0	0.12 U	0.12 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,3-Dichloropropane	0.096	1.0	0.096 U	0.096 U	ug/l
MW-30 / 071217	Field Blank	8260B	1,4-Dichlorobenzene	0.21	1.0	0.21 U	0.21 U	ug/l
MW-30 / 071217	Field Blank	8260B	2,2-Dichloropropane	0.13	4.0	0.13 U	0.13 U	ug/l
MW-30 / 071217	Field Blank	8260B	2-Butanone	1.1	5.0	1.1 U	1.1 U	ug/l
MW-30 / 071217	Field Blank	8260B	2-Chlorotoluene	0.30	1.0	0.30 U	0.30 U	ug/l
MW-30 / 071217	Field Blank	8260B	4-Chlorotoluene	0.26	1.0	0.26 U	0.26 U	ug/l
MW-30 / 071217	Field Blank	8260B	4-Isopropyltoluene	0.19	1.0	0.19 U	0.19 U	ug/l
MW-30 / 071217	Field Blank	8260B	4-Methyl-2-pentanone	0.43	5.0	0.43 U	0.43 U	ug/l
MW-30 / 071217	Field Blank	8260B	Acetone	2.0	20.0	2.1 J,B	20.0 U	ug/l
MW-30 / 071217	Field Blank	8260B	Allyl chloride	0.25	4.0	0.25 U	0.25 U	ug/l
MW-30 / 071217	Field Blank	8260B	Benzene	0.16	1.0	0.16 U	0.16 U	ug/l
MW-30 / 071217	Field Blank	8260B	Bromobenzene	0.34	1.0	0.34 U	0.34 U	ug/l
MW-30 / 071217	Field Blank	8260B	Bromochloromethane	0.19	1.0	0.19 U	0.19 U	ug/l
MW-30 / 071217	Field Blank	8260B	Bromodichloromethane	0.24	1.0	0.24 U	0.24 U	ug/l
MW-30 / 071217	Field Blank	8260B	Bromoform	0.27	4.0	0.27 U	0.27 U	ug/l
MW-30 / 071217	Field Blank	8260B	Bromomethane	0.44	4.0	0.44 U,CL	0.44 UJ	ug/l
MW-30 / 071217	Field Blank	8260B	Carbon tetrachloride	0.20	1.0	0.20 U	0.20 U	ug/l
MW-30 / 071217	Field Blank	8260B	Chlorobenzene	0.11	1.0	0.11 U	0.11 U	ug/l
MW-30 / 071217	Field Blank	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	0.34 UJ	ug/l
MW-30 / 071217	Field Blank	8260B	Chloroform	0.21	1.0	0.86 J	0.86 J	ug/l
MW-30 / 071217	Field Blank	8260B	Chloromethane	0.25	4.0	0.25 U	0.25 U	ug/l
MW-30 / 071217	Field Blank	8260B	cis-1,2-Dichloroethene	0.12	1.0	0.12 U	0.12 U	ug/l
MW-30 / 071217	Field Blank	8260B	cis-1,3-Dichloropropene	0.15	4.0	0.15 U	0.15 U	ug/l
MW-30 / 071217	Field Blank	8260B	Dibromochloromethane	0.16	1.0	0.16 U	0.16 U	ug/l
MW-30 / 071217	Field Blank	8260B	Dibromomethane	0.19	4.0	0.19 U	0.19 U	ug/l
MW-30 / 071217	Field Blank	8260B	Dichlorodifluoromethane	0.23	1.0	0.23 U	0.23 U	ug/l
MW-30 / 071217	Field Blank	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	0.21 UJ	ug/l
MW-30 / 071217	Field Blank	8260B	Diethyl ether (Ethyl ether)	0.19	4.0	0.19 U	0.19 U	ug/l
MW-30 / 071217	Field Blank	8260B	Ethylbenzene	0.15	1.0	0.15 U	0.15 U	ug/l
MW-30 / 071217	Field Blank	8260B	Hexachlorobutadiene	0.18	1.0	0.18 U	0.18 U	ug/l

Table 2
Summary of Blank Samples
BNSF- Mission Wye
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Blank ID	Blank Type	Method	Analyte	Method Detection Limit	Laboratory Reporting Limit	Laboratory Result	Final Result	Units
MW-30 / 071217	Field Blank	8260B	Isopropylbenzene	0.25	1.0	0.25 U	0.25 U	ug/l
MW-30 / 071217	Field Blank	8260B	Methyl tert-butyl ether	0.15	1.0	0.15 U	0.15 U	ug/l
MW-30 / 071217	Field Blank	8260B	Methylene chloride	0.29	4.0	0.29 U	0.29 U	ug/l
MW-30 / 071217	Field Blank	8260B	Naphthalene	0.20	4.0	0.20 U	0.20 U	ug/l
MW-30 / 071217	Field Blank	8260B	n-Butylbenzene	0.16	1.0	0.16 U	0.16 U	ug/l
MW-30 / 071217	Field Blank	8260B	n-Propylbenzene	0.23	1.0	0.23 U	0.23 U	ug/l
MW-30 / 071217	Field Blank	8260B	sec-Butylbenzene	0.19	1.0	0.19 U	0.19 U	ug/l
MW-30 / 071217	Field Blank	8260B	Styrene	0.29	1.0	0.29 U	0.29 U	ug/l
MW-30 / 071217	Field Blank	8260B	tert-Butylbenzene	0.22	1.0	0.22 U	0.22 U	ug/l
MW-30 / 071217	Field Blank	8260B	Tetrachloroethene	0.25	1.0	0.25 U	0.25 U	ug/l
MW-30 / 071217	Field Blank	8260B	Tetrahydrofuran	1.5	10.0	1.5 U	1.5 U	ug/l
MW-30 / 071217	Field Blank	8260B	Toluene	0.14	1.0	0.14 U	0.14 U	ug/l
MW-30 / 071217	Field Blank	8260B	trans-1,2-Dichloroethene	0.16	1.0	0.16 U	0.16 U	ug/l
MW-30 / 071217	Field Blank	8260B	trans-1,3-Dichloropropene	0.15	4.0	0.15 U	0.15 U	ug/l
MW-30 / 071217	Field Blank	8260B	Trichloroethene	0.052	0.40	0.052 U	0.052 U	ug/l
MW-30 / 071217	Field Blank	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	0.33 UJ	ug/l
MW-30 / 071217	Field Blank	8260B	Vinyl chloride	0.069	0.20	0.069 U	0.069 U	ug/l
MW-30 / 071217	Field Blank	8260B	Xylenes, total	0.32	3.0	0.32 U	0.32 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,1,1,2-Tetrachloroethane	0.17	1.0	0.17 U	0.17 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,1,1-Trichloroethane	0.17	1.0	0.17 U	0.17 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,1,2,2-Tetrachloroethane	0.22	1.0	0.22 U	0.22 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,1,2-Trichloro-1,2,2-trifluoroethane	0.32	1.0	0.32 U	0.32 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,1,2-Trichloroethane	0.15	1.0	0.15 U	0.15 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,1-Dichloroethane	0.17	1.0	0.17 U	0.17 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,1-Dichloroethene	0.28	1.0	0.28 U	0.28 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,1-Dichloropropene	0.23	1.0	0.23 U	0.23 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,2,3-Trichlorobenzene	0.21	1.0	0.21 U	0.21 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,2,3-Trichloropropane	0.28	4.0	0.28 U	0.28 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,2,4-Trichlorobenzene	0.21	1.0	0.21 U	0.21 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,2,4-Trimethylbenzene	0.18	1.0	0.18 U	0.18 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,2-Dibromo-3-chloropropane	0.60	4.0	0.60 U	0.60 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,2-Dibromoethane	0.20	1.0	0.20 U	0.20 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,2-Dichlorobenzene	0.17	1.0	0.17 U	0.17 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,2-Dichloroethane	0.17	1.0	0.22 J	0.22 J	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,2-Dichloropropane	0.22	4.0	0.22 U	0.22 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,3,5-Trimethylbenzene	0.27	1.0	0.27 U	0.27 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,3-Dichlorobenzene	0.12	1.0	0.12 U	0.12 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,3-Dichloropropane	0.096	1.0	0.096 U	0.096 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	1,4-Dichlorobenzene	0.21	1.0	0.21 U	0.21 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	2,2-Dichloropropane	0.13	4.0	0.13 U	0.13 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	2-Butanone	1.1	5.0	1.1 U	1.1 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	2-Chlorotoluene	0.30	1.0	0.30 U	0.30 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	4-Chlorotoluene	0.26	1.0	0.26 U	0.26 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	4-Isopropyltoluene	0.19	1.0	0.19 U	0.19 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	4-Methyl-2-pentanone	0.43	5.0	0.43 U	0.43 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Acetone	2.0	20.0	4.5 J,B	20.0 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Allyl chloride	0.25	4.0	0.25 U	0.25 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Benzene	0.16	1.0	0.16 U	0.16 U	ug/l

Table 2
Summary of Blank Samples
BNSF- Mission Wye
July 2017 Annual Groundwater Monitoring

Blank ID	Blank Type	Method	Analyte	Method Detection Limit	Laboratory Reporting Limit	Laboratory Result	Final Result	Units
MW-32 / 071217	Equipment Blank	8260B	Bromobenzene	0.34	1.0	0.34 U	0.34 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Bromochloromethane	0.19	1.0	0.19 U	0.19 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Bromodichloromethane	0.24	1.0	0.24 U	0.24 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Bromoform	0.27	4.0	0.27 U	0.27 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Bromomethane	0.44	4.0	0.44 U,CL	0.44 UJ	ug/l
MW-32 / 071217	Equipment Blank	8260B	Carbon tetrachloride	0.20	1.0	0.20 U	0.20 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Chlorobenzene	0.11	1.0	0.11 U	0.11 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Chloroethane	0.34	1.0	0.34 U,L2,CL	0.34 UJ	ug/l
MW-32 / 071217	Equipment Blank	8260B	Chloroform	0.21	1.0	0.74 J	0.74 J	ug/l
MW-32 / 071217	Equipment Blank	8260B	Chloromethane	0.25	4.0	0.25 U	0.25 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	cis-1,2-Dichloroethene	0.12	1.0	0.12 U	0.12 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	cis-1,3-Dichloropropene	0.15	4.0	0.15 U	0.15 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Dibromochloromethane	0.16	1.0	0.16 U	0.16 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Dibromomethane	0.19	4.0	0.19 U	0.19 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Dichlorodifluoromethane	0.23	1.0	0.23 U	0.23 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Dichlorofluoromethane	0.21	1.0	0.21 U,L2	0.21 UJ	ug/l
MW-32 / 071217	Equipment Blank	8260B	Diethyl ether (Ethyl ether)	0.19	4.0	0.19 U	0.19 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Ethylbenzene	0.15	1.0	0.15 U	0.15 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Hexachlorobutadiene	0.18	1.0	0.18 U	0.18 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Isopropylbenzene	0.25	1.0	0.25 U	0.25 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Methyl tert-butyl ether	0.15	1.0	0.15 U	0.15 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Methylene chloride	0.29	4.0	0.29 U	0.29 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Naphthalene	0.20	4.0	0.20 U	0.20 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	n-Butylbenzene	0.16	1.0	0.16 U	0.16 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	n-Propylbenzene	0.23	1.0	0.23 U	0.23 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	sec-Butylbenzene	0.19	1.0	0.19 U	0.19 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Styrene	0.29	1.0	0.29 U	0.29 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	tert-Butylbenzene	0.22	1.0	0.22 U	0.22 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Tetrachloroethene	0.25	1.0	0.25 U	0.25 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Tetrahydrofuran	1.5	10.0	1.5 U	1.5 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Toluene	0.14	1.0	0.14 U	0.14 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	trans-1,2-Dichloroethene	0.16	1.0	0.16 U	0.16 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	trans-1,3-Dichloropropene	0.15	4.0	0.15 U	0.15 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Trichloroethene	0.052	0.40	0.052 U	0.052 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Trichlorofluoromethane	0.33	1.0	0.33 U,L2	0.33 UJ	ug/l
MW-32 / 071217	Equipment Blank	8260B	Vinyl chloride	0.069	0.20	0.069 U	0.069 U	ug/l
MW-32 / 071217	Equipment Blank	8260B	Xylenes, total	0.32	3.0	0.32 U	0.32 U	ug/l

Table 3
Summary of Field Duplicate Results and RPDs
BNSF- Mission Wye
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Sample ID	Field Duplicate ID	Analyte	Parent Sample Results	Field Duplicate Results	Units	RPD
MW-3 / 071217	MW-33 / 071217	1,1,1,2-Tetrachloroethane	0.17 U	0.17 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,1,1-Trichloroethane	0.17 U	0.17 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,1,2,2-Tetrachloroethane	0.22 U	0.22 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,1,2-Trichloro-1,2,2-trifluoroethane	0.32 U	0.32 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,1,2-Trichloroethane	0.15 U	0.15 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,1-Dichloroethane	0.17 U	0.17 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,1-Dichloroethene	0.28 U	0.28 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,1-Dichloropropene	0.23 U	0.23 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,2,3-Trichlorobenzene	0.21 U	0.21 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,2,3-Trichloropropane	0.28 U	0.28 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,2,4-Trichlorobenzene	0.21 U	0.21 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,2,4-Trimethylbenzene	0.18 U	0.18 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,2-Dibromo-3-chloropropane	0.60 U	0.60 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,2-Dibromoethane	0.20 U	0.20 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,2-Dichlorobenzene	0.17 U	0.17 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,2-Dichloroethane	0.17 U	0.17 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,2-Dichloropropane	0.22 U	0.22 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,3,5-Trimethylbenzene	0.27 U	0.27 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,3-Dichlorobenzene	0.12 U	0.12 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,3-Dichloropropane	0.096 U	0.096 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	1,4-Dichlorobenzene	0.21 U	0.21 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	2,2-Dichloropropane	0.13 U	0.13 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	2-Butanone	1.1 U	1.1 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	2-Chlorotoluene	0.30 U	0.30 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	4-Chlorotoluene	0.26 U	0.26 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	4-Isopropyltoluene	0.19 U	0.19 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	4-Methyl-2-pentanone	0.43 U	0.43 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Acetone	2.7 U	20.0 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Allyl chloride	0.25 U	0.25 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Benzene	0.16 U	0.16 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Bromobenzene	0.34 U	0.34 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Bromochloromethane	0.19 U	0.19 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Bromodichloromethane	0.24 U	0.24 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Bromoform	0.27 U	0.27 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Bromomethane	0.44 UJ	0.44 UJ	ug/l	Both results ND

Table 3
Summary of Field Duplicate Results and RPDs
BNSF- Mission Wye
July 2017 Annual Groundwater Monitoring

Sample ID	Field Duplicate ID	Analyte	Parent Sample Results	Field Duplicate Results	Units	RPD
MW-3 / 071217	MW-33 / 071217	Carbon tetrachloride	0.20 U	0.20 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Chlorobenzene	0.11 U	0.11 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Chloroethane	0.34 UJ	0.34 UJ	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Chloroform	0.21 U	0.21 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Chloromethane	0.25 U	0.25 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	cis-1,2-Dichloroethene	0.12 U	0.12 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	cis-1,3-Dichloropropene	0.15 U	0.15 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Dibromochloromethane	0.16 U	0.16 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Dibromomethane	0.19 U	0.19 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Dichlorodifluoromethane	0.23 U	0.23 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Dichlorofluoromethane	0.21 UJ	0.21 UJ	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Diethyl ether (Ethyl ether)	0.19 U	0.19 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Ethylbenzene	0.15 U	0.15 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Hexachlorobutadiene	0.18 U	0.18 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Isopropylbenzene	0.25 U	0.25 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Methyl tert-butyl ether	0.15 U	0.15 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Methylene chloride	0.29 U	0.29 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Naphthalene	0.20 U	0.20 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	n-Butylbenzene	0.16 U	0.16 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	n-Propylbenzene	0.23 U	0.23 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	sec-Butylbenzene	0.19 U	0.19 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Styrene	0.29 U	0.29 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	tert-Butylbenzene	0.22 U	0.22 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Tetrachloroethene	4.7	4.3	ug/l	8.9%
MW-3 / 071217	MW-33 / 071217	Tetrahydrofuran	1.5 U	1.5 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Toluene	0.14 U	0.14 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	trans-1,2-Dichloroethene	0.16 U	0.16 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	trans-1,3-Dichloropropene	0.15 U	0.15 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Trichloroethene	0.35 J	0.35 J	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Trichlorofluoromethane	0.33 UJ	0.33 UJ	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Vinyl chloride	0.069 U	0.069 U	ug/l	Both results ND
MW-3 / 071217	MW-33 / 071217	Xylenes, total	0.32 U	0.32 U	ug/l	Both results ND

ID - identification
ND - not detected
RPD - relative percent difference

Attachment 4

Historical Groundwater Sample Result Summary

Table 1 Tetrachloroethylene (PCE) Concentrations (µg/L), Historical Analytical Results (July 1992-July 2017)
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

	Pre and During Interim Remedial Activities								
Well Number	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
MW-1	< 1.0	< 1	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	< 1.0	< 1.0
MW-3	**1,000**	**1,600**	**564**	**381**	**726**	**910**	**845**	**314**	**180**
MW-4	<1.0	NA	NA	NA	NA	NA	**31**	**12**	< 6.8
MW-5	**17**	**15**	**26**	**18**	**22**	**29**	**43**	**18**	< 9.9
MW-9	**96**	NA	NA	NA	NA	**50**	**87**	**39**	< 12
MW-12	NA	NA	NA	NA	NA	NA	1.8	1.2	< 1.0
MW-14	**29**	**17**	**19**	**18**	**14**	NA	NA	NA	NA
MW-18	NA	NA	NA	NA	3.4	3.8	3.7	3.9	< 2.4
MW-19	NA	NA	NA	< 1.0	< 1.0	NA	< 1.00	0.5	< 1.0

	Post Interim Remedial Activities																
Well Number	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
MW-1	< 1.0	< 1.0	< 1.0	< 1.0	< 0.400	< 0.200	< 0.200	< 0.200	< 1.0	< 1.0	< 1.0	< 0.10	< 1.0	< 1.0	< 0.19	< 0.13	< 0.25
MW-3	**173**	**200**	**223**	**195**	**48.3**	**165**	**117**	**85.6**	< 1.0	37	260	**30**	**93**	**35.2**	**67.4**	**6.4**	4.7
MW-4	2.6	**14**	2.86	**10.4**	0.67	**12.2**	0.38	**13.6**	4.1	3.9	2.6	**5.3**	2.00	4.70	1.4	< 0.13	1.1
MW-5	**9.4**	**14**	**5.65**	**5.59**	3.63	4.47	2.59	2.79	1.2	2.4	3	0.83	1.4	2.7	1.0	< 0.13	0.75 J
MW-9	**6.4**	8.8	**6.07**	**16.1**	3.91	**15.1**	**10.6**	**5.45**	2.6	2.4	**8.6**	1.9	3.6	3.1	**5.2**	0.90 J	1.1
MW-12	1.2	<1.0	<1.0	0.800 J	0.330 J	1.01	0.39	0.21	0.19	< 1.0	0.7	<0.10	0.51 J	1.1	0.24 J	< 0.13	0.80 J
MW-14	NA	NA	NA	1.7	2.04	3.25	1.98	1.35	0.43	1.1	2.7	1.5	0.67 J	1.3	1.8	1.0	0.85 J
MW-18	2.1	2.3	1.36	1.13	1.01	0.85	0.94	0.89	< 1.0	< 1.0	0.39	<0.10	0.37 J	1.1	0.39 J	0.40 J	0.83 J
MW-19	< 1.0	< 1.0	< 1.0	0.36	0.29	0.27	0.3	0.31	< 1.0	< 1.0	0.23	<0.10	< 1.0	< 1.0	0.23 J	< 0.13	< 0.25

Notes:

The DEQ-7 Groundwater Standard for PCE is 5 µg/L (from *Circular DEQ-7 Montana's Numeric Water Quality Standards* , Human Health Standards for Groundwater, May 2017).
Values exceeding the DEQ-7 standard are bolded.
NA = Not analyzed.
µg/L= micrograms per liter.
< = analyte not detected above the MDL.
J = The analyte was detected above the reported sample method detection limit (MDL). The result was "J" flagged by the laboratory to indicate an estimated value.

Table 2 Trichloroethylene (TCE) Concentrations (µg/L), Historical Analytical Results (July 1992-July 2017)
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

	Pre and During Interim Remedial Activities								
Well Number	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**
MW-1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	< 1.0	< 1.0
MW-3	**1,400**	**1,500**	**631**	**314**	**660**	**750**	**344**	**138**	**81**
MW-4	**60**	NA	NA	NA	NA	NA	**26**	**19**	**12**
MW-5	**35**	**26**	**59**	**33**	**52**	**62**	**29**	**15**	**6.3**
MW-9	**200**	NA	NA	NA	NA	**89**	**75**	**38**	**16**
MW-12	NA	NA	NA	NA	NA	NA	2.7	3	2.3
MW-14	**79**	**41**	**51**	**24**	**32**	NA	NA	NA	NA
MW-18	NA	NA	NA	NA	**5.6**	**5.6**	5	4.5	2.9
MW-19	NA	NA	NA	2.2	1.5	NA	< 1.00	1.3	< 1.0

	Post Interim Remedial Activities																
Well Number	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
MW-1	< 1.0	< 1.0	< 1.0	< 1.0	< 0.400	< 0.200	< 0.200	< 0.200	< 1.0	< 1.0	< 1.0	< 0.10	< 0.4	< 0.40	< 0.14	< 0.40 U	< 0.052
MW-3	**62**	**66**	**38.4**	**23.2**	**7.34**	**11**	**9.86**	**8.23**	< 1.0	4.7	27	2.9	**5.3**	2.6	4.6	0.43	0.35 J
MW-4	4.9	**9.8**	2.57	4.24	2.51	2.19	2.4	2.49	1.2	1.2	0.7	1.1	0.71	0.96	0.59	0.75	0.48
MW-5	3	**6.9**	2.67	1.84	0.85	1.92	0.94	1.75	1.2	1.3	1.1	0.69	1.1	1.0	0.44	0.49	0.64
MW-9	4.7	**8.9**	**5.44**	**5.21**	2.36	**5.56**	3.24	2.08	1.6	1.1	2.8	0.65	1.1	0.77	1.5	0.26 J	0.27 J
MW-12	2.5	2.1	<1.0	1.33	0.79	1.05	0.55	0.36	1.3	1.0	0.8	<0.10	1.1	1.3	0.58	< 0.051	0.77
MW-14	NA	NA	NA	1.01	1	1.6	0.89	0.59	0.54	0.47	1.1	0.48	0.26J	0.30	0.64	0.40	< 0.052
MW-18	2.2	2.5	1.54	0.940 J	0.92	0.72	0.86	0.71	0.34	0.50	0.05	0.52	0.29J	0.49	0.44	0.50	0.29 J
MW-19	< 1.0	< 1.0	< 1.0	0.82	0.8	0.670 J	0.76	0.77	0.64	0.081	0.39	0.59	0.46	0.27	0.57	0.62	0.40

Notes:

The DEQ-7 Groundwater Standard for TCE is 5 µg/L (from *Circular DEQ-7 Montana's Numeric Water Quality Standards* , Human Health Standards for Groundwater, May 2017).
Values exceeding the DEQ-7 standard are bolded.
NA = Not analyzed.
µg/L= micrograms per liter.
< = analyte not detected above the MDL.
J = The analyte was detected above the reported sample method detection limit (MDL). The result was "J" flagged by the laboratory to indicate an estimated value.
U = The analyte was not detected above the reported sample MDL. In some cases, the analyte was detected above the reported sampled MDL; however, the result was qualified as not detected at the laboratory reporting limit due to blank contamination.

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification:	MW-1	MW-2	MW-3	MW-4	MW-5	MW-9	MW-11	MW-12	MW-13	MW-17	MW-18	(1) MW-29	(2) MW-30	Trip Blank	Trip Blank	Method Blanks
Date:	04/30/98	04/29/98	04/29/98	04/30/98	04/30/98	04/30/98	04/30/98	04/30/98	04/30/98	04/29/98	04/29/98	04/29/98	04/30/98	04/29/98	04/30/98	
Volatile Organics (µg/L)																
Carbon disulfide	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	7.60	< 2.00	< 2.00	62.00 J	16.00	18.00 J	< 2.00	< 2.00	< 2.00	< 2.00
Carbon tetrachloride	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	1.80	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Chlorobenzene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichlorobenzene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,4-Dichlorobenzene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichloroethane	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
cis-1,2-Dichloroethene (DCE)	< 1.00	< 1.00	4.80	< 1.00	8.90	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	5.20	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
trans-1,2-Dichloroethene (DCE)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
cis-1,3-Dichloropropene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	8.20	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Methylene chloride	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00	< 3.00
Tetrachloroethene (PCE)	< 1.00	< 1.00	3.70	< 1.00	**5.10**	3.50 J	< 1.00	< 1.00	< 1.00	< 1.00	4.70	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Toluene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1,1-Trichloroethane	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1,2-Trichloroethane	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Trichloroethene (TCE)	< 1.00	< 1.00	3.30	3.70	4.40	6.90 J	< 1.00	< 1.00	< 1.00	< 1.00	**7.70**	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Xylene, Total	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00
TOTAL DCE, PCE, TCE	< 1.00	< 1.00	11.80	3.70	18.40	10.40	< 1.00	< 1.00	< 1.00	< 1.00	17.60	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Metals (mg/L)																
Dissolved Iron	< 0.02	NA	NA	0.03	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	< 0.02
Total Iron	28.60	NA	NA	7.06	0.53	4.19	15.00	3.55	1.62	NA	NA	NA	NA	NA	NA	< 0.02
Other (mg/L)																
Methane	14.00	NA	NA	18.00	8.00	6.00	8.00	3.00	30.00	NA	NA	NA	NA	NA	NA	< 1.00
Ethane	< 1.00	NA	NA	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	NA	NA	NA	NA	NA	NA	< 1.00
Ethene	< 1.00	NA	NA	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	NA	NA	NA	NA	NA	NA	< 1.00
Total Organic Carbon	3.00	NA	NA	6.00	1.00	11.00	2.00	1.00	< 1.00	NA	NA	NA	NA	NA	NA	< 1.00
Total Nitrogen	0.86	NA	NA	1.48	0.76	2.13	1.05	0.99	0.61	NA	NA	NA	NA	NA	NA	< 0.10
Total Phosphorus	0.67	NA	NA	0.17	0.10	0.25	0.36	0.07	0.05	NA	NA	NA	NA	NA	NA	< 0.02
Alkalinity	238.00	NA	NA	265.00	262.00	254.00	270.00	262.00	217.00	NA	NA	NA	NA	NA	NA	< 1.00
Redox Potential	494.00	NA	NA	486.00	490.00	442.00	475.00	479.00	434.00	NA	NA	NA	NA	NA	NA	NA
Sulfate	35.00	NA	NA	100.00	50.00	40.00	43.00	43.00	33.00	NA	NA	NA	NA	NA	NA	< 1.00
Sulfide	< 0.02 UJ	NA	NA	< 0.02 UJ	< 0.02 UJ	< 0.02 UJ	< 0.02 UJ	< 0.02 UJ	< 0.02 UJ	NA	NA	NA	NA	NA	NA	< 0.02
Chloride	5.50	NA	NA	9.00	5.30	7.50	9.50	8.00	6.70	NA	NA	NA	NA	NA	NA	< 1.00
Nitrate (N)	0.60	NA	NA	1.10	0.61	0.33	0.87	0.83	0.48	NA	NA	NA	NA	NA	NA	< 0.05
Nitrite (N)	< 0.005	NA	NA	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	NA	NA	NA	NA	NA	NA	< 0.005
Dissolved Oxygen	NA	NA	NA	3.40	5.40	3.40	7.50	6.30	6.50	NA	NA	NA	NA	NA	NA	< 0.70

(1) Field Duplicate of MW-17
(2) Field Blank
J - estimated value.
UJ - estimated non-detection.
NA - not analyzed

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification:	MW-1	MW-2	MW-3	MW-4	MW-5	MW-9	MW-11	MW-12	MW-13	MW-17	MW-18	MW-19	MW-30(1)	MW-31(2	Trip Blank	Carpenter Well	Harris Well	Method
Date:	07/30/98	07/30/98	07/30/98	07/30/98	07/30/98	07/30/98	07/30/98	07/30/98	07/30/98	07/30/98	07/30/98	07/30/98	07/30/98	07/30/98	07/30/98	07/30/98	07/30/98	Blanks
Volatile Organics - ppb																		
1,2-Dichlorobenzene	< 1.00	< 1.00	< 1.00	49.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,3-Dichlorobenzene	< 1.00	< 1.00	< 1.00	1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,4-Dichlorobenzene	< 1.00	< 1.00	< 1.00	11.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethane	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichloroethane	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
cis-1,2-Dichloroethene	< 1.00	< 1.00	171.00	4.80	12.00	28.00	< 1.00	< 1.00	< 1.00	< 1.00	2.40	1.80	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
trans-1,2-Dichloroethene	< 1.00	< 1.00	2.50	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Tetrachloroethene	< 1.00	1.40	845.00	31.00	43.00	87.00	1.40	1.80	< 1.00	< 1.00	3.70	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	**1.80**	< 1.00
Toluene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	1.10	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1,1-Trichloroethane	< 1.00	< 1.00	6.90	< 1.00	1.60	5.40	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Trichloroethene	< 1.00	14.00	344.00	26.00	29.00	75.00	< 1.00	2.70	< 1.00	< 1.00	5.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	**3.30**	< 1.00
Vinyl chloride	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Total DCE,PCE,TCE	< 1.00	15.40	1362.50	61.80	84.00	190.00	1.40	4.50	< 1.00	< 1.00	11.10	1.80	< 1.00	< 1.00	< 1.00	< 1.00	**5.10**	< 1.00
Metals - ppm																		
Dissolved Iron	< 0.02	NA	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Iron	0.76	NA	NA	8.29	2.61	10.60	2.26	0.08	< 0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA
Other - ppm																		
Methane	< 1.00	NA	NA	8.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	< 1.00	NA	NA	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	< 1.00	NA	NA	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon	< 1.00	NA	NA	20.00	6.00	3.00	2.00	1.00	< 1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Nitrogen	0.11	NA	NA	0.77	1.07	1.15	0.95	0.76	0.44	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Phosphorus	0.16	NA	NA	0.73	0.16	0.32	0.13	0.05	0.10	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity	218.00	NA	NA	230.00	251.00	249.00	217.00	230.00	217.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
Redox Potential (Lab) (mv)	+395	NA	NA	+395	+387	+399	+426	+425	+424	NA	NA	NA	NA	NA	NA	NA	NA	NA
Redox Potential (Field) (mv)	+142	NA	NA	+151	+160	+124	+138	+178	+234	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	35.00	NA	NA	400.00	149.00	105.00	25.50	39.00	39.00	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfide	< 0.02	NA	NA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	5.90	NA	NA	20.00	9.30	8.50	5.80	6.10	6.80	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate (N)	1.33	NA	NA	0.19	0.86	0.86	0.79	0.64	0.34	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrite (N)	< 0.005	NA	NA	0.048	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen (Field data)	2.44	NA	NA	0.56	1.23	1.27	1.92	1.88	1.55	NA	NA	NA	NA	NA	NA	NA	NA	NA

(1) Field Duplicate of MW-17
(2) Field Blank
NA - Not analyzed

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification: / Collection Date:	MW-1 5/4/99	MW-2 5/5/99	MW-3 5/5/99	MW-4 5/5/99	MW-5 5/4/99	MW-9 5/4/99	MW-11 5/4/99	MW-12 5/4/99	MW-13 5/4/99	MW-17 5/4/99	MW-18 5/5/99	MW-19 5/5/99	MW-30(1) 5/5/99	MW-31(2) 5/4/99	Method Blanks
Volatile Organics - ppb (ug/L)															
Chlorobenzene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichlorobenzene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,3-Dichlorobenzene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,4-Dichlorobenzene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethane	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,2-Dichloroethane	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1-Dichloroethene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
cis-1,2-Dichloroethene (DCE)	< 1.00	< 1.00	< 1.00	< 1.00	2.70	5.30	< 1.00	< 1.00	< 1.00	< 1.00	1.90	< 1.00	< 1.00	< 1.00	< 1.00
trans-1,2-Dichloroethene (DCE)	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Tetrachloroethene (PCE)	< 1.00	< 1.00	3.20	< 1.00	**D 30**	**8.50**	< 1.00	1.10	< 1.00	< 1.00	4.70	1.20	< 1.00	< 1.00	< 1.00
Toluene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
1,1,1-Trichloroethane	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Trichloroethene (TCE)	< 1.00	< 1.00	3.30	2.20	**9.40**	**7.10**	< 1.00	2.00	< 1.00	< 1.00	**5.70**	1.60	< 1.00	< 1.00	< 1.00
Vinyl chloride	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00
Total DCE, PCE, TCE	< 1.00	< 1.00	6.50	2.20	42.1	20.9	< 1.00	3.10	< 1.00	< 1.00	12.3	2.80	< 1.00	< 1.00	< 1.00
Metals - ppm (mg/L)															
Dissolved Iron	2.36	NA	NA	0.81	1.32	1.22	2.96	0.29	< 0.03	NA	NA	NA	NA	NA	NA
Total Iron	4.51	NA	NA	3.01	2.37	1.94	5.24	3.86	1.89	NA	NA	NA	NA	NA	NA
Other - ppm (mg/L)															
Methane (3)	< 1.00	NA	NA	1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	NA	NA	NA	NA	NA	NA
Ethane	< 1.00	NA	NA	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	NA	NA	NA	NA	NA	NA
Ethene	< 1.00	NA	NA	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	NA	NA	NA	NA	NA	NA
Total Organic Carbon	2.00	NA	NA	2.00	2.00	2.00	< 2.00	< 2.00	< 2.00	NA	NA	NA	NA	NA	NA
Total Nitrogen - (NO3+NO2+TKN)	0.70	NA	NA	1.70	1.20	1.10	0.80	1.60	< 0.50	NA	NA	NA	NA	NA	NA
Total Nitrogen - Kjeldahl	< 0.05	NA	NA	0.80	0.50	0.50	< 0.50	0.80	< 0.50	NA	NA	NA	NA	NA	NA
Total Phosphorus	0.20	NA	NA	0.14	0.12	0.09	0.15	0.11	0.06	NA	NA	NA	NA	NA	NA
Nitrate (N)	0.70	NA	NA	0.87	0.73	0.60	0.84	0.80	0.43	NA	NA	NA	NA	NA	NA
Nitrite (N)	< 0.05	NA	NA	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NA	NA	NA	NA	NA	NA
Sulfate	27	NA	NA	35	47	37	42	33	29	NA	NA	NA	NA	NA	NA
Sulfide	< 0.40	NA	NA	< 0.04	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	NA	NA	NA	NA	NA	NA
Chloride	6	NA	NA	6	5	6	10	7	6	NA	NA	NA	NA	NA	NA
Alkalinity	+225	NA	NA	+257	+228	+236	+280	+253	+212	NA	NA	NA	NA	NA	NA
Redox Potential (Field data) (mv)	+136	+100	+99	+121	+134	+127	+128	+121	+131	NA	NA	NA	NA	NA	NA
Dissolved Oxygen (Field data)	5.57	6.30	9.58	5.80	4.99	3.26	6.24	7.14	5.25	5.18	NA	NA	NA	NA	NA

(1) - Field blank collected at well MW-2
(2) - Duplicate sample collected at well MW-17
(3) - Volume of water in vial =33ml and headspace in vial =10ml.
D - Value derived from a 10X dilution.
NA - not analyzed

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification: / Collection Date:	MW-1 7/27/99	MW-2 7/27/99	MW-3 7/27/99	MW-4 7/27/99	MW-5 7/27/99	MW-9 7/27/99	MW-11 7/27/99	MW-12 7/27/99	MW-13 7/27/99	MW-17 7/27/99	MW-18 7/27/99	MW-19 7/27/99	MW-30(1) 7/27/99	MW-31(2) 7/27/99	Method Blanks
Volatile Organics - ppb (ug/L)															
Chlorobenzene	< 1.0	< 1.0	J 0.3	11.0	J .33	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	< 1.0	< 1.0	< 1.0	D 39.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	< 1.0	< 1.0	< 1.0	1.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	< 1.0	< 1.0	< 1.0	12.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	< 1.0	< 1.0	< 1.0	J 0.9	J 0.3	J 0.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	< 1.0	< 1.0	J 0.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene (DCE)	< 1.0	< 1.0	**D 76**	14.0	9.3	D 33.0	< 1.0	J 0.9	< 1.0	< 1.0	1.2	< 1.0	< 1.0	1.3	< 1.0
trans-1,2-Dichloroethene (DCE)	< 1.0	< 1.0	J 0.7	< 1.0	< 1.0	J 0.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene (PCE)	< 1.0	J 1.0	**D1 314**	**12.0**	**18.0**	**D 39**	< 1.0	1.2	< 1.0	J 0.3	3.9	J 0.5	< 1.0	3.6	< 1.0
Toluene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	< 1.0	< 1.0	**2.5**	1.3	J 0.5	1.8	< 1.0	< 1.0	< 1.0	< 1.0	J 0.2	< 1.0	< 1.0	J 0.2	< 1.0
Trichloroethene (TCE)	< 1.0	**11**	D **138**	**19.0**	**15.0**	**D 38**	< 1.0	3.0	< 1.0	< 1.0	4.5	1.3	< 1.0	4.5	< 1.0
Vinyl chloride	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total DCE, PCE, TCE	< 1.0	11.0	528	45.0	42.3	110	< 1.0	4.20	< 1.0	< 1.0	9.6	1.3	< 1.0	9.4	< 1.0
Metals - ppm (mg/L)															
Dissolved Iron	< 0.03	NA	NA	0.18	< 0.03	< 0.03	0.03	< 0.03	< 0.03	NA	NA	NA	NA	NA	NA
Total Iron	0.38	NA	NA	0.71	1.90	1.12	0.28	0.62	< 0.03	NA	NA	NA	NA	NA	NA
Other - ppm (mg/L)															
Methane (3)	< 0.0002	NA	NA	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	NA	NA	NA	NA	NA	NA
Ethane	< 1	NA	NA	120	< 1	< 1	< 1	< 1	2	NA	NA	NA	NA	NA	NA
Ethene	< 1	NA	NA	< 1.00	< 1	< 1	< 1	< 1	< 1	NA	NA	NA	NA	NA	NA
Total Organic Carbon	3	NA	NA	8.0	5	3	3	2	< 2	NA	NA	NA	NA	NA	NA
Total Phosphorus	0.06	NA	NA	0.42	0.10	0.05	0.06	0.03	0.03	NA	NA	NA	NA	NA	NA
Total Nitrogen - (NO3+NO2+TKN)	2.5	NA	NA	0.5	1.0	0.8	1.0	0.8	0.5	NA	NA	NA	NA	NA	NA
Total Nitrogen - Kjeldahl	< 0.5	NA	NA	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Nitrate + Nitrite as N	2.50	NA	NA	< 0.05	0.96	0.77	1.03	0.84	0.51	NA	NA	NA	NA	NA	NA
Nitrate (N)	2.50	NA	NA	< 0.05	0.96	0.77	1.03	0.84	0.51	NA	NA	NA	NA	NA	NA
Nitrite (N)	< 0.05	NA	NA	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	NA	NA	NA	NA	NA	NA
Sulfate	37	NA	NA	105	87	62	21	33	31	NA	NA	NA	NA	NA	NA
Sulfide	< 0.04	NA	NA	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	NA	NA	NA	NA	NA	NA
Chloride	6	NA	NA	12	12	10	5	7	7	NA	NA	NA	NA	NA	NA
Alkalinity	235	NA	NA	264	260	266	238	225	206	NA	NA	NA	NA	NA	NA
Redox Potential (Field data) (mv)	112	124	111	108	110	121	105	112	116	103	115	100	NA	NA	NA
Dissolved Oxygen (Field data)	3.41	NA	NA	0.25	4.40	3.50	3.74	7.40	5.50	NA	NA	NA	NA	NA	NA

(1) - Field blank collected at well MW-2
(2) - Duplicate sample collected at well MW-17
(3) - Volume of water in vial =33ml and headspace in vial =10ml.
D - Value derived from a 10X dilution.
J - Estimated value.
D1 - Value derived from a 100X dilution.
NA - not analyzed

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification: / Collection Date:	MW-2 4/10/00	MW-3 4/10/00	MW-4 4/10/00	MW-5 4/10/00	MW-9 4/10/00	MW-11 4/10/00	MW-12 4/10/00	MW-13 4/10/00	MW-17 4/10/00	MW-18 4/10/00	MW-19 4/10/00	MW-30(1) 4/10/00	MW-31(2) 4/10/00	Method Blanks
Volatile Organics - ppb (ug/L)														
Chlorobenzene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene (DCE)	< 1.0	< 1.0	< 1.0	< 1.0	2.4	< 1.0	< 1.0	< 1.0	< 1.0	1.8	< 1.0	< 1.0	2.0	< 1.0
trans-1,2-Dichloroethene (DCE)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene (PCE)	< 1.0	1.8	< 1.0	**7.7**	**5.7**	< 1.0	1.2	< 1.0	< 1.0	3.5	< 1.0	< 1.0	3.6	< 1.0
Toluene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene (TCE)	< 1.0	2.2	1.5	2.6	4.5	< 1.0	3.2	< 1.0	< 1.0	4.4	1.5	< 1.0	4.7	< 1.0
Vinyl chloride	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total DCE, PCE, TCE	< 1.0	4.0	1.5	10.3	12.6	< 1.0	4.4	< 1.0	< 1.0	9.7	1.5	< 1.0	10.3	< 1.0
Metals - ppm (mg/L)														
Dissolved Iron	NA	NA	1.90	1.17	< 0.03	0.03	< 0.03	< 0.03	NA	NA	NA	NA	NA	NA
Total Iron	NA	NA	3.00	4.09	1.29	60.1	0.78	0.32	NA	NA	NA	NA	NA	NA
Other - ppm (mg/L)														
Methane (3)	NA	NA	0.0004	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	NA	NA	NA	NA	NA	NA
Ethane	NA	NA	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	NA	NA	NA	NA	NA	NA
Ethylene	NA	NA	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	NA	NA	NA	NA	NA	NA
Total Organic Carbon	NA	NA	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	NA	NA	NA	NA	NA	NA
Total Nitrogen - (NO3+NO2+TKN)	NA	NA	0.90	0.90	0.70	0.80	0.90	0.50	NA	NA	NA	NA	NA	NA
Total Nitrogen - Kjeldahl	NA	NA	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	NA	NA	NA	NA
Total Phosphorus	NA	NA	0.21	0.27	0.06	1.75	0.04	0.04	NA	NA	NA	NA	NA	NA
Nitrogen, Nitrate plus Nitrite	NA	NA	0.93	0.92	0.68	0.79	0.90	0.54	NA	NA	NA	NA	NA	NA
Sulfate	NA	NA	31.0	31.0	31.0	45.0	34.0	35.0	NA	NA	NA	NA	NA	NA
Sulfide	NA	NA	< 0.04	< 0.04	< 0.04	< 0.04	< 0.40	< 0.04	NA	NA	NA	NA	NA	NA
Chloride	NA	NA	6.00	5.00	6.00	10.00	8.00	7.00	NA	NA	NA	NA	NA	NA
Alkalinity	NA	NA	+261	+238	+234	+282	+255	+214	NA	NA	NA	NA	NA	NA
Redox Potential (Field) (mv)	+138	+136	+133	+137	+129	+87	+128	+127	+91	+118	+99	NA	NA	NA
Dissolved Oxygen (Field)	NA	NA	4.07	5.12	2.73	NA	4.58	5.57	NA	NA	NA	NA	NA	NA

(1) - Field blank collected at well MW-2
(2) - Duplicate sample collected at well MW-18
NA - not analyzed

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification: / Collection Date:	MW-1 7/11/00	MW-2 7/11/00	MW-3 7/11/00	MW-4 7/11/00	MW-5 7/11/00	MW-9 7/11/00	MW-11 7/11/00	MW-12 7/11/00	MW-13 7/11/00	MW-17 7/11/00	MW-18 7/11/00	MW-19 7/11/00	MW-30(1) 7/11/00	MW-31(2) 7/11/00	Method Blanks
Volatile Organics - ppb (ug/L)															
Chlorobenzene	< 1.0	< 1.0	< 1.0	9.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	< 1.0	< 1.0	< 1.0	6.7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	< 1.0	< 1.0	< 1.0	4.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	< 1.0	< 1.0	< 1.0	17.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene (DCE)	< 1.0	< 1.0	D 59	< 1.0	3.7	18	< 1.0	1.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene (DCE)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene (PCE)	< 1.0	< 1.0	**DB 180**	**BU 6.8**	**BU 9.9**	**BU 12**	< 1.0	< 1.0	< 1.0	BU 3.3	BU 2.4	< 1.0	< 1.0	BU 2.2	< 1.0
Toluene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	< 1.0	< 1.0	1.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene (TCE)	< 1.0	< 1.0	**D 81**	**12**	**6.3**	**16**	< 1.0	2.3	< 1.0	< 1.0	2.9	< 1.0	< 1.0	2.7	< 1.0
Vinyl chloride	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total DCE, PCE, TCE	< 1.0	< 1.0	**320**	**18.8**	**19.9**	**46.0**	< 1.0	3.4	< 1.0	3.3	5.3	< 1.0	< 1.0	4.9	< 1.0
Metals - ppm (mg/L)															
Dissolved Iron	< 0.03	NA	NA	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	NA	NA	NA	NA	NA	NA
Total Iron	4.92	NA	NA	0.52	4.77	0.05	11.9	0.47	0.91	NA	NA	NA	NA	NA	NA
Other - ppm (mg/L)															
Methane	< 0.0002	NA	NA	0.0067	< 0.0002	< 0.0002	0.0003	< 0.0002	< 0.0002	NA	NA	NA	NA	NA	NA
Ethane	< 0.003	NA	NA	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	NA	NA	NA	NA	NA	NA
Ethylene	< 0.003	NA	NA	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	NA	NA	NA	NA	NA	NA
Total Organic Carbon	< 2.00	NA	NA	4.00	3.00	3.00	< 2.00	< 2.00	< 2.00	NA	NA	NA	NA	NA	NA
Total Nitrogen - (NO3+NO2+TKN)	2.90	NA	NA	0.60	1.1	0.7	1.00	0.90	0.60	NA	NA	NA	NA	NA	NA
Total Nitrogen - Kjeldahl	< 0.50	NA	NA	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	NA	NA	NA	NA	NA	NA
Total Phosphorus	0.10	NA	NA	0.11	0.13	0.02	0.56	0.03	0.04	NA	NA	NA	NA	NA	NA
Nitrogen, Nitrate plus Nitrite	2.86	NA	NA	0.55	1.06	0.65	1.03	0.92	0.58	NA	NA	NA	NA	NA	NA
Sulfate	32	NA	NA	65	67	47	20	34	32	NA	NA	NA	NA	NA	NA
Sulfide	< 0.04	NA	NA	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	NA	NA	NA	NA	NA	NA
Chloride	6.0	NA	NA	8.0	7.0	7.0	5.0	6.0	7.0	NA	NA	NA	NA	NA	NA
Alkalinity	+236	NA	NA	+271	+252	+256	+225	+232	+205	NA	NA	NA	NA	NA	NA
Redox Potential (Field data) (mV)	22.0	144	150	146	148	132	61.0	101	94	44	83	70	NA	NA	NA
Dissolved Oxygen (Field data)	8.16	NA	NA	3.71	5.68	4.49	7.94	6.28	6.64	NA	NA	NA	NA	NA	NA

(1) - Field blank collected at well MW-2
(2) - Duplicate sample collected at well MW-18
B - The compound was found in the associated trip blank at a level of 5.1 µg/L
D - Value was derived from a 20 times dilution.
NA - not analyzed
U - Analyte undetected because the analyte was detected at or below 5 times the blank concentration as indicated by the validation report.

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification: Collection Date:	MW-1 7/10/01	MW-2 7/10/01	MW-3 7/10/01	MW-4 7/10/01	MW-5 7/10/01	MW-9 7/10/01	MW-11 7/10/01	MW-12 7/10/01	MW-13 7/10/01	MW-17 7/10/01	MW-18 7/10/01	MW-19 7/10/01	MW-30(1) 7/10/01	MW-31(2) 7/10/01	Method Blanks
Volatile Organics - ppb (ug/L)															
Chlorobenzene	< 1.0	< 1.0	1.8	2.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.9	< 1.0
1,2-Dichlorobenzene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene (DCE)	< 1.0	< 1.0	**D 77**	3.0	1.5	12	< 1.0	2.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**D 76**	< 1.0
trans-1,2-Dichloroethene (DCE)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene (PCE)	< 1.0	< 1.0	**D 173**	2.6	**9.4**	**6.4**	< 1.0	1.2	< 1.0	< 1.0	2.1	< 1.0	< 1.0	**D** 165	< 1.0
Toluene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	< 1.0	< 1.0	1.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.2	< 1.0
Trichloroethene (TCE)	< 1.0	< 1.0	**D 62**	4.9	3.0	4.7	< 1.0	2.5	< 1.0	< 1.0	2.2	< 1.0	< 1.0	**D 59**	< 1.0
Vinyl chloride	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total DCE, PCE, TCE	< 1.0	< 1.0	312	10.5	13.9	23.1	< 1.0	5.0	< 1.0	< 1.0	4.3	< 1.0	< 1.0	300	< 1.0
Metals - ppm (mg/L)															
Dissolved Iron	< 0.03	NA	NA	< 0.03	< 0.03	< 0.03	0.06	< 0.03	< 0.03	NA	NA	NA	NA	NA	NA
Total Iron	0.46	NA	NA	3.03	5.41	< 0.03	5.10	< 0.03	< 0.03	NA	NA	NA	NA	NA	NA
Other - ppm (mg/L)															
Methane	< 0.0002	NA	NA	0.0004	< 0.0002	0.0024	< 0.0002	0.0002	< 0.0002	NA	NA	NA	NA	NA	NA
Ethane	< 0.003	NA	NA	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	NA	NA	NA	NA	NA	NA
Ethylene	< 0.003	NA	NA	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	< 0.003	NA	NA	NA	NA	NA	NA
Total Organic Carbon	2	NA	NA	4	3	< 2	< 2	< 2	< 2	NA	NA	NA	NA	NA	NA
Total Nitrogen - (NO3+NO2+TKN)	3.9	NA	NA	1.3	1.0	0.7	1.2	0.9	0.6	NA	NA	NA	NA	NA	NA
Total Nitrogen - Kjeldahl	< 0.5	NA	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Total Phosphorus	0.06	NA	NA	0.14	0.14	0.03	0.13	0.03	0.01	NA	NA	NA	NA	NA	NA
Nitrogen, Nitrate plus Nitrite	3.91	NA	NA	1.28	1.01	0.71	1.23	0.89	0.63	NA	NA	NA	NA	NA	NA
Sulfate	34	NA	NA	75	48	39	19	32	29	NA	NA	NA	NA	NA	NA
Sulfide	< 1	NA	NA	< 1	< 1	< 1	< 1	< 1	< 1	NA	NA	NA	NA	NA	NA
Chloride	7	NA	NA	8	6	6	5	6	7	NA	NA	NA	NA	NA	NA
Alkalinity	225	NA	NA	269	241	241	227	225	209	NA	NA	NA	NA	NA	NA
Redox Potential (mV)	229	NA	NA	212	212	208	206	207	208				NA	NA	NA
Dissolved Oxygen (Field data)	8.62	NA	NA	5.15	7.30	5.14	8.53	6.51	7.18	NA	NA	NA	NA	NA	NA

(1) - Field blank collected at well MW-17
(2) - Duplicate sample collected at well MW-3
D - Indicates sample dilution 10 X
NA - not analyzed

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification: / Collection Date:	MW-1 7/9/02	MW-2 7/9/02	MW-3 7/9/02	MW-4 7/9/02	MW-5 7/9/02	MW-9 7/9/02	MW-11 7/9/02	MW-12 7/9/02	MW-13 7/9/02	MW-17 7/9/02	MW-18 7/9/02	MW-19 7/9/02	MW-30(1) 7/9/02	MW-31(2) 7/9/02	Method Blank
Volatile Organics - ppb (ug/L)															
Chlorobenzene	< 1.0	< 1.0	1.1	17	1.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	< 1.0	< 1.0	< 1.0	2.7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	< 1.0	< 1.0	< 1.0	3.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene (DCE)	< 1.0	< 1.0	54	5.3	5.3	16	< 1.0	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene (DCE)	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene (PCE)	< 1.0	< 1.0	**200**	**14**	**14**	**8.8**	< 1.0	< 1.0	< 1.0	< 1.0	2.3	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.1	< 1.0	< 1.0
1,1,1-Trichloroethane	< 1.0	< 1.0	1.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene (TCE)	< 1.0	< 1.0	**66**	**9.8**	**6.9**	**8.9**	< 1.0	2.1	< 1.0	< 1.0	2.5	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl chloride	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total DCE, PCE, TCE	< 1.0	< 1.0	320	29.1	26.2	33.7	< 1.0	3.1	< 1.0	< 1.0	4.8	< 1.0	< 1.0	< 1.0	< 1.0
Metals - ppm (mg/L)															
Dissolved Iron	< 0.03	NA	NA	< 0.03	< 0.03	< 0.03	U 0.04	< 0.03	< 0.03	NA	NA	NA	NA	NA	NA
Total Iron	0.58	NA	NA	3.05	3.82	0.23	3.01	0.03	< 0.03	NA	NA	NA	NA	NA	NA
Other - ppm (mg/L)															
Methane	< 0.0002	NA	NA	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	NA	NA	NA	NA	NA	NA
Ethane	< 0.0002	NA	NA	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	NA	NA	NA	NA	NA	NA
Ethene	< 0.0002	NA	NA	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	NA	NA	NA	NA	NA	NA
Total Organic Carbon	1.3	NA	NA	8.4	5.4	3.7	1.7	1.0	0.6	NA	NA	NA	NA	NA	NA
Total Nitrogen - (NO3+NO2+TKN)	3.7	NA	NA	1.0	1.7	1.0	1.0	1.0	0.6	NA	NA	NA	NA	NA	NA
Total Nitrogen - Kjeldahl	< 0.5	NA	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	NA	NA	NA	NA	NA	NA
Total Phosphorus	U 0.05	NA	NA	0.39	0.13	U 0.06	0.09	U 0.02	U 0.02	NA	NA	NA	NA	NA	NA
Nitrogen, Nitrate plus Nitrite	3.70	NA	NA	1.04	1.74	1.02	0.98	0.99	0.60	NA	NA	NA	NA	NA	NA
Sulfate	27	NA	NA	85	70	42	15	27	29	NA	NA	NA	NA	NA	NA
Sulfide	< 1.0	NA	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA
Chloride	7	NA	NA	10	9	8	7	7	8	NA	NA	NA	NA	NA	NA
Alkalinity	213	NA	NA	210	256	236	180	185	182	NA	NA	NA	NA	NA	NA
Redox Potential (mV)	74.0	NA	NA	100.1	118.3	84.4	92.8	83.7	92.8	NA	NA	NA	NA	NA	NA
Dissolved Oxygen (Field data)	20.86	NA	NA	0.98	12.26	8.53	18.93	15.43	15.73	NA	NA	NA	NA	NA	NA

(1) - Field blank collected at well MW-17.
(2) - Duplicate sample collected at well MW-2.
NA - Not analyzed
U - Indicates a false positive and undetected at reported concentration due to laboratory concentration. See validation report.

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification: Collection Date:	Gravel Pit Well 1/31/03	Gravel Pit Pond 1/31/03	Trip Blank
Volatile Organic Compound Method 8260 ppb (ug/L)			
Chlorobenzene	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene (DCE)	< 1.0	< 1.0	< 1.0
Trans-1,2-Dichloroethene (DCE)	< 1.0	< 1.0	< 1.0
Tetrachloroethene (PCE)	< 1.0	< 1.0	< 1.0
Toluene	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	< 1.0	< 1.0	< 1.0
Trichloroethene (TCE)	< 1.0	< 1.0	< 1.0
Vinyl Chloride	< 1.0	< 1.0	< 1.0
Total DCE, PCE, TCE	< 1.0	< 1.0	< 1.0

Note: Pond sample collected at Southwestern edge of pond, down-gradient of BNSF Mission Wye.

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification: Collection Date:	MW-1 7/8/03	MW-2 7/8/03	MW-3 7/8/03	MW-4 7/8/03	MW-5 7/8/03	MW-9 7/8/03	MW-11 7/8/03	MW-12 7/8/03	MW-13 7/8/03	MW-17 7/8/03	MW-18 7/8/03	MW-19 7/8/03	Gravel Pit Pond 7/8/03	Gravel Pit Well 7/8/03	Harris Well * 7/8/03	MW-30(1) 7/8/03	MW-31(2) 7/8/03	Method Blank
Volatile Organics - ppb (ug/L)																		
2-Butanone	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	30.8	< 10.0	< 10.0
Chlorobenzene	< 1.0	< 1.0	< 2.0	2.76	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene (DCE)	< 1.0	< 1.0	D 30.7	1.70	1.07	9.93	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	31.2	< 1.0
trans-1,2-Dichloroethene (DCE)	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene (PCE)	< 1.0	< 1.0	**D 223**	2.86	**5.65**	**6.07**	< 1.0	< 1.0	< 1.0	< 1.0	1.36	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**212**	< 1.0
Toluene	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene (TCE)	< 1.0	< 1.0	**D 38.4**	2.57	2.67	**5.44**	< 1.0	< 1.0	< 1.0	< 1.0	1.54	< 1.0	< 1.0	< 1.0	1.46	< 1.0	**39.7**	< 1.0
Vinyl chloride	< 1.0	< 1.0	< 2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total DCE, PCE, TCE	< 1.0	< 1.0	292	7.1	9.4	21.4	< 1.0	< 1.0	< 1.0	< 1.0	2.9	< 1.0	< 1.0	< 1.0	1.5	< 1.0	283	< 1.0
Other - ppm (mg/L)																		
Dissolved Oxygen (Field data)	6.69	6.00	6.18	4.30	5.44	3.30	4.43	6.10	5.47	2.40	11.54	3.91	NA	NA	NA	NA	NA	NA

(1) - Field blank collected at well MW-17.
(2) - Duplicate sample collected at well MW-3.
* - Harris Well sample was collected at the Harris Stock Well down-gradient of Well MW-18.
D - Indicates sample dilution.
NA - Not analyzed

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification: Collection Date:	MW-1 7/20/04	MW-3 7/20/04	MW-4 7/20/04	MW-5 7/20/04	MW-9 7/20/04	MW-12 7/20/04	MW-13 7/20/04	MW-14 7/20/04	MW-15 7/20/04	MW-16 7/20/04	MW-18 7/20/04	MW-19 7/20/04	Gravel Pit Pond 7/20/04	Harris Well * 7/20/04	MW-30(1) 7/20/04	MW-31(2) 7/20/04	Method Blank
Volatile Organics - ppb (ug/L)																	
2-Butanone	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Chlorobenzene	< 1.0	J 0.330	4.57	J 0.180	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	J 0.270	< 1.0
Chloroform	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	< 1.0	< 1.0	J 0.510	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	< 1.0	< 1.0	1.00	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	J 0.790	< 1.0	< 1.0
1,1-Dichloroethane	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene (DCE)	< 1.0	20.6	2.40	J 0.820	7.88	J 0.400	< 1.0	1.20	< 1.0	< 1.0	J 0.220	< 1.0	< 1.0	< 1.0	< 1.0	18.1	< 1.0
trans-1,2-Dichloroethene (DCE)	< 1.0	J 0.740	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	J 0.630	< 1.0
Tetrachloroethene (PCE)	< 1.0	**195**	**10.4**	**5.59**	**16.1**	J 0.800	< 1.0	1.70	J 0.120	J 0.360	1.13	J 0.360	J 0.780	J 0.660	< 1.0	**170**	< 1.0
Toluene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	J 0.240	< 1.0	< 1.0
1,1,1-Trichloroethane	< 1.0	J 0.450	< 1.0	< 1.0	J 0.170	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	J 0.430	< 1.0
Trichloroethene (TCE)	< 1.0	**23.2**	4.24	1.84	**5.21**	1.33	< 1.0	1.01	< 1.0	< 1.0	J 0.940	J 0.820	< 1.0	1.30	< 1.0	**19.2**	< 1.0
Vinyl chloride	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total DCE, PCE, TCE	< 1.0	240	17.0	27.4	29.2	2.5	< 1.0	3.9	J 0.120	J 0.360	2.3	J 1.2	J 0.780	2.0	< 1.0	190	< 1.0

(1) - Field blank collected at well MW-19.
(2) - Duplicate sample collected at well MW-3.
* - Harris Well sample was collected at the Harris Stock Well down-gradient of Well MW-18.
J - Indicates the compound was detected in a sample but at a concentration lower than the laboratory's reporting limit for that compound and therefore the concentration is an estimate.
NA - Not analyzed

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification: / Collection Date:	MW-1 7/6/05	MW-3 7/7/05	MW-4 7/7/05	MW-5 7/7/05	MW-9 7/7/05	MW-12 7/6/05	MW-13 7/7/05	MW-14 7/6/05	MW-18 7/7/05	MW-19 7/6/05	Stock Well 7/6/05	Gravel Pit Pond 7/6/05	MW-30(1) 7/6/05	MW-30 (2) 7/7/05	MW-33(3) 7/7/05	Method Blank	Stock Well 7/6/2005	MDEQ Data MW-14 7/6/2005
Volatile Organics - ppb (ug/L)																		
2-Butanone	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	NA	< 10.0	< 10.0	< 10.0	NA	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	NA	< 1.0
Chlorobenzene	< 0.400	< 0.400	J 0.390	< 0.400	< 0.400	< 0.400	NA	< 0.400	< 0.400	< 0.400	< 0.500	< 0.400	< 0.400	< 0.400	0.980	< 0.400	< 0.500	< 1.0
Chloroform	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	NA	< 0.400	< 0.400	< 0.400	< 0.500	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.500	< 1.0
1,2-Dichlorobenzene	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	NA	< 0.400	< 0.400	< 0.400	< 0.500	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.500	< 1.0
1,3-Dichlorobenzene	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	NA	< 0.400	< 0.400	< 0.400	< 0.500	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.500	< 1.0
1,4-Dichlorobenzene	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	NA	< 0.400	< 0.400	< 0.400	< 0.500	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.500	< 1.0
1,1-Dichloroethane	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	NA	< 0.400	< 0.400	< 0.400	< 0.500	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.500	< 1.0
1,2-Dichloroethane	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	NA	< 0.400	< 0.400	< 0.400	< 0.500	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.500	< 1.0
1,1-Dichloroethene	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	NA	< 0.400	< 0.400	< 0.400	< 0.500	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.500	< 1.0
cis-1,2-Dichloroethene (DCE)	< 0.400	7.91	0.590	< 0.400	6.43	J 0.220	NA	1.75	J 0.210	< 0.400	< 0.500	< 0.400	< 0.400	< 0.400	0.830	< 0.400	< 0.500	1.5
trans-1,2-Dichloroethene (DCE)	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	NA	< 0.400	< 0.400	< 0.400	< 0.500	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.500	< 1.0
Ethylbenzene	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	NA	< 0.400	< 0.400	J 0.150	< 0.500	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.500	< 1.0
Naphthalene	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	NA	< 2.00	< 2.00	J 0.840	< 0.500	< 2.00	J 0.200	< 2.00	< 2.00	< 2.00	< 0.500	< NA
n-Propylbenzene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	NA	< 1.00	< 1.00	J 0.160	< 0.500	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 0.500	< NA
Tetrachloroethene (PCE)	< 0.400	48.3	0.670	3.63	3.91	J 0.330	NA	2.04	1.01	J 0.290	0.620	J 0.130	J 0.310	< 0.400	1.37	< 0.400	0.500	2.2
Toluene	J 0.380	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	NA	< 0.400	< 0.400	< 0.400	< 0.500	< 0.400	< 0.400	0.620	< 0.400	< 0.400	< 0.500	< 1.0
1,1,1-Trichloroethane	< 0.400	J 0.110	< 0.400	< 0.400	J 0.140	< 0.400	NA	< 0.400	< 0.400	< 0.400	< 0.500	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.500	< 1.0
Trichloroethene (TCE)	< 0.400	7.34	2.51	0.850	2.36	0.790	NA	1.00	0.920	0.800	1.07	< 0.400	0.800	< 0.400	2.67	< 0.400	1.07	1.0
1,2,4-Trimethylbenzene	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	NA	< 1.00	< 1.00	J 0.470	< 0.500	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 0.500	< NA
Vinyl chloride	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	NA	< 0.400	< 0.400	< 0.400	< 0.500	< 0.400	< 0.400	< 0.400	< 0.400	< 0.400	< 0.500	< NA
Metals - ppm (mg/L)																		
Total Iron	1.01	NA	0.696	2.78	J 0.0210	0.649	J 0.0915	NA	NA	NA	NA	J 0.130	NA	NA	0.451	J 0.0193	NA	NA
Other - ppm (mg/L)																		
Total Organic Carbon	2.37	NA	4.66	2.21	4.09	2.59	1.82	NA	NA	NA	NA	NA	NA	NA	4.34	J 0.177	NA	NA
Nitrate/Nitrite - Nitrogen	D 7.32	NA	D 1.18	D 1.19	D 0.667	D 1.18	D 0.984	NA	NA	NA	NA	NA	NA	NA	D 1.19	< 0.00500	NA	NA
Total Nitrogen - Kjeldahl	J 0.205	NA	0.579	J 0.378	J 0.408	0.518	J 0.240	NA	NA	NA	NA	NA	NA	NA	J 0.237	J 0.103	NA	NA
Total Phosphorus	0.0437	NA	0.0452	0.0779	J 0.0189	0.0270	0.0206	NA	NA	NA	NA	NA	NA	NA	0.0502	< 0.0200	NA	NA
Sulfate	36.3	NA	65.8	49.8	39.1	30.0	30.2	NA	NA	NA	NA	NA	NA	NA	66.2	< 1.00	NA	NA
Chloride	6.53	NA	7.73	7.38	7.48	9.15	8.97	NA	NA	NA	NA	NA	NA	NA	7.72	< 0.500	NA	NA
Total Nitrogen (Calculated)	7.32	NA	1.76	1.19	0.667	1.70	0.984	NA	NA	NA	NA	NA	NA	NA	1.19	NA	NA	NA
Alkalinity (mg/L)																		
Bicarbonate Alkalinity	221	NA	254	218	268	213	187	NA	NA	NA	NA	NA	NA	NA	256	< 5.00	NA	NA
Carbonate Alkalinity	< 5.00	NA	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	NA	NA	NA	NA	NA	NA	NA	< 5.00	< 5.00	NA	NA
Hydroxide Alkalinity	< 5.00	NA	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	NA	NA	NA	NA	NA	NA	NA	< 5.00	< 5.00	NA	NA
Total Alkalinity	221	NA	254	218	268	213	187	NA	NA	NA	NA	NA	NA	NA	256	< 5.00	NA	NA
Volatile Petroleum Hydrocarbons (mg/L)																		
C5-C8 Aliphatics	NA	< 20.0	< 20.0	NA	< 20.0	NA	NA	< 20.0	NA	NA	NA	NA	NA	NA	< 20.0	NA	NA	< 20
C9-C12 Aliphatics	NA	< 20.0	< 20.0	NA	< 20.0	NA	NA	< 20.0	NA	NA	NA	NA	NA	NA	< 20.0	NA	NA	< 20
C9-C10 Aromatics	NA	< 20	< 20.0	NA	< 20.0	NA	NA	< 20.0	NA	NA	NA	NA	NA	NA	< 20.0	NA	NA	< 20
Total VPH	NA	< 40.0	< 40.0	NA	< 40.0	NA	NA	< 40.0	NA	NA	NA	NA	NA	NA	< 40.0	NA	NA	< 20
Extractable Petroleum Hydrocarbons (mg/L)																		
C11-C22 Aromatics	NA	< 0.250	< 0.250	NA	< 0.250	NA	NA	< 0.250	NA	NA	NA	NA	NA	NA	< 0.250	NA	NA	NA
C9-C18 Aliphatics	NA	< 0.250	< 0.250	NA	< 0.250	NA	NA	< 0.250	NA	NA	NA	NA	NA	NA	< 0.250	NA	NA	NA
C19-C36 Aliphatics	NA	< 0.250	< 0.250	NA	< 0.250	NA	NA	< 0.250	NA	NA	NA	NA	NA	NA	< 0.250	NA	NA	NA
TEH (Total Ext. Petroleum)	NA	< 0.750	< 0.750	NA	< 0.750	NA	NA	< 0.750	NA	NA	NA	NA	NA	NA	< 0.750	NA	NA	< 0.31

(1) - Duplicate sample collected at well MW-19.
(2) - Field Blank collected at well MW-4.
(3) - Duplicate sample collected at well MW-4
NA - Not analyzed
D - Data reported from a preparation or analytical dilution
J - Estimated concentration

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification: Collection Date:	MW-1 7/25/06	MW-3 7/25/06	MW-4 7/25/06	MW-5 7/25/06	MW-9 7/25/06	MW-12 7/25/06	MW-13 7/25/06	MW-14 7/25/06	MW-18 7/25/06	MW-19 7/25/06	Stock Well 7/25/06	Gravel Pit Pond 7/25/06	Gravel Pit Well 7/25/06	MW-30[1] 7/25/06	MW-33[2] 7/25/06	Trip Blank	Trip Blank	Method Blank	Method Blank	Method Blank	Method Blank
Volatile Organics - ppb (ug/L)																					
Acetone	U< 10.0	U< 10.0	U< 10.0	U< 10.0	U< 10.0	J 2.15	NA	J 1.01	< 10.0	U< 10.0	NA	J 5.23	NA	U< 10.0	J 1.29	J 3.94	NA	< 10.0	< 10.0	< 10.0	NA
Bromodichloromethane	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	NA	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	J 1.68	< 0.200	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
2-Butanone	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	U< 10.0	NA	U< 10.0	< 2.00	< 2.00	NA	U< 10.0	NA	< 2.00	< 2.00	< 2.00	NA	< 2.00	< 2.00	< 2.00	NA
Chlorobenzene	< 0.200	< 0.200	4.17	< 0.200	< 0.200	< 0.200	NA	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	8.62	4.15	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
Chloroform	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	NA	< 0.200	J 0.110	UJ< 0.200	< 0.500	J 0.110	< 0.500	J 8.620	< 0.200	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
Dibromochloromethane	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	NA	< 0.200	< 0.200	UJ< 0.200	< 0.500	< 0.200	< 0.500	0.280	< 0.200	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
1,2-Dichlorobenzene	< 0.200	< 0.200	0.310	< 0.200	< 0.200	< 0.200	NA	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	0.310	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
1,3-Dichlorobenzene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	NA	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
1,4-Dichlorobenzene	< 0.200	< 0.200	0.980	< 0.200	< 0.200	< 0.200	NA	< 0.200	< 0.200	UJ< 0.200	< 0.500	J 0.110	< 0.500	J 2.47	0.960	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
1,1-Dichloroethane	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	NA	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
1,2-Dichloroethane	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	NA	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
1,1-Dichloroethene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	NA	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	U< 10.0	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
cis-1,2-Dichloroethene (DCE)	< 0.200	8.05	0.950	0.480	8.82	0.420	NA	2.54	J 0.100	< 0.200	< 0.500	J 0.110	< 0.500	< 0.200	0.930	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
trans-1,2-Dichloroethene (DCE)	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	NA	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
Ethylbenzene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	NA	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
Hexachlorobutadiene	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	NA	< 2.50	< 2.50	< 2.50	< 0.500	< 2.50	< 0.500	< 2.50	< 2.50	< 2.50	< 0.000500	J 0.290	J 0.330	J 0.420	< 0.000500
Naphthalene	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	NA	< 2.50	< 2.50	< 2.50	< 0.500	< 2.50	< 0.500	< 2.50	< 2.50	< 2.50	< 0.000500	< 2.50	< 2.50	< 2.50	< 0.000500
n-Propylbenzene	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	NA	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.000500	< 0.500	< 0.500	< 0.500	< 0.000500
Tetrachloroethene (PCE)	< 0.200	165	12.2	4.47	15.1	1.01	NA	3.25	0.850	0.270	0.600	J 0.180	< 0.500	< 0.200	12.4	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
Toluene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	NA	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	J 0.140	< 0.200	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
1,1,1-Trichloroethane	< 0.200	0.210	< 0.200	< 0.200	0.240	< 0.200	NA	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
Trichloroethene (TCE)	< 0.200	11.0	2.19	1.92	5.56	1.05	NA	1.60	0.720	J 0.670	0.900	< 0.200	< 0.500	UJ< 0.200	2.13	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
1,2,4-Trimethylbenzene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	NA	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
Vinyl chloride	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	NA	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
Total DCE, PCE, TCE	< 0.200	184	15.3	6.87	29.5	2.48	NA	7.39	1.67	0.940	1.50	J 0.290	< 0.500	< 0.200	15.5	< 0.200	< 0.000500	< 0.200	< 0.200	< 0.200	< 0.000500
Metals - ppm (mg/L)																					
Total Iron	J 0.787	NA	J 0.749	J 1.19	< 0.150	< 0.150	J 0.259	NA	NA	NA	NA	NA	NA	NA	J 1.29	NA	NA	< 0.150	< 0.150	< 0.150	< 0.150
Other - ppm (mg/L)																					
Total Organic Carbon	3.50	NA	8.20	8.30	6.40	2.50	J 0.700	NA	NA	NA	NA	NA	NA	NA	7.80	NA	NA	< 2.00	< 2.00	NA	NA
Nitrate/Nitrite - Nitrogen	1.60	NA	0.956	1.53	0.969	1.44	0.813	NA	NA	NA	NA	NA	NA	NA	0.984	NA	NA	< 0.0100	< 0.0100	NA	NA
Total Nitrogen - Kjeldahl	< 1.00	NA	< 1.00	J 0.313	J 0.340	< 1.00	< 1.00	NA	NA	NA	NA	NA	NA	NA	< 1.00	NA	NA	< 1.00	< 1.00	NA	NA
Total Phosphorus	0.0650	NA	0.173	0.0630	0.0460	0.0240	0.0260	NA	NA	NA	NA	NA	NA	NA	0.163	NA	NA	J 0.00200	< 0.00500	NA	NA
Total Nitrogen (Calculated)	1.60	NA	0.956	1.53	0.969	1.44	< 0.200	NA	NA	NA	NA	NA	NA	NA	0.984	NA	NA	NA	NA	NA	NA
Sulfate	22.3	NA	D 46.6	D 51.8	D 43.8	23.6	D 27.1	NA	NA	NA	NA	NA	NA	NA	D 46.2	NA	NA	< 0.400	< 1.00	NA	NA
Chloride	8.08	NA	8.02	7.87	8.49	8.30	D 8.70	NA	NA	NA	NA	NA	NA	NA	7.84	NA	NA	< 0.400	< 1.00	NA	NA
Dissolved Oxygen (Field data)		NA						NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	NA
Alkalinity (mg/L)																					
Bicarbonate Alkalinity	225	NA	223	228	241	199	192	NA	NA	NA	NA	NA	NA	NA	225	NA	NA	J 0.700	NA	NA	NA
Carbonate Alkalinity	< 5.00	NA	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	NA	NA	NA	NA	NA	NA	NA	< 5.00	NA	NA	< 5.00	NA	NA	NA
Hydroxide Alkalinity	< 5.00	NA	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	NA	NA	NA	NA	NA	NA	NA	< 5.00	NA	NA	< 5.00	NA	NA	NA
Total Alkalinity	225	NA	223	228	241	199	192	NA	NA	NA	NA	NA	NA	NA	225	NA	NA	J 0.700	NA	NA	NA

(1) - Field Blank collected at well MW-19.
(2) - Duplicate sample collected at well MW-4
NA - Not analyzed

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification: / Collection Date:	MW-1 7/10/07	MW-3 7/11/07	MW-4 7/11/07	MW-5 7/11/07	MW-9 7/10/07	MW-12 7/10/07	MW-14 7/10/07	MW-18 7/10/07	MW-19 7/10/07	MW-21 7/11/07	MW-22 7/11/07	Stock Well 7/25/06	Gravel Pit Pond 7/10/07	Gravel Pit Well 7/25/06	MW-30[1] 7/10/07	MW-33[2] 7/11/07	Trip Blank	Method Blank	Method Blank
Volatile Organics - ppb (ug/L)																			
Acetone	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	NA	< 10.0	NA	< 10.0	< 10.0	< 10.0	< 10.0	NA
Bromodichloromethane	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	0.470	< 0.200	< 0.200	< 0.200	< 0.500
2-Butanone	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	NA	< 2.00	NA	< 2.00	< 2.00	< 2.00	< 2.00	NA
Chlorobenzene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
Chloroform	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	0.850	< 0.200	< 0.200	< 0.200	< 0.500
Dibromochloromethane	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
1,2-Dichlorobenzene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
1,3-Dichlorobenzene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
1,4-Dichlorobenzene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
1,1-Dichloroethane	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
1,2-Dichloroethane	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
1,1-Dichloroethene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
cis-1,2-Dichloroethene (DCE)	< 0.200	11.4	< 0.200	0.320	8.00	< 0.200	1.37	< 0.200	< 0.200	0.410	6.980	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
trans-1,2-Dichloroethene (DCE)	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
Ethylbenzene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
Hexachlorobutadiene	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 0.500	< 2.50	< 0.500	< 2.50	< 2.50	< 2.50	< 2.500	< 0.500
Naphthalene	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 0.500	< 2.50	< 0.500	< 2.50	< 2.50	< 2.50	< 2.50	< 0.500
n-Propylbenzene	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500
Tetrachloroethene (PCE)	< 0.200	D 117	0.380	2.59	10.6	0.39	1.98	0.940	0.300	0.580	4.45	< 0.500	< 0.200	< 0.500	< 0.200	0.370	< 0.200	< 0.200	< 0.500
Toluene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
1,1,1-Trichloroethane	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
Trichloroethene (TCE)	< 0.200	9.86	2.40	0.940	3.24	0.55	0.890	0.860	0.760	0.570	3.92	1.19	< 0.200	< 0.500	< 0.200	2.32	< 0.200	< 0.200	< 0.500
1,2,4-Trimethylbenzene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
Vinyl chloride	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500	< 0.200	< 0.500	< 0.200	< 0.200	< 0.200	< 0.200	< 0.500
Total DCE, PCE, TCE	< 0.200	138	2.8	3.85	21.8	0.94	4.24	1.80	1.060	1.56	15.35	1.19	< 0.200	< 0.500	< 0.200	2.7	< 0.200	< 0.200	< 0.500
Metals - ppm (mg/L)																			
Total Iron	< 0.150	< 0.150	< 0.150	< 0.150	< 0.150	< 0.150	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.150	NA	< 0.150	NA
Arsenic	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.100	NA	< 0.100	NA
Barium	0.0721	0.0843	0.0626	0.0888	0.0940	0.0833	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0652	NA	< 0.0500	NA
Cadmium	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.0050	NA	< 0.0050	NA
Chromium	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.0100	NA	< 0.0100	NA
Copper	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.0100	NA	< 0.0100	NA
Iron	< 0.150	< 0.150	< 0.150	< 0.150	< 0.150	< 0.150	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.150	NA	< 0.150	NA
Lead	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500	< 0.0500	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.0500	NA	< 0.0500	NA
Manganese	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.0100	NA	< 0.0100	NA
Selenium	< 0.150	< 0.150	< 0.150	< 0.150	< 0.150	< 0.150	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.150	NA	< 0.150	NA
Hydrocarbons by GC/FID Headspace (ug/L)																			
Methane	< 1.20	< 1.20	< 1.20	< 1.20	< 1.20	< 1.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.20	NA	< 1.20	NA
Ethane	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10.0	NA	< 10.0	NA
Ethene	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10.0	NA	< 10.0	NA
Other - ppm (mg/L)																			
Total Organic Carbon	6.43	8.39	8.39	9.72	8.73	5.27	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.80	NA	< 2.00	NA
Nitrate/Nitrite - Nitrogen	1.79	2.30	1.37	1.45	0.629	1.51	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.33	NA	< 0.0100	NA
Total Nitrogen - Kjeldahl	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.00	NA	< 1.00	NA
Total Phosphorus	0.0660	0.0590	0.0890	0.0600	0.0340	0.0760	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0980	NA	< 0.00500	NA
Total Nitrogen	2.04	1.29	1.29	1.57	0.615	1.54	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.35	NA	NA	NA
Sulfate	29.3	144	D 50.1	D 49.6	D 47.8	D 29.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	D 50.3	NA	< 0.400	NA
Chloride	7.68	8.83	7.87	7.72	8.10	D 9.80	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.92	NA	< 0.400	NA
Dissolved Oxygen (Field data)	8.86	7.65	5.35	7.51	2.19	9.41	8.06	5.98	7.35	7.61	7.78	NA	NA	NA	NA	5.35	NA	NA	NA
Oxidation Reduction Potential (mV - Field Data)	93.7	-28.8	67.0	5.7	19.4	7.0	-8.7	26.5	60.7	4.3	15.2	NA	NA	NA	NA	67.0	NA	NA	
Alkalinity (mg/L)																			
Bicarbonate Alkalinity	215	211	225	215	234	206	NA	NA	NA	NA	NA	NA	NA	NA	NA	230	NA	< 5.00	NA
Carbonate Alkalinity	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5.00	NA	< 5.00	NA
Hydroxide Alkalinity	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 5.00	NA	< 5.00	NA
Total Alkalinity	215	211	225	215	234	206	NA	NA	NA	NA	NA	NA	NA	NA	NA	230	NA	< 5.00	NA

(1) - Field Blank collected at well MW-19.
(2) - Duplicate sample collected at well MW-4
NA - Not analyzed

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification: / Collection Date:	MW-1 7/8/08	MW-3 7/9/08	MW-4 7/9/08	MW-5 7/9/08	MW-9 7/9/08	MW-12 7/8/08	MW-14 7/8/08	MW-18 7/8/08	MW-19 7/8/08	MW-21 7/9/08	MW-22 7/9/08	Stock Well 7/8/08	Gravel Pit Pond 7/8/08	Gravel Pit Well 7/8/08	MW-30[1] 7/8/08	MW-33[2] 7/9/08	Trip Blank	Method Blank	Method Blank
Volatile Organics - ppb (ug/L)																			
Acetone	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	NA	< 10.0	NA	< 10.0	< 10.0	< 10.0	< 10.0	< 0.0005
Bromodichloromethane	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005
2-Butanone	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	NA	< 2.00	NA	< 2.00	< 2.00	< 2.00	< 2.00	< 0.0005
Chlorobenzene	< 0.200	< 0.200	3.36	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	< 0.200	3.26	< 0.200	< 0.200	< 0.0005
Chloroform	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005
Dibromochloromethane	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005
1,2-Dichlorobenzene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005
1,3-Dichlorobenzene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005
1,4-Dichlorobenzene	< 0.200	< 0.200	0.970	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	0.330	0.990	< 0.200	< 0.200	< 0.0005
1,1-Dichloroethane	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005
1,2-Dichloroethane	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005
1,1-Dichloroethene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005
cis-1,2-Dichloroethene (DCE)	< 0.200	10.8	1.68	0.620	5.14	< 0.200	0.600	< 0.200	< 0.200	0.780	11.7	< 0.0005	< 0.200	< 0.0005	< 0.200	1.75	< 0.200	< 0.200	< 0.0005
trans-1,2-Dichloroethene (DCE)	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005
Ethylbenzene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005
Hexachlorobutadiene	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 0.0005	< 2.50	< 0.0005	< 2.50	< 2.50	< 2.50	< 2.50	< 0.0005
Naphthalene	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 2.50	< 0.0005	< 2.50	< 0.0005	< 2.50	< 2.50	< 2.50	< 2.50	< 0.0005
n-Propylbenzene	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.500	< 0.0005	< 0.500	< 0.0005	< 0.500	< 0.500	< 0.500	< 0.500	< 0.0005
Tetrachloroethene (PCE)	< 0.200	85.6	13.6	2.79	5.45	0.210	1.35	0.890	0.310	1.07	6.67	0.0005	< 0.200	< 0.0005	< 0.200	13.6	< 0.200	< 0.200	< 0.0005
Toluene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	0.200	< 0.200	< 0.200	< 0.200	< 0.0005
1,1,1-Trichloroethane	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	0.250	< 0.0005	< 0.200	< 0.0005	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005
Trichloroethene (TCE)	< 0.200	8.23	2.49	1.75	2.08	0.360	0.590	0.710	0.770	0.910	5.86	0.0008	< 0.200	< 0.0005	< 0.200	2.42	< 0.200	< 0.200	< 0.0005
1,2,4-Trimethylbenzene	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005
Vinyl chloride	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005	< 0.200	< 0.0005	< 0.200	< 0.200	< 0.200	< 0.200	< 0.0005
Total DCE, PCE, TCE	ND	104.6	17.77	5.16	12.67	0.570	2.54	1.60	1.08	2.76	24.23	0.0014	ND	ND	ND	17.77	ND	ND	ND
Metals - ppm (mg/L)																			
Total Iron	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.010	NA	< 0.010	NA
Arsenic	0.0028	0.0029	0.0016	0.0043	0.0041	0.0027	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0016	NA	< 0.0005	NA
Barium	0.0633	0.0756	0.0588	0.106	0.0949	0.0913	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0566	NA	< 0.0020	NA
Cadmium	0.00004	< 0.00002	0.00002	< 0.00002	< 0.00002	< 0.00002	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00002	NA	< 0.00002	NA
Chromium	0.0004	0.0006	0.0003	0.0005	0.0004	0.0005	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0003	NA	< 0.0002	NA
Copper	0.0009	0.0017	0.0027	0.0014	0.0010	0.0010	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0028	NA	< 0.0001	NA
Iron (Dissolved)	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.010	NA	NA	NA
Lead	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.00002	NA	< 0.00002	NA
Manganese	< 0.0006	< 0.0006	0.0012	< 0.0006	< 0.0006	< 0.0006	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.0012	NA	< 0.0006	NA
Selenium	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	< 0.0010	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.0010	NA	< 0.0010	NA
Hydrocarbons by GC/FID Headspace (ug/L)																			
Methane	< 1.20	< 1.20	< 1.20	< 1.20	< 1.20	< 1.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.20	NA	< 1.20	NA
Ethane	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10.0	NA	< 10.0	NA
Ethene	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10.0	NA	< 10.0	NA
Other - ppm (mg/L)																			
Total Organic Carbon	2.0	4.8	7.4	5.4	2.5	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.0	NA	< 1.0	NA
Nitrate/Nitrite - Nitrogen	2.68	3.32	1.38	1.96	0.967	2.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.31	NA	< 0.0100	NA
Total Nitrogen - Kjeldahl	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.00	NA	< 1.00	NA
Total Phosphorus	0.0570	0.0650	0.187	0.0490	0.0380	0.0530	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.208	NA	< 0.00500	NA
Total Nitrogen	2.74	3.35	1.38	2.04	0.967	2.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.40	NA	NA	NA
Sulfate	37.4	235	69.5	82.5	48.4	32.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	69.5	NA	< 0.400	NA
Chloride	10.2	9.64	8.60	8.02	8.33	12.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.56	NA	< 0.400	NA
Dissolved Oxygen (Field data)	10.32	8.31	0.59	8.58	7.69	11.34	10.42	6.87	7.16	5.61	4.27	NA	NA	NA	NA	0.59	NA	NA	NA
Oxidation Reduction Potential (mV - Field Data)	506.8	563.1	405.8	457.6	295.3	450.0	474.7	460.6	557.0	561.7	554.6	NA	NA	NA	NA	405.8	NA	NA	NA
Alkalinity (mg/L)																			
Bicarbonate Alkalinity	NR	NR	NR	NR	NR	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NA	NR	NA
Carbonate Alkalinity	NR	NR	NR	NR	NR	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NA	NR	NA
Hydroxide Alkalinity	NR	NR	NR	NR	NR	NR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NR	NA	NR	NA
Total Alkalinity	260	220	250	230	240	230	NA	NA	NA	NA	NA	NA	NA	NA	NA	240	NA	< 5.0	NA

(1) - Field Blank collected at well MW-19.
(2) - Duplicate sample collected at well MW-4
NA - Not analyzed

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Sample Identification	MW-1	MW-1	MW-3	MW-3	MW-4	MW-5	MW-9	MW-12	MW-14	MW-18	MW-19	MW-21	MW-22	Stock Well	Gravel Pit Pond	Gravel Pit Well
Sample Date	7/7/2009	7/14/2009	7/7/2009	7/14/2009	7/7/2009	7/7/2009	7/7/2009	7/7/2009	7/7/2009	7/8/2009	7/8/2009	7/14/2009	7/14/2009	7/8/2009	7/7/2009	7/7/2009
Volatile Organics - ppb (ug/L)																
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Bromodichloromethane	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
2-Butanone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	< 10
Chlorobenzene	NA	< 1.0	NA	< 1.0	1.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
Chloroform	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.23 J	< 1.0	< 1.0	< 1.0	< 0.50	0.13 J	< 0.50
Dibromochloromethane	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
1,2-Dichlorobenzene	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
1,3-Dichlorobenzene	NA	< 1.0	NA	< 1.0	0.51 J	0.31 J	0.49 J	0.34 J	0.31 J	0.21 J	0.23 J	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
1,4-Dichlorobenzene	NA	< 1.0	NA	< 1.0	0.53 J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
1,1-Dichloroethane	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
1,2-Dichloroethane	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
1,1-Dichloroethene	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
cis-1,2-Dichloroethene (DCE)	NA	< 1.0	NA	< 1.0	0.38 J	0.52 J	4.5	0.31 J	1.1	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
trans-1,2-Dichloroethene (DCE)	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
Ethylbenzene	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
Hexachlorobutadiene	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
Naphthalene	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
Tetrachloroethene (PCE)	NA	< 1.0	NA	< 1.0	4.1	1.2	2.6	0.19 J	0.43 J	< 1.0	< 1.0	< 1.0	< 1.0	0.53	< 1.0	< 0.50
Toluene	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
1,1,1-Trichloroethane	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
Trichloroethene (TCE)	NA	< 1.0	NA	< 1.0	1.2	1.2	1.6	1.3	0.54 J	0.34 J	0.64 J	< 1.0	< 1.0	0.66	< 1.0	< 0.50
1,2,4-Trimethylbenzene	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	0.63
Vinyl chloride	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	< 0.50
Total PCE, TCE, and DCE	NA	ND	NA	ND	5.68	2.92	8.7	1.8	2.07	0.34	0.64	ND	ND	1.19	ND	ND
Metals - ppm (mg/L)																
Total Iron	< 10	NA	< 10	NA	13	< 10	< 10	14	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	2.7	NA	2.9	NA	1.7	3.9	3.7	3.8	NA	NA	NA	NA	NA	NA	NA	NA
Barium	54.7	NA	72.6	NA	65.7	108	105	72.2	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	< 0.02	NA	< 0.02	NA	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	0.4	NA	0.7	NA	0.6	0.7	0.4	0.7	NA	NA	NA	NA	NA	NA	NA	NA
Copper	1.0	NA	1.5	NA	2.7	1.4	1.5	0.8	NA	NA	NA	NA	NA	NA	NA	NA
Iron (Dissolved)	< 10	NA	< 10	NA	< 10	< 10	< 10	< 10	NA	NA	NA	NA	NA	NA	NA	NA
Lead	< 0.02	NA	< 0.02	NA	< 0.02	< 0.02	< 0.02	< 0.02	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	< 0.6	NA	< 0.6	NA	< 0.6	< 0.6	< 0.6	< 0.6	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	< 1.0	NA	< 1.0	NA	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA
Hydrocarbons by GC/FID Headspace (ug/L)																
Methane	< 1.20	NA	< 1.20	NA	< 1.20	< 1.20	< 1.20	< 1.20	NA	NA	NA	NA	NA	NA	NA	NA
Ethane	< 10.0	NA	< 10.0	NA	< 10.0	< 10.0	< 10.0	< 10.0	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	< 10.0	NA	< 10.0	NA	< 10.0	< 10.0	< 10.0	< 10.0	NA	NA	NA	NA	NA	NA	NA	NA
Other - ppm (mg/L)																
Total Organic Carbon	1.9	NA	5.6	NA	6.0	5.0	2.6	1.3	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate/Nitrite	2.4	NA	4.0	NA	2.1	5.2	2.5	2.6	NA	NA	NA	NA	NA	NA	NA	NA
Total Kjeldahl Nitrogen	< 0.100	NA	< 0.100	NA	0.298	0.277	0.121	0.153	NA	NA	NA	NA	NA	NA	NA	NA
Total Phosphorus	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Nitrogen	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	31	NA	20	NA	11	13	9.7	38	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	7.1	NA	0.91	NA	1.6	1.9	1.9	12	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen (Field data)	10.77	10.78	9.83	10.04	0.77	7.31	4.50	8.80	10.18	6.34	7.54	8.11	9.97	NA	NA	NA
Oxidation Reduction Potential (mV - Field Data)	112.8	122.0	130.7	139.1	162.2	178.7	123.1	127.2	120.2	162.8	158.3	236.0	98.1	NA	NA	NA
Alkalinity (mg/L)																
Bicarbonate Alkalinity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbonate Alkalinity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hydroxide Alkalinity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity, Total	220	NA	230	NA	230	240	240	220	NA	NA	NA	NA	NA	NA	NA	NA

J - Estimated
NA - Not Analyzed

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Location ID / Sample Date	DEQ-7 Groundwater Standards	MW-1 07/13/10	MW-3 07/14/10	MW-4 07/14/10	MW-5 07/14/10	MW-9 07/14/10	MW-12 07/13/10	MW-14 07/13/10	MW-18 07/14/10	MW-19 07/14/10	MW-21 07/14/10	MW-22 07/14/10	Harris Stock Well 07/13/10	Gravel Pit Pond 07/13/10	Gravel Pit Well 07/13/10	MW-30[1] 07/13/10	MW-33[2] 07/14/10	Trip Blank 07/14/10	Method Blank	Method Blank
Volatile Organics (µg/L)																				
Acetone	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	NS	NA	NA	NA	< 10	NA
Bromodichloromethane	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NS	< 1.0	< 1.0	NA	< 0.50	< 0.50
2-Butanone	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	NS	NA	NA	NA	< 10	NA
Chlorobenzene	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0	NA	< 0.50	< 0.086
Chloroform	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.31 J	< 1.0	< 1.0	< 1.0	< 0.50	0.11 J	NS	< 1.0	< 1.0	NA	< 0.50	< 0.057
Dibromochloromethane	4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0	NA	< 1.0	< 0.053
1,2-Dichlorobenzene	600	< 1.0	< 1.0	0.071 J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0	NA	< 0.50	< 0.061
1,3-Dichlorobenzene	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0	NA	< 0.50	< 0.091
1,4-Dichlorobenzene	75	< 1.0	< 1.0	0.24 J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	0.26 J	NA	< 0.50	< 0.075
1,1-Dichloroethane	---	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0	NA	< 0.50	< 0.049
1,2-Dibromoethane	0.004	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0	NA	< 0.50	NA
1,1-Dichloroethene	0.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0	NA	< 0.50	< 0.066
cis-1,2-Dichloroethene (DCE)	70	< 1.0	5.7	0.31 J	0.95 J	2.5	0.17 J	0.66 J	< 1.0	< 1.0	0.16 J	3.9	< 0.50	< 1.0	NS	< 1.0	0.31 J	NA	< 0.50	< 0.067
trans-1,2-Dichloroethene (DCE)	100	< 1.0	0.11 J	< 1.0	< 1.0	0.054 J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	0.052 J	< 0.50	< 1.0	NS	< 1.0	< 1.0	NA	< 0.50	< 0.051
Ethylbenzene	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0	NA	< 0.50	< 0.061
Hexachlorobutadiene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0	NA	< 0.50	< 0.23
Naphthalene	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NS	< 1.0	< 1.0	NA	< 1.0	< 0.064
n-Propylbenzene	---	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0	NA	< 0.50	< 0.075
Tetrachloroethene (PCE)	5	< 1.0 U	**37**	3.9	2.4	2.4	< 1.0 U	1.1	< 1.0 U	< 1.0 U	< 1.0 U	4.3	0.42 J	< 1.0 U	NS	< 1.0 U	3.9	NA	< 0.50	0.163 J
Toluene	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0	NA	< 0.50	< 0.076
1,1,1-Trichloroethane	200	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0	NA	< 0.50	< 0.041
Trichloroethene (TCE)	5	< 1.0	4.7	1.2	1.3	1.1	1.0	0.47 J	0.5 J	0.081 J	0.31 J	2.4	0.81	< 1.0	NS	< 1.0	1.1	NA	< 0.50	< 0.056
1,2,4-Trimethylbenzene	---	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 0.50	< 1.0 U	NS	< 1.0 U	< 1.0 U	NA	< 0.50	0.365 J
Vinyl chloride	0.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0	NA	< 0.50	< 0.091
Total PCE, TCE, and DCE	---	ND	47.40 J	5.41 J	4.65 J	6.00 J	1.17 J	2.23 J	0.5 J	0.081 J	0.47 J	10.60 J	1.23 J	ND	NS	ND	5.31 J	NA	ND	0.163 J
Total Metals (µg/L)																				
Iron	300*	11.70	13.5	< 10.0	< 10.0	< 10.0	< 10.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10.0	NA	< 10.0	NA
Arsenic	10	2.83	3.44	1.57	4.27	4.01	4.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.65	NA	< 0.50	NA
Barium	2000	55.60	71.1	71.3	102	93.9	77.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	70.8	NA	< 2.0	NA
Cadmium	5	< 0.020	< 0.020	< 0.020	< 0.020	< 0.02	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.020	NA	< 0.020	NA
Chromium	100	0.74	1.16	1.16	0.93	0.76	0.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.14	NA	< 0.20	NA
Copper	1300	0.83	1.57	2.52	1.26	1.34	0.70	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.44	NA	< 0.10	NA
Lead	15	< 0.020	0.086	< 0.020	< 0.020	< 0.020	< 0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.020	NA	< 0.020	NA
Manganese	50*	< 0.6	3.7	< 0.6	< 0.6	0.7	< 0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.6	NA	< 0.6	NA
Selenium	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	NA	< 1.0	NA
Hydrocarbon by GC/FID Headspace (mg/L)																				
Methane		< 1.20	< 1.20	< 1.20	< 1.20	< 1.20	< 1.20	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 1.20	< 1.20	NA	NA
Ethane		< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10.0	< 10.0	NA	NA
Ethene		< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10.0	< 10.0	NA	NA
Other (mg/L)																				
Total Organic Carbon		1.8	5.4	5.4	5.0	2.3	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	5.3	NA	< 1.0	NA
Nitrate/Nitrite		3.2	2.6	1.3	1.5	0.8	1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4	NA	< 0.010	NA
Total Kjeldahl Nitrogen		0.191	0.272	0.202 J	0.263	0.144	< 0.100	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.539 J	NA	NA	NA
Total Phosphorus		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Nitrogen		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate		36	200	50	57	35	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	50	NA	< 1.2	NA
Chloride		8.4	7.0	6.7	6.5	7.0	9.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.7	NA	< 0.90	NA
Iron (Dissolved)		< 0.010	0.139	< 0.010	< 0.010	< 0.010	< 0.010	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.010	NA	NA	NA
Dissolved Oxygen (field)		10.61	9.20	3.62	7.34	4.87	7.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.62	NA	NA	NA
Oxidation Reduction Potential (mV - field)		2.60	-48.70	95.90	63.90	9.30	25.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	95.90	NA	NA	NA
Alkalinity, Total (mg/L as $CaCO_3$)		230	220	220	240	230	210	NA	NA	NA	NA	NA	NA	NA	NA	NA	220	NA	< 5.0	NA

Notes:

(1) - Field Blank collected at MW-19
(2) - Duplicate sample collected at MW-4
--- = no DEQ-7 standard available
NS = not sampled
NA = not analyzed
ND = not detected
J = estimated concentration
U = undected concentration at the reporting limit or at the reported concentration, result is considered to be a false positive
< = less than
µg/L - micrograms per liter
* = Secondary maximum contaminant level
All DEQ-7 groundwater standard exceedances have been bolded
DEQ-7 Groundwater Standard was obtained from *Circular DEQ-7 Montana's Numeric Water Quality Standards* , Human Health Standards for Groundwater, August 2010

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Location ID / Sample Date	DEQ-7 Groundwater Standards	MW-1 07/12/11	MW-3 07/13/11	MW-4 07/13/11	MW-5 07/13/11	MW-9 07/13/11	MW-12 07/12/11	MW-14 07/13/11	MW-18 07/12/11	MW-19 07/12/11	MW-21 07/13/11	MW-22 07/13/11	Harris Stock Well 07/12/11	Gravel Pit Pond 07/13/11	Gravel Pit Well 07/13/11	MW-30[1] 07/12/11	MW-33[2] 07/13/11	Trip Blank 07/14/10	Method Blank Method 8260B	Method Blank Method 524.2
Volatile Organics (ηg/L)[3]																				
Acetone	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	NS	NA	NA	NA	NA	< 10
Bromodichloromethane (Dichlorobromomethan	10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0
2-Butanone (Methyl ethyl ketone)	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	NS	NA	NA	NA	NA	< 10
Chlorobenzene	100	< 0.10	< 0.10	< 0.10	< 0.10	0.14	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50
Chloroform	70	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.20	0.12	< 0.10	< 0.10	< 0.50	0.19	NS	0.12	0.12	< 0.10	< 0.10	< 0.50
Dibromochloromethane (Chlorodibromomethan	4	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50
1,2-Dichlorobenzene	600	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.50	< 0.20	NS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.50
1,3-Dichlorobenzene	600	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.50	< 0.20	NS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.50
1,4-Dichlorobenzene	75	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.50	< 0.20	NS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.50
1,1-Dichloroethane	---	< 0.10	0.043 J	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50
1,2-Dibromoethane	0.004	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50
1,1-Dichloroethene	0.6	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50
cis-1,2-Dichloroethene (DCE)	70	< 0.10	19	0.080 J	0.18	4.2	0.35	1.7	0.035 J	< 0.10	0.11	7.2	< 0.50	0.12	NS	< 0.10	0.076 J	< 0.10	< 0.10	< 0.50
trans-1,2-Dichloroethene (DCE)	100	< 0.10	0.26	< 0.10	< 0.10	0.065 J	< 0.10	0.031 J	< 0.10	< 0.10	< 0.10	0.13	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50
Ethylbenzene	700	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	0.041 J	< 0.10	< 0.10	< 0.10	< 0.50
Hexachlorobutadiene	5	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.50	< 0.20	NS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.50
Naphthalene	100	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 1.0	< 0.40	NS	< 0.40	< 0.40	< 0.40	< 0.40	< 1.0
n-Propylbenzene	---	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50
Tetrachloroethene (PCE)	5	< 0.10	**260**	2.6	3.0	**8.6**	0.70	2.7	0.39	0.23	0.27	**18**	0.45 J	0.22	NS	< 0.10	2.4	< 0.10	< 0.10	< 0.50
Toluene	1000	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10 U	NS	0.17	< 0.10	< 0.10	< 0.10	< 0.50
1,1,1-Trichloroethane	200	< 0.10	0.45	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.12	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50
Trichloroethene (TCE)	5	< 0.10	**27**	0.70	1.1	2.8	0.85	1.1	0.45	0.39	0.20	4.5	0.66	0.096 J	NS	< 0.10	0.64	< 0.10	< 0.10	< 0.50
1,2,4-Trimethylbenzene	---	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50
Vinyl chloride	0.2	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	0.016 J	< 0.020	< 0.020	< 0.020	< 0.50	< 0.020	NS	< 0.020	< 0.020	< 0.020	< 0.020	< 0.50
Total PCE, TCE, and DCE	---	ND	306	3.38 J	4.28	15.7 J	1.90	5.53 J	0.441 J	0.62	0.58	29.8	1.11 J	0.436 J	NS	ND	3.12 J	ND	ND	ND
Total Metals (ηg/L)																				
Iron	300*	14.2	15.6	16.6	ND	39.1	46.3	NA	NA	NA	NA	NA	NA	NA	NA	< 10.0	11.3	NA	< 10.0	< 10.0
Arsenic	10	2.4	2.6	1.7	4.2	3.9	4.1	NA	NA	NA	NA	NA	NA	NA	NA	< 0.50	1.7	NA	< 0.50	< 0.50
Barium	2000	63.8	38.9	68.7	110	116	90.1	NA	NA	NA	NA	NA	NA	NA	NA	< 2.0	69.1	NA	< 2.0	< 2.0
Cadmium	5	< 0.02	< 0.02	< 0.02	< 0.02	0.030	< 0.02	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	0.040	NA	< 0.02	< 0.02
Chromium	100	0.90	1.3	1.5	1.2	1.1	0.70	NA	NA	NA	NA	NA	NA	NA	NA	< 0.20	1.4	NA	< 0.20	< 0.20
Copper	1300	1.4	2.4	2.9	1.7	3.0	1.4	NA	NA	NA	NA	NA	NA	NA	NA	< 0.10	2.9	NA	< 0.10	< 0.10
Lead	15	0.030	< 0.02	< 0.02	< 0.02	0.050	0.040	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02	0.020	NA	< 0.02	< 0.02
Manganese	50*	< 0.6	< 0.6	1.1	< 0.6	4.5	1.4	NA	NA	NA	NA	NA	NA	NA	NA	< 0.6	1.0	NA	< 0.6	< 0.6
Selenium	50	< 1.0	< 1.0	< 1.0	< 1.0	1.0 U	< 1.0	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	< 1.0	NA	< 1.0	< 1.0
Hydrocarbon by GC/FID Headspace (mg/L)																				
Methane		< 10.0	ND	< 10.0	< 10.0	< 10.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	< 10.0	< 10.0	NA	NA	NA
Ethane		< 10.0	ND	< 10.0	< 10.0	< 10.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	< 10.0	< 10.0	NA	NA	NA
Ethene		< 10.0	ND	< 10.0	< 10.0	< 10.0	ND	NA	NA	NA	NA	NA	NA	NA	NA	< 10.0	< 10.0	NA	NA	NA
Other (mg/L)																				
Total Organic Carbon		2.5	7.3	3.8	4.0	3.7	2.2	NA	NA	NA	NA	NA	NA	NA	NA	< 1.0	3.9	NA	NA	NA
Nitrate/Nitrite		2.3	2.1	1.7	1.8	1.2	1.6	NA	NA	NA	NA	NA	NA	NA	NA	0.0056 J	1.8	NA	NA	NA
Total Kjeldahl Nitrogen		0.387	0.261	< 0.100	0.470	0.240	< 0.100	NA	NA	NA	NA	NA	NA	NA	NA	< 0.100	0.107	NA	NA	NA
Total Phosphorus		< 0.050	< 0.050	0.087	0.073	< 0.050	< 0.050	NA	NA	NA	NA	NA	NA	NA	NA	< 0.050	0.088	NA	NA	NA
Total Nitrogen		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate		50	150	51	68	62	41	NA	NA	NA	NA	NA	NA	NA	NA	< 1.2	51	NA	NA	NA
Chloride		11	12.0	12	11	11	15	NA	NA	NA	NA	NA	NA	NA	NA	< 0.90	12	NA	NA	NA
Iron (Dissolved)		< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	21.9	NA	NA	NA	NA	NA	NA	NA	NA	< 10.0	< 10.0	NA	NA	NA
Dissolved Oxygen (field)		9.77	5.22	3.76	5.23	4.56	9.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.76	NA	NA	NA
Oxidation Reduction Potential (mV - field)		-9.70	-75.8	-96.8	-90.4	-103.6	-52.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	-96.8	NA	NA	NA
Alkalinity, Total (mg/L as $CaCO_3$)		240	250	230	240	250	240	NA	NA	NA	NA	NA	NA	NA	NA	< 5.0	240	NA	NA	NA

Notes:

(1) - Field Blank collected at MW-12
(2) - Duplicate sample collected at MW-4
(3) - VOCs anlayzed by EPA Method 8260 with the exception of the Harris Stock Well, which was anlzyed by EPA Method 524.2.
--- = no DEQ-7 standard available
NS = Not sampled. No power to the pump or access to the well.
NA = not analyzed
ND = not detected
J = estimated concentration
U = undected concentration at the reporting limit or at the reported concentration, result is considered to be a false positive
< = less than
ηg/L - micrograms per liter
mg/L - milligrams per liter
- = negative
mV = millivolts
* = Secondary maximum contaminant level

All DEQ-7 groundwater standard exceedances have been bolded
DEQ-7 Groundwater Standard was obtained from *Circular DEQ-7 Montana's Numeric Water Quality Standards* , Human Health Standards for Groundwater, August 2010

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Location ID / Sample Date	DEQ-7 Groundwater Standards	MW-1 07/03/12	MW-3 07/03/12	MW-4 07/03/12	MW-5 07/03/12	MW-9 07/03/12	MW-12 07/02/12	MW-14 07/02/12	MW-18 07/02/12	MW-19 07/02/12	MW-21 07/03/12	MW-22 07/03/12	Harris Stock Well 07/02/12	Gravel Pit Pond 07/02/12	Gravel Pit Well 07/02/12	MW-30[1] 07/03/12	MW-32[2] 07/02/12	MW-33[3] 07/03/12	Trip Blank 1 07/02/12	Trip Blank 2 07/02/12	Trip Blanks 1 and 2 07/03/12	Method Blank Method 8260B	Method Blank Method 524.2
Volatile Organics (µg/L)[4]																							
Acetone	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	NS	NA	NA	NA	NA	NA	NA	NA	< 10
Bromodichloromethane (Dichlorobromomethane	10	< 0.10	< 0.10 UJ	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 1.0	< 0.10	< 1.0
2-Butanone (Methyl ethyl ketone)	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 10	NA	NS	NA	NA	NA	NA	NA	NA	NA	< 10
Chlorobenzene	100	< 0.10	< 0.10 UJ	1.3	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	1.2	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
Chloroform	70	< 0.10	< 0.10 UJ	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.24	0.12	< 0.10	< 0.10	< 0.50	0.15	NS	0.037 J	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
Dibromochloromethane (Chlorodibromomethane	4	< 0.10	< 0.10 UJ	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
1,2-Dichlorobenzene	600	< 0.20	< 0.20 UJ	0.13 J	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.50	< 0.20	NS	< 0.20	< 0.20	0.11 J	< 0.20	< 0.20	< 0.50	< 0.20	< 0.50
1,3-Dichlorobenzene	600	< 0.20	< 0.20 UJ	0.060 J	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.50	< 0.20	NS	< 0.20	< 0.20	0.062 J	< 0.20	< 0.20	< 0.50	< 0.20	< 0.50
1,4-Dichlorobenzene	75	< 0.20	< 0.20 UJ	0.81	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.50	< 0.20	NS	< 0.20	< 0.20	0.77	< 0.20	< 0.20	< 0.50	< 0.20	< 0.50
1,1-Dichloroethane	---	< 0.10	< 0.10 UJ	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
1,2-Dibromoethane	0.004	< 0.10	< 0.10 UJ	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
1,1-Dichloroethene	0.6	< 0.10	< 0.10 UJ	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
cis-1,2-Dichloroethene (DCE)	70	< 0.10	4.0 J	0.83	0.41	1.7	< 0.10	0.60	< 0.10	< 0.10	0.092 J	1.0	< 0.50	0.040 J	NS	< 0.10	< 0.10	0.80	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
trans-1,2-Dichloroethene (DCE)	100	< 0.10	0.068 J	< 0.10	< 0.10	0.043 J	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.032 J	< 0.50	< 0.10	NS	< 0.10	< 0.10	0.034 J	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
Ethylbenzene	700	< 0.10	< 0.10 UJ	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
Hexachlorobutadiene	5	< 0.20	< 0.20 U	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.50	< 0.20	NS	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.50	< 0.20	< 0.50
Naphthalene	100	< 0.40	< 0.40 UJ	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 1.0	< 0.40	NS	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 1.0	< 0.40	< 1.0
n-Propylbenzene	---	< 0.10	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10 U	< 0.50	< 0.10	NS	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10	< 0.50	< 0.10	< 0.50
Tetrachloroethene (PCE)	5	< 0.10 U	**30** J	**5.3**	0.83	1.9	< 0.10 U	1.5	< 0.39 U	< 0.20 U	< 0.23 U	1.8	0.43 J	< 0.10 U	NS	< 0.10 U	< 0.10 U	**5.5**	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
Toluene	1000	< 0.10	< 0.10 UJ	< 0.10	< 0.10 U	< 0.10	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.10 U	< 0.50	< 0.10	NS	< 0.10	0.030 J	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
1,1,1-Trichloroethane	200	< 0.10	< 0.10 UJ	0.035 J	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
Trichloroethene (TCE)	5	< 0.10	2.9 J	1.1	0.69	0.65	< 0.10	0.48	0.52	0.59	0.12	0.72	0.83	0.029 J	NS	< 0.10	0.027 J	1.1	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
1,2,4-Trimethylbenzene	---	< 0.10	< 0.10 UJ	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	NS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.50	< 0.10	< 0.50
Vinyl chloride	0.2	< 0.020	< 0.020 UJ	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.02	< 0.020	< 0.020	< 0.020	< 0.50	< 0.02	NS	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.50	< 0.020	< 0.50
Total PCE, TCE, and DCE	---	ND	36.97 J	9.57 J	1.93	4.29 J	ND	2.58	0.76	0.71	0.212 J	3.55 J	1.26 J	0.219 J	NS	0.037 J	0.057 J	9.58 J	ND	ND	ND	ND	ND
Natural Attenuation (mg/L unless noted)																							
Total Organic Carbon		2.1	2.6	5.4	3.0	2.4	2.3	NA	NA	NA	NA	NA	NA	NA	NS	< 1.0	< 1.0	6.0	NA	NA	NA	NA	NA
Nitrate/Nitrite		1.3	0.83	0.40	0.74	0.68	1.3	NA	NA	NA	NA	NA	NA	NA	NS	0.0	0.0 J	0.4	NA	NA	NA	NA	NA
Total Kjeldahl Nitrogen		< 0.23 U	< 0.33 U	< 0.93 U	< 0.35 U	< 0.44 U	< 0.45 U	NA	NA	NA	NA	NA	NA	NA	NS	0.46	0.81	< 0.29 U	NA	NA	NA	NA	NA
Total Phosphorus		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.27	NA	NA	NA	NA	NA	NA	NA	NS	< 0.10	< 0.10	< 0.10	NA	NA	NA	NA	NA
Sulfate		34 J-	43 J-	36 J-	40 J-	41 J-	38 J-	NA	NA	NA	NA	NA	NA	NA	NS	< 1 UJ	< 1 UJ	36 J-	NA	NA	NA	NA	NA
Chloride		9.0 J-	7.4 J-	7.1 J-	7.4 J-	7.9 J-	13.0 J-	NA	NA	NA	NA	NA	NA	NA	NS	< 0.9 UJ	< 0.9 UJ	7.1 J-	NA	NA	NA	NA	NA
Dissolved Oxygen (field)		9.35	9.20	1.13	6.32	7.31	7.99	NA	NA	NA	NA	NA	NA	NA	NS	NA	NA	1.13	NA	NA	NA	NA	NA
Oxidation Reduction Potential (mV - field)		116	126	92	108	101	152	NA	NA	NA	NA	NA	NA	NA	NS	NA	NA	92	NA	NA	NA	NA	NA
Alkalinity, Total (mg/L as $CaCO_3$)		240	230	250	250	250	250	NA	NA	NA	NA	NA	NA	NA	NS	< 5	< 5	240	NA	NA	NA	NA	NA

Notes:

(1) - Field Blank collected at MW-5.
(2) - Equipment Blank collected at MW-19.
(3) - Duplicate sample collected at MW-4.
(4) - VOCs analyzed by EPA Method 8260 with the exception of the Harris Stock Well, which was analyzed by EPA Method 524.2.
--- = no DEQ-7 standard available.
NA = Parameter not analyzed.
NS = Not sampled. No power to the pump or access to the well.
ND = PCE, TCE, and DCE were not detected.
J = detected result, estimated concentration.
J- = detected result, estimated concentration with low bias.
U = result has been evaluated to be undetected at the reporting limit or at the reported concentration; result is considered to be a false positive; data qualification determined result is less than the reporting limit.
UJ = data validation determined undetected result, reporting limit is estimated.
< = less than.
µg/L - micrograms per liter.
mg/L - milligrams per liter.
mV = millivolts.
* = secondary maximum contaminant level.

All DEQ-7 groundwater standard exceedences have been bolded.
DEQ-7 Groundwater Standard was obtained from *Circular DEQ-7 Montana's Numeric Water Quality Standards* , Human Health Standards for Groundwater, August 2010.

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Location ID / Sample Date	DEQ-7 Groundwater Standards	MW-1 07/09/13	MW-3 07/09/13	MW-4 07/09/13	MW-4 Dup MW-33 07/09/13	MW-5 07/09/13	MW-9 07/09/13	MW-12 07/08/13	MW-14 07/08/13	MW-18 07/08/13	MW-19 07/08/13	MW-21 07/09/13	MW-22 07/30/13	Harris Stock Well 07/08/13	Gravel Pit Pond 07/08/13	Gravel Pit Well 07/08/13	Field Blank MW-30 07/09/13	Equip. Blank MW-32 07/08/13	Trip Blank 1 07/08/13	Trip Blank 2 07/30/13
Volatile Organics (µg/L) *																				
Acetone	---	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	NS	< 20.0	< 20.0	< 20.0	< 20.0
Bromodichloromethane (Dichlorobromomethane	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone (Methyl ethyl ketone)	---	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NS	< 5.0	< 5.0	< 5.0	< 5.0
Chlorobenzene	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane (Chlorodibromomethane	4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	75	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	---	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	0.004	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	0.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene (DCE)	70	< 1.0	7.6	< 1.0	< 1.0	< 1.0	2.3	< 1.0	0.28 J	< 1.0	< 1.0	< 1.0	7.7	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene (DCE)	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	100	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 1.0	< 4.0	NS	< 4.0	< 4.0	< 4.0	< 4.0
n-Propylbenzene	---	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0 U	< 1.0
Tetrachloroethene (PCE)	5	< 1.0 U	**93**	2	2.1	1.4	3.6	0.51 J	0.67 J	0.37 J	< 1.0	0.35 J	**6.5**	0.42 J	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	200	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene (TCE)	5	< 0.4	**5.3**	0.71	0.73	1.1	1.1	1.1	0.26 J	0.29 J	0.46	0.15 J	2.5	0.63	< 0.4	NS	< 0.4	< 0.4	< 0.4	< 0.4
1,2,4-Trimethylbenzene	---	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.5	< 1.0	NS	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl chloride	0.2	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	NS	< 0.4	< 0.4	< 0.4	< 0.4
Total PCE, TCE, and DCE	---	ND	106	2.71	2.83	2.5	3.6	1.61 J	1.21 J	0.66 J	0.46	0.50 J	16.7	1.05 J	ND	NS	ND	ND	ND	ND
Natural Attenuation (mg/L unless noted)																				
Total Organic Carbon	---	1.4 J-	3.6 J-	3.2 J-	2.3 J-	3.7 J-	2.1 J-	1.1 J	NA	NA	NA	NA	NA	NA	NA	NS	0.12 J-	NA	NA	NA
Nitrate/Nitrite	---	1.8	1.6	1.4	1.4	1.5	0.99	1.1	NA	NA	NA	NA	NA	NA	NA	NS	0.070	NA	NA	NA
Total Kjeldahl Nitrogen	---	< 0.2	0.28	0.22	0.10 J	0.18 J	0.18 J	< 0.2	NA	NA	NA	NA	NA	NA	NA	NS	< 0.2	NA	NA	NA
Total Phosphorus	---	0.051	0.055	0.12	0.12	0.036	0.034	0.036	NA	NA	NA	NA	NA	NA	NA	NS	< 0.005 U	NA	NA	NA
Sulfate	---	29.0	71.0	31.4	31.6	37.1	35.3	32.9	NA	NA	NA	NA	NA	NA	NA	NS	< 1.0	NA	NA	NA
Chloride	---	6.7	6.9	6.7	6.8	6.7	7.3	8.3	NA	NA	NA	NA	NA	NA	NA	NS	< 1.0	NA	NA	NA
Dissolved Oxygen (field)	---	10.1	8.7	4.8	NA	7.6	4.8	7.9	NA	NA	NA	NA	NA	NA	NA	NS	NA	NA	NA	NA
Oxidation Reduction Potential (mV - field)	---	96.7	126	101	NA	103	54.1	161	NA	NA	NA	NA	NA	NA	NA	NS	NA	NA	NA	NA
Alkalinity, Total (mg/L as $CaCO_3$)	---	194	215	193	192	214	224	202	NA	NA	NA	NA	NA	NA	NA	NS	< 5	NA	NA	NA

Notes:

* = VOCs anlayzed by EPA Method 8260 with the exception of the Harris Stock Well, which was analyzed by EPA Method 524.2.

µg/L - micrograms per liter
< = less than
NA = Parameter not analyzed.
NS = Not sampled. No power to the pump or access to the well.
ND = PCE, TCE, and DCE were not detected.
J = detected result, estimated concentration
U = result has been evaluated to be undetected at the reporting limit or at the reported concentration; result is considered to be a false positive; data qualification determined result is less than the reporting limit.
UJ = Data validation determined undetected result, reporting limit is estimated

DEQ-7 Groundwater Standard was obtained from *Circular DEQ-7 Montana's Numeric Water Quality Standards* , Human Health Standards for Groundwater, October 2012
--- = no DEQ-7 standard available
All DEQ-7 groundwater standard exceedances have been bolded

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Location ID / Sample Date	Groundwater Standards	MW-1 7/2/2014	MW-3 7/2/2014	MW-4 7/2/2014	MW-4 Dup MW-33 7/2/2014	MW-5 7/2/2014	MW-9 7/2/2014	MW-12 7/1/2014	MW-14 7/1/2014	MW-18 7/1/2014	MW-19 7/1/2014	MW-21 7/2/2014	MW-22 7/2/2014	Harris Stock Well 7/1/2014	Gravel Pit Pond 7/1/2014	Gravel Pit Well	Field Blank MW-30 7/2/2014	Equip. Blank MW-32 7/1/2014
Volatile Organics (µg/L) [1]																		
Acetone	---	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	NS	< 20.0	< 20.0
Bromodichloromethane (Dichlorobromomethar	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	0.37 J	0.34 J
2-Butanone	---	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	NS	< 5.0	< 5.0
Chlorobenzene	100	< 1.0	< 1.0	0.27 J	0.23 J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0
Chloroform	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0 U	NS	0.37 J	0.48 J
Dibromochloromethane (Chlorodibromomethar	4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	0.68 J	0.64 J
1,2-Dichlorobenzene	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0
1,3-Dichlorobenzene	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0
1,4-Dichlorobenzene	75	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0
1,1-Dichloroethane	---	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0
1,2-Dibromoethane	0.004	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0
1,1-Dichloroethene	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0
cis-1,2-Dichloroethene (DCE)	70	< 1.0	3.7	< 1.0	0.16 J	0.37 J	1.3	< 1.0	0.19 J	< 1.0	< 1.0	< 1.0	1.7	< 0.50	< 1.0	NS	< 1.0	< 1.0
trans-1,2-Dichloroethene (DCE)	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0
Ethylbenzene	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0
Hexachlorobutadiene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	NS	< 1.0	< 1.0
Naphthalene	100	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0	< 1.0	< 4.0	NS	< 4.0	< 4.0
n-Propylbenzene	---	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0
Tetrachloroethene (PCE)	5	< 1.0	**35.2**	4.7	4.2	2.7	3.1	1.1	1.3	1.1	< 1.0	1.0	**5.1**	0.38 J	< 1.0	NS	< 1.0	< 1.0
Toluene	1000	< 1.0 U	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0	< 1.0 U	< 1.0 U	< 1.0	< 0.50	< 1.0	NS	0.27 J	0.22 J
1,1,1-Trichloroethane	200	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0
Trichloroethene (TCE)	5	< 0.40	2.6	0.94	0.96	1.0	0.77	1.3	0.30 J	0.49	0.27 J	0.17 J	1.5	0.72	< 0.40	NS	< 0.40	< 0.40
1,2,4-Trimethylbenzene	---	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 0.50	< 1.0	NS	< 1.0	< 1.0
Vinyl chloride	0.2	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	NS	< 0.40	< 0.40
Total PCE, TCE, and DCE (µg/L)	---	ND	41.5	5.6	5.3 J	4.1 J	5.2	2.4	1.8 J	1.6	0.27 J	1.2 J	8.3	1.10 J	ND	NS	ND	ND
Natual Attenuation (mg/L unless noted)																		
Total Organic Carbon	---	1.3	3.5	4.0	4.0	4.0	2.0	0.81	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate/Nitrite	---	2.4	1.7	1.9	1.9	2.1	1.4	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Kjeldahl Nitrogen	---	0.26 J+	0.36 J+	0.38 J+	0.32 J+	0.33 J+	0.42 J+	0.28 J+	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Phosphorus	---	0.052	0.12	0.11	0.11	0.040	0.036	0.034	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	---	46.3	112	58.2	58.1	67.8	50.7	33.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloride	---	12.3	8.7	11.1	11.0	10.2	10.2	10.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen (field)	---	9.60	8.66	5.94	5.94	7.27	4.41	5.39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oxidation Reduction Potential (mV - field)	---	167.0	131.6	145.1	145.1	131.5	110.9	126.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity, Total (mg/L as $CaCO_3$)	---	227	226	225	225	240	235	212	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

1 = VOCs anlayzed by EPA Method 8260 with the exception of the Harris Stock Well, which was analyzed by EPA Method 524.2.

µg/L - micrograms per liter
mg/L - milligrams per liter.
mV = millivolts.
< = less than
NA = Parameter not analyzed.
NS = Not sampled. No power to the pump or access to the well.
ND = PCE, TCE, and DCE were not detected.
J = detected result, estimated concentration
J+ = detected result, estimated concentration with high bias.
U = evaluated to be undetected at the reporting limit/concentration, due to evidence of contamination. Please refer Section 2.2.5 of the text and to the Table below for the anlaytical result reported by the laboratory.
Toluene was detected at similar concentrations in the associated field blank and equipment rinse blanks at comparable concentrations, which is an indication of field or sampling contamination and is not considered to be associated with Mission Wye.

DEQ-7 Groundwater Standard was obtained from *Circular DEQ-7 Montana's Numeric Water Quality Standards* , Human Health Standards for Groundwater, October 2012.
--- = no DEQ-7 standard available
All DEQ-7 groundwater standard exceedances have been bolded

Toluene - Qualified Results vs. Original Result Reported by Laboratory

Location ID / Sample Date	MW-1 7/2/2014	MW-9 7/2/2014	MW-12 7/1/2014	MW-14 7/1/2014	MW-19 7/1/2014	MW-21 7/2/2014
Toluene						
Validated	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
Original	0.12 J	0.12 J	0.27 J	0.16 J	0.36 J	0.13 J

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Location ID / Sample Date	Groundwater Standards	MW-1 7/22/2015	MW-3 7/23/2015	MW-4 7/23/2015	MW-4 Dup MW-33 7/23/2015	MW-5 7/23/2015	MW-9 7/23/2015	MW-12 7/22/2015	MW-14 7/22/2015	MW-18 7/22/2015	MW-19 7/22/2015	MW-21 7/22/2015	MW-22 7/23/2015	Harris Stock Well 7/22/2015	Gravel Pit Pond 7/22/2015	Gravel Pit Well 7/22/2015	Field Blank MW-30 7/23/2015	Equip. Blank MW-32 7/22/2015
Volatile Organics (µg/L) [1]																		
Acetone	---	< 7.1	< 7.1	< 7.1	< 7.1	< 7.1	< 7.1	< 7.1	< 7.1	< 7.1	< 7.1	< 7.1	< 7.1	< 2.8	< 7.1	< 2.8	< 7.1	< 7.1
Bromodichloromethane (Dichlorobromomethane)	10	< 0.18	< 0.18	< 0.18	< 0.18	< 0.18	< 0.18	< 0.18	< 0.18	< 0.18	< 0.18	< 0.18	< 0.18	< 0.14	< 0.18	< 0.14	< 0.18	< 0.18
2-Butanone	---	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	5.5	< 2.5	< 2.5
Chlorobenzene	100	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23
Chloroform	70	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	< 0.27	0.32 J	< 0.27	< 0.27	< 0.27
Dibromochloromethane (Chlorodibromomethane)	4	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
1,2-Dichlorobenzene	600	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22
1,3-Dichlorobenzene	600	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21
1,4-Dichlorobenzene	75	< 0.16	< 0.16	< 0.16	0.19 J	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
1,1-Dichloroethane	---	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.19	< 0.22	< 0.19	< 0.22	< 0.22
1,2-Dibromoethane	0.004	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.21	< 0.23	< 0.21	< 0.23	< 0.23
1,1-Dichloroethene	7	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.22	< 0.17	< 0.22	< 0.17	< 0.22	< 0.22
cis-1,2-Dichloroethene (DCE)	70	< 0.25	6.6	< 0.25	< 0.25	< 0.25	2.6	< 0.25	0.94 J	< 0.25	< 0.25	< 0.25	0.48 J	< 0.17	< 0.25	< 0.17	< 0.25	< 0.25
trans-1,2-Dichloroethene (DCE)	100	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.18	< 0.21	< 0.18	< 0.21	< 0.21
Ethylbenzene	700	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23	< 0.23
Hexachlorobutadiene	5	< 0.48	< 0.48	< 0.48	< 0.48	< 0.48	< 0.48	< 0.48	< 0.48	< 0.48	< 0.48	< 0.48	< 0.48	< 0.14	< 0.48	< 0.14	< 0.48	< 0.48
Naphthalene	100	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14	< 0.14
n-Propylbenzene	---	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21
Tetrachloroethene (PCE)	5	< 0.19	**67.4**	1.3	1.4	1.0	**5.2**	0.24 J	1.8	0.39 J	0.23 J	< 0.19	1.4	0.76 J	< 0.19	< 0.15	< 0.19	< 0.19
Toluene	1000	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.12	< 0.13	< 0.12	< 0.13	< 0.13
1,1,1-Trichloroethane	200	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Trichloroethene (TCE)	5	< 0.14	4.6	0.59	0.53	0.44	1.5	0.58	0.64	0.44	0.57	< 0.14	0.38 J	0.41 J	< 0.14	< 0.14	< 0.14	< 0.14
1,2,4-Trimethylbenzene	---	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16	< 0.16
Vinyl chloride	0.2	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.081	< 0.15	< 0.081	< 0.15	< 0.15
Total PCE, TCE, and DCE (µg/L)	---	ND	78.6	1.89	1.93	1.44	9.3	0.82 J	3.38 J	0.83 J	0.80 J	ND	2.26 J	1.17 J	ND	ND	ND	ND

Notes:

1 = VOCs anlayzed by EPA Method 8260 with the exception of the Gravel Pit Well and the Harris Stock Well, which were analyzed by EPA Method 524.2.

µg/L - micrograms per liter
< = less than
ND = PCE, TCE, and DCE were not detected.
J = detected result, estimated concentration

DEQ-7 Groundwater Standard was obtained from *Circular DEQ-7 Montana's Numeric Water Quality Standards* , Human Health Standards for Groundwater, October 2012.
--- = no DEQ-7 standard available
All DEQ-7 groundwater standard exceedances have been bolded

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Location ID / Sample Date	Groundwater Standards	MW-1 7/6/2016	MW-3 7/7/2016	MW-4 7/7/2016	MW-4 Dup MW-33 7/7/2016	MW-5 7/7/2016	MW-9 7/7/2016	MW-12 7/6/2016	MW-14 7/6/2016	MW-18 7/6/2016	MW-19 7/6/2016	MW-21 7/7/2016	MW-22 7/7/2016	Harris Stock Well 7/7/2016	Gravel Pit Pond 7/7/2016	Gravel Pit Well 7/6/2016	Field Blank MW-30 7/7/2016	Equip. Blank MW-32 7/7/2016
Volatile Organics (µg/L) [1]																		
Acetone	---	< 0.64	< 20.0 U	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 0.64	< 20.0 U	< 20.0 U	< 0.64	< 0.64	NS	< 20.0 U	< 2.8	< 20.0 U	< 20.0 U
Bromodichloromethane (Dichlorobromomethane)	10	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	NS	< 0.068	< 0.14	< 0.068	< 0.068
2-Butanone	---	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	< 1.1	NS	< 1.1	< 2.5	< 1.1	< 1.1
Chlorobenzene	100	< 0.066	< 0.066	< 0.066	< 0.066	< 0.066	< 0.066	< 0.066	< 0.066	< 0.066	< 0.066	< 0.066	< 0.066	NS	< 0.066	< 0.23	< 0.066	< 0.066
Chloroform	70	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	< 0.21	NS	< 1.0 U	< 0.27	< 1.0 U	< 1.0 U
Dibromochloromethane (Chlorodibromomethane)	4	< 0.048	< 0.048	< 0.048	< 0.048	< 0.048	< 0.048	< 0.048	< 0.048	< 0.048	< 0.048	< 0.048	< 0.048	NS	< 0.048	< 0.16	< 0.048	< 0.048
1,2-Dichlorobenzene	600	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	NS	< 0.078	< 0.22	< 0.078	< 0.078
1,3-Dichlorobenzene	600	< 0.085	< 0.085	< 0.085	< 0.085	< 0.085	< 0.085	< 0.085	< 0.085	< 0.085	< 0.085	< 0.085	< 0.085	NS	< 0.085	< 0.21	< 0.085	< 0.085
1,4-Dichlorobenzene	75	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	< 0.081	NS	< 0.081	< 0.16	< 0.081	< 0.081
1,1-Dichloroethane	---	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	< 0.055	NS	< 0.055	< 0.19	< 0.055	< 0.055
1,2-Dibromoethane	0.004	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	< 0.092	NS	< 0.092	< 0.21	< 0.092	< 0.092
1,1-Dichloroethene	7	< 0.069	< 0.069	< 0.069	< 0.069	< 0.069	< 0.069	< 0.069	< 0.069	< 0.069	< 0.069	< 0.069	< 0.069	NS	< 0.069	< 0.17	< 0.069	< 0.069
cis-1,2-Dichloroethene (DCE)	70	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	NS	< 0.12	< 0.17	< 0.12	< 0.12
trans-1,2-Dichloroethene (DCE)	100	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	NS	< 0.15	< 0.18	< 0.15	< 0.15
Ethylbenzene	700	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	NS	< 0.075	< 0.23	< 0.075	< 0.075
Hexachlorobutadiene	5	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	< 0.13	NS	< 0.13	< 0.14	< 0.13	< 0.13
Naphthalene	100	< 4.0 U	< 0.064	< 0.064	< 0.064	< 0.064	< 0.064	< 0.064	< 4.0 U	< 4.0 U	< 4.0 U	< 0.064	< 0.064	NS	< 0.064	< 0.14	< 0.064	< 0.064
n-Propylbenzene	---	0.69 J	< 0.049	< 0.049	< 0.049	< 0.049	< 0.049	< 0.049	< 0.049	< 0.049	< 0.049	< 0.049	< 0.049	NS	< 0.049	< 0.21	< 0.049	< 0.049
Tetrachloroethene (PCE)	5	< 0.13	**6.4**	< 0.13	< 0.13	< 0.13	0.90 J	< 0.13	1.0	0.40	< 0.13	< 0.13	0.56 J	NS	< 0.13	< 0.15	< 0.13	< 0.13
Toluene	1000	< 0.059	< 0.059	< 0.059	< 0.059	< 0.059	< 0.059	< 0.059	< 0.059	< 0.059	< 0.059	< 0.059	< 0.059	NS	< 0.059	< 0.12	1.1	< 1.0 U
1,1,1-Trichloroethane	200	< 0.057	< 0.057	< 0.057	< 0.057	< 0.057	< 0.057	< 0.057	< 0.057	< 0.057	< 0.057	< 0.057	< 0.057	NS	< 0.057	< 0.20	< 0.057	< 0.057
Trichloroethene (TCE)	5	< 0.40 U	0.43	0.64	0.75	0.49	0.26 J	< 0.051	0.40	0.50	0.62	< 0.051	< 0.051	NS	< 0.051	< 0.14	< 0.051	< 0.051
1,2,4-Trimethylbenzene	---	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	< 0.068	NS	< 0.068	< 0.16	< 0.068	< 0.068
Vinyl chloride	0.2	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	< 0.084	NS	< 0.084	< 0.081	< 0.084	< 0.084
Total PCE, TCE, and DCE[2] (µg/L)	---	ND	6.8	0.64	0.75	0.49	1.2 J	ND	1.40	0.90	0.62	ND	0.56 J	NS	ND	ND	ND	ND

Notes:

1 = VOCs anlayzed by EPA Method 8260 with the exception of the Gravel Pit Well and the Harris Stock Well, which were analyzed by EPA Method 524.2.
2 = DCE includes both cis-1,2-Dichloroethene and trans-1,2-Dichloroethene.

VOC = volatile organic compound.
µg/L= micrograms per liter.
< = analyte not detected above the method detection limit.
NA = Not analyzed.
ND = PCE, TCE, and DCE were not detected.
NS = Not Sampled. The Harris Stock Well was not sampled during this event due to the breaker tripping continually.
J = Sample results reported at concentrations > the method detection limit (MDL) but < the limit of quantitation (LOQ)/RL require J qualifiers to indicate estimated concentrations. The analyte cannot be accurately quantitated at this trace concentration level.
U = The analyte was detected above the reported sample MDL; however, the result was qualified as not detected due to blank contamination.
UJ = The analyte was not detected above the LOQ. However, the LOQ is approximate and may or may not represent the actual LOQ necessary to accurately and precisely measure the analyte in the sample.

DEQ-7 Groundwater Standard was obtained from *Circular DEQ-7 Montana's Numeric Water Quality Standards* , Human Health Standards for Groundwater, October 2012.
--- = no DEQ-7 standard available
All DEQ-7 groundwater standard exceedances have been bolded

Table 3 Historical Summary of Groundwater Analytical Results
Feasibility Study Report, Appendix E, Attachment 4
BNSF Mission Wye, Livingston, Montana

Location ID / Sample Date	Groundwater Standards	MW-1 7/12/2017	MW-3 7/12/2017	MW-3 Dup MW-33 7/12/2017	MDEQ Split[2] MW-3 7/12/2017	MW-4 7/12/2017	MW-5 7/12/2017	MW-9 7/12/2017	MDEQ Split[2] MW-9 7/12/2017	MW-12 7/13/2017	MW-14 7/12/2017	MDEQ Split[2] MW-14 7/12/2017	MW-18 7/13/2017	MW-19 7/13/2017	MW-21 7/13/2017	MW-22 7/13/2017	Harris Stock Well 7/13/2017	Gravel Pit Pond 7/13/2017	Gravel Pit Well 7/13/2017	Field Blank MW-30 7/12/2017	Equip. Blank MW-32 7/12/2017
Volatile Organics (µg/L) [1]																					
Acetone	---	< 2.0	20 U	20 U	NA	< 2.0	< 2.0	< 2.0	NA	< 2.0	< 2.0	NA	< 2.0	< 2.0	< 2.0	< 2.0	NA	2.6 J	NA	20 U	20 U
Bromodichloromethane (Dichlorobromomethane)	10	< 0.24	< 0.24	< 0.24	< 0.50	< 0.24	< 0.24	< 0.24	< 0.50	< 0.24	< 0.24	< 0.50	< 0.24	< 0.24	< 0.24	< 0.24	< 0.090	< 0.24	< 0.090	< 0.24	< 0.24
2-Butanone (MEK)	---	< 1.1	< 1.1	< 1.1	< 20	< 1.1	< 1.1	< 1.1	< 20	< 1.1	< 1.1	< 20	< 1.1	< 1.1	< 1.1	< 1.1	NA	< 1.1	NA	< 1.1	< 1.1
Chlorobenzene	100	< 0.11	< 0.11	< 0.11	< 0.50	< 0.11	< 0.11	< 0.11	< 0.50	< 0.11	< 0.11	< 0.50	< 0.11	< 0.11	< 0.11	< 0.11	< 0.068	< 0.11	< 0.068	< 0.11	< 0.11
Chloroform	70	< 0.21	< 0.21	< 0.21	< 0.50	< 0.21	< 0.21	< 0.21	< 0.50	< 0.21	< 0.21	< 0.50	< 0.21	< 0.21	< 0.21	< 0.21	< 0.10	< 0.21	< 0.10	0.86 J	0.74 J
Dibromochloromethane (Chlorodibromomethane)	4	< 0.16	< 0.16	< 0.16	< 0.50	< 0.16	< 0.16	< 0.16	< 0.50	< 0.16	< 0.16	< 0.50	< 0.16	< 0.16	< 0.16	< 0.16	< 0.13	< 0.16	< 0.13	< 0.16	< 0.16
1,2-Dichlorobenzene	600	< 0.17	< 0.17	< 0.17	< 0.50	< 0.17	< 0.17	< 0.17	< 0.50	< 0.17	< 0.17	< 0.50	< 0.17	< 0.17	< 0.17	< 0.17	< 0.10	< 0.17	< 0.10	< 0.17	< 0.17
1,3-Dichlorobenzene	600	< 0.12	< 0.12	< 0.12	< 0.50	< 0.12	< 0.12	< 0.12	< 0.50	< 0.12	< 0.12	< 0.50	< 0.12	< 0.12	< 0.12	< 0.12	< 0.082	< 0.12	< 0.082	< 0.12	< 0.12
1,4-Dichlorobenzene	75	< 0.21	< 0.21	< 0.21	< 0.50	< 0.21	< 0.21	< 0.21	< 0.50	< 0.21	< 0.21	< 0.50	< 0.21	< 0.21	< 0.21	< 0.21	< 0.075	< 0.21	< 0.075	< 0.21	< 0.21
1,1-Dichloroethane	---	< 0.17	< 0.17	< 0.17	< 0.50	< 0.17	< 0.17	< 0.17	< 0.50	< 0.17	< 0.17	< 0.50	< 0.17	< 0.17	< 0.17	< 0.17	< 0.088	< 0.17	< 0.088	< 0.17	< 0.17
1,2-Dibromoethane	0.004	< 0.20	< 0.20	< 0.20	< 0.30	< 0.20	< 0.20	< 0.20	< 0.30	< 0.20	< 0.20	< 0.30	< 0.20	< 0.20	< 0.20	< 0.20	< 0.091	< 0.20	< 0.091	< 0.20	< 0.20
1,1-Dichloroethene	7	< 0.28	< 0.28	< 0.28	< 0.50	< 0.28	< 0.28	< 0.28	< 0.50	< 0.28	< 0.28	< 0.50	< 0.28	< 0.28	< 0.28	< 0.28	< 0.089	< 0.28	< 0.089	< 0.28	< 0.28
cis-1,2-Dichloroethene (DCE)	70	< 0.12	< 0.12	< 0.12	0.10 J	< 0.12	< 0.12	< 0.12	< 0.50	< 0.12	< 0.12	< 0.50	< 0.12	< 0.12	< 0.12	< 0.12	< 0.085	< 0.12	< 0.085	< 0.12	< 0.12
trans-1,2-Dichloroethene (DCE)	100	< 0.16	< 0.16	< 0.16	< 0.50	< 0.16	< 0.16	< 0.16	< 0.50	< 0.16	< 0.16	< 0.50	< 0.16	< 0.16	< 0.16	< 0.16	< 0.11	< 0.16	< 0.11	< 0.16	< 0.16
Ethylbenzene	700	< 0.15	< 0.15	< 0.15	< 0.50	< 0.15	< 0.15	< 0.15	< 0.50	< 0.15	< 0.15	< 0.50	< 0.15	< 0.15	< 0.15	< 0.15	< 0.051	< 0.15	< 0.051	< 0.15	< 0.15
Hexachlorobutadiene	5	< 0.18	< 0.18	< 0.18	NA	< 0.18	< 0.18	< 0.18	NA	< 0.18	< 0.18	NA	< 0.18	< 0.18	< 0.18	< 0.18	< 0.11	< 0.18	< 0.11	< 0.18	< 0.18
Naphthalene	100	< 0.20	< 0.20	< 0.20	NA	< 0.20	< 0.20	< 0.20	NA	< 0.20	< 0.20	NA	< 0.20	< 0.20	< 0.20	< 0.20	< 0.064	< 0.20	< 0.064	< 0.20	< 0.20
n-Propylbenzene	---	< 0.23	< 0.23	< 0.23	NA	< 0.23	< 0.23	< 0.23	NA	< 0.23	< 0.23	NA	< 0.23	< 0.23	< 0.23	< 0.23	< 0.096	< 0.23	< 0.096	< 0.23	< 0.23
Tetrachloroethene (PCE)	5	< 0.25	4.7	4.3	4.5	1.1	0.75 J	1.1	0.53	0.80 J	0.85 J	0.38 J	0.83 J	< 0.25	< 0.25	0.94 J	0.22 J	< 0.25	< 0.12	< 0.25	< 0.25
Toluene	1000	< 0.14	< 0.14	< 0.14	< 0.50	< 0.14	< 0.14	< 0.14	< 0.50	< 0.14	< 0.14	< 0.50	< 0.14	< 0.14	< 0.14	< 0.14	< 0.080	< 0.14	< 0.080	< 0.14	< 0.14
1,1,1-Trichloroethane	200	< 0.17	< 0.17	< 0.17	< 0.50	< 0.17	< 0.17	< 0.17	< 0.50	< 0.17	< 0.17	< 0.50	< 0.17	< 0.17	< 0.17	< 0.17	< 0.10	< 0.17	< 0.10	< 0.17	< 0.17
Trichloroethene (TCE)	5	< 0.052	0.35 J	0.35 J	0.36 J	0.48	0.64	0.27 J	0.25 J	0.77	< 0.052	0.17 J	0.29 J	0.40	< 0.052	< 0.052	0.36 J	< 0.052	< 0.044	< 0.052	< 0.052
1,2,4-Trimethylbenzene	---	< 0.18	< 0.18	< 0.18	NA	< 0.18	< 0.18	< 0.18	NA	< 0.18	< 0.18	NA	< 0.18	< 0.18	< 0.18	< 0.18	< 0.083	< 0.18	< 0.083	< 0.18	< 0.18
Vinyl chloride	0.2	< 0.069	< 0.069	< 0.069	< 0.40	< 0.069	< 0.069	< 0.069	< 0.40	< 0.069	< 0.069	< 0.40	< 0.069	< 0.069	< 0.069	< 0.069	< 0.098	< 0.069	< 0.098	< 0.069	< 0.069
Total PCE, TCE, and DCE[3] (µg/L)	---	ND	5.05 J	4.65 J	4.86 J	1.58	1.39 J	1.37 J	0.78 J	1.57 J	0.85 J	0.55 J	1.12 J	0.40	ND	0.94 J	0.58 J	ND	ND	ND	ND

Notes:

1 = VOCs anlayzed by EPA Method 8260 with the exception of the Gravel Pit Well and the Harris Stock Well, which were analyzed by EPA Method 524.2.
2 = MDEQ split samples reported non-detect data less than the reporting limit (RL).
3 = DCE includes both cis-1,2-Dichloroethene and trans-1,2-Dichloroethene.

VOC = volatile organic compound.
µg/L= micrograms per liter.
< = analyte not detected above the method detection limit.
NA = Not analyzed.
ND = PCE, TCE, and DCE were not detected.
NS = Not Sampled. The Harris Stock Well was not sampled during this event due to the breaker tripping continually.
J = Sample results reported at concentrations > the method detection limit (MDL) but < the limit of quantitation (LOQ)/RL require J qualifiers to indicate estimated concentrations. The analyte cannot be accurately quantitated at this trace concentration level.
U = The analyte was detected above the reported sample MDL; however, the result was qualified as not detected due to blank contamination.
UJ = The analyte was not detected above the LOQ. However, the LOQ is approximate and may or may not represent the actual LOQ necessary to accurately and precisely measure the analyte in the sample.

DEQ-7 Groundwater Standard was obtained from *Circular DEQ-7 Montana's Numeric Water Quality Standards* , Human Health Standards for Groundwater, October 2012.
--- = no DEQ-7 standard available
All DEQ-7 groundwater standard exceedances have been bolded

Appendix F

Cost Estimates of Remedial Technologies

Table F-1 Scope of Remedial Alternative and Assumptions used for Cost Estimates
BNSF Mission Wye, Livingston, Montana

Technologies	Assumed Cleanup Timeframe (years)	Total Capital Cost	Total O&M Cost	Total Cost	Net Present Value (NPV)* Cost	Notes
No Action	1-30	$ -	$ -	$ -	$ -	Baseline case
Soil Tilling	1	$ 9,300	$ 27,600	$ 36,900	--	Soil tilling with use of a mini-excavator with articulated bucket or disc to turn over soils to an approximate depth of two feet bgs. Assume two 10 ft x 10 ft tilling areas.
Soil Vapor Extraction (SVE)	2	$ 20,300	$ 153,400	$ 173,700	$ 167,100	Preparation of Remedial Action Work Plan/Design. Restart of SVE system. Assume 8 existing SVE wells and 3 VMPs, 10 HP regenerative blower, GAC SVE vapor treatment. Operation full-time with semi-annual vapor sampling and annual groundwater monitoring for two years followed by two years of post remediation groundwater monitoring.
Monitored Natural Attenuation (MNA)	1-4	$ 13,200	$ 140,000	$ 153,200	$ 143,300	Preparation of Work Plan. Annual groundwater monitoring includes VOC analysis at 14 sample locations and collection of 4 QA/QC samples and measurement of groundwater depth at 23 locations. Assumes MNA parameters analyzed at 6 of the sampling locations.
Institutional Controls (ICs)	1-30	$ 20,300	$ 78,000	$ 98,300	$ 67,500	Assumes deed restriction of property and annual inspections to ensure compliance and a review of the title records (once every 5 years) to ensure compliance.

Notes:

* = 3% discount factor used for NPV calculation used for remedies with time frames greater than one year (USEPA, 2000. *A Guide to Developing and Documenting Cost Estimates During The Feasibility Study*. July. EPA 540-R-00-002 OSWER 9355.0-75. https://www.epa.gov/superfund/cost-remedy-selection-process).

All Technologies assume two years of post-remediation confirmation groundwater sampling (8 wells) and groundwater levels (23 wells) at $45,600.

The 2-year post remediation groundwater monitoring period is not included in the Assumed Timeframes.

bgs - below ground surface

ft - feet

GAC - granular activated carbon

HP - horsepower

BNSF Mission Wye FS Rev 3
Cost Estimate Backup

Site	BNSF Mission Wye
Location	Livingston, MT
Phase	Feasibility Study REV 3
Task	Tilling Cost Estimate Backup
Revision Date	June 19, 2018
Base Year	2019

Soil Tilling	
Tilling - Capital Cost	$9,300
Tilling - Annual O&M Cost	$27,600

Key Assumptions

Prepare Remedial Action Work Plan. Periodic soil tilling (monthly for 8 months) and soil monitoring at four locations plus 1 QA/QC sample for VOCs. Remedial Activities Completion Report.

Work Description	Quantity	Units	Unit Costs	Total
Remedial Action Work Plan				
RA Work Plan	1	LS	$4,250	$4,250
MDEQ Oversight	1	LS	$5,000	$5,000
TOTAL CAPITAL COSTS				**$9,250**
Annual Operation of Tilling				
O&M	1	Each	$11,120	$11,120
Soil Sampling	1	Each	$5,000	$5,000
Analytical Laboratory	1	Each	$300	$300
Remedial Activities Completion Report[1]	1	Each	$3,150	$3,150
MDEQ Oversight	1	Each	$8,000	$8,000
TOTAL ANNUAL O&M COSTS				**$27,570**

Notes:
LS = Lump Sum
[1] = The Activities Completion report will include a complete description of field activities such as methods used, sample locations, analytical results, and recommendations.

BNSF Mission Wye FS Rev 3
Cost Estimate Backup

Site	BNSF Mission Wye
Location	Livingston, MT
Phase	Feasibility Study REV 3
Task	Soil Vapor Extraction Cost Estimate Backup
Base Year	2019

Soil Vapor Extraction (SVE)

SVE - Capital Cost	$20,300
SVE - Annual O&M Cost	$76,700
SVE - 2 Years O&M Cost	$153,400

Key Assumptions

Remedial Action Work Plan, Annual Report/Remedial Activities Completion Report, operation of SVE system. No additional expansion/capital costs from the pilot SVE system already installed. O&M activities include bi-weekly O&M inspections/drive-bys to confirm operation and annual groundwater monitoring of eight wells. Semi-annual soil gas monitoring of treatment effluent.

Work Description	Quantity	Units	Unit Cost	Total
Remedial Action Work Plan				
RA Work Plan	1	LS	$10,250	$10,250
MDEQ Oversight	1	LS	$5,000	$5,000
SVE System Restart	1	LS	$5,000	$5,000
TOTAL CAPITAL COSTS				**$20,250**
Annual Operation of SVE				
O&M	1	Each	$42,000	$42,000
Annual GW Sampling	1	Each	$12,000	$12,000
Analytical Laboratory (GW)	1	Each	$600	$600
Analytical Laboratory (Vapor)	1	Each	$1,900	$1,900
Annual Report / Remedial Activities Completion Report[1]	1	Each	$12,150	$12,150
MDEQ Oversight	1	Each	$8,000	$8,000
TOTAL ANNUAL O&M COSTS				**$76,650**

Notes:
LS = Lump Sum
[1] = The Activities Completion report will include a complete description of field activities such as methods used, sample locations, analytical results, and recommendations.

Net Present Value (NPV) Analysis:

Estimated Duration of Remedial Alternative (years)	2
Discount Factor (MDEQ Requested)	3%

Year	Cost Type	Total Cost Per Year	Total Cost	Present Value
0	Capital Cost	$20,300	$20,300	$20,300
1	Annual O&M Cost	$76,700		$74,466
2	Annual O&M Cost	$76,700		$72,297
	Total Capital Cost:	**$20,300**	**Total NPV**	**$167,100**
	Total O&M Cost:	**$153,400**		

BNSF Mission Wye FS Rev 3
Cost Estimate Backup

Site	BNSF Mission Wye
Location	Livingston, MT
Phase	Feasibility Study REV 3
Task	Soil Vapor Extraction Cost Estimate Backup
Base Year	2019

GW Remedial Option - MNA with Annual GW Monitoring

MNA - Capital Cost	$13,200	Work Plan Prep
MNA - Annual O&M Cost	$35,000	Sample & Report
MNA - 4 years O&M Cost	$140,000	Sample & Report

Key Assumptions

Remedial Action Work Plan. Annual MNA groundwater monitoring at the site. Annual groundwater monitoring includes VOC analysis at 14 sample locations and collection of 3 QA/QC samples and measurement of groundwater depth at 23 locations. MNA parameters analyzed at 6 of the sampling locations. Annual Report.

Work Description	Quantity	Units	Unit Cost	Total
Remedial Action Work Plan				
RA Work Plan	1	LS	$9,150	$9,150
MDEQ Oversight	1	LS	$4,000	$4,000
TOTAL CAPITAL COSTS				**$13,150**
Annual Groundwater Monitoring and Reporting				
Annual GW Sampling	1	Each	$15,500	$15,500
Analytical Laboratory	1	Each	$3,390	$3,390
Annual Report / Remedial Activities Completion Report[1]	1	Each	$12,150	$12,150
MDEQ Oversight	1	Each	$4,000	$4,000
TOTAL ANNUAL O&M COSTS				**$35,040**

Notes:
LS = Lump Sum
[1] = The Activities Completion report will include a complete description of field activities such as methods used, sample locations, analytical results, and recommendations.

Net Present Value (NPV) Analysis:

Estimated Duration of Remedial Alternative (years)	4
Discount Factor (MDEQ Requested)	3%

Year	Cost Type	Total Cost Per Year	Total Cost	Present Value
0	Capital Cost	$13,200	$13,200	$13,200
1	Periodic Monitoring Co	$35,000		$33,981
2	Periodic Monitoring Co	$35,000		$32,991
3	Periodic Monitoring Co	$35,000		$32,030
4	Periodic Monitoring Co	$35,000		$31,097
	Total Capital Cost:	**$13,200**	**Total NPV**	**$143,300**
	Total O&M Cost:	**$140,000**		

BNSF Mission Wye FS Rev 3
Cost Estimate Backup

Site	BNSF Mission Wye
Location	Livingston, MT
Phase	Feasibility Study REV 3
Task	Institutional Controls Cost Estimate Backup
Base Year	2019

Institutional Controls

IC - Capital Cost	$16,500
IC - Annual O&M Cost	$2,600
IC - 30 years O&M cost	$78,000

Description

Institutional controls will place deed restriction on railroad owned property; BNSF will work directly with MRL for agreements. Survey will be completed by MT licensed PLS. O&M costs include inspection program for annual inspections and every 5 years deed review with brief letter report summary for each.

Work Description	Quantity	Units	Unit Cost	Total
Deed Restriction				
Deed Restriction	1	LS	$12,500	$12,500
MDEQ Oversight	1	LS	$4,000	$4,000
TOTAL CAPITAL COSTS				**$16,500**
Inspection Program				
Annual Inspection Program	1	Each	$1,350	$1,350
5-yr Deed Restriction Review	1	Each	$270	$270
MDEQ Oversight	1	Each	$1,000	$1,000
TOTAL ANNUAL O&M COSTS				**$2,620**

Notes:
LS = Lump Sum

Net Present Value (NPV) Analysis:

Estimated Duration of Remedial Alternative (years) 30
Discount Factor (MDEQ Requested) 3%

Year	Cost Type	Total Cost Per Year	Total Cost	Present Value
0	Capital Cost	$16,500	$16,500	$16,500
1	Annual O&M Cost	$2,600		$2,524
2	Annual O&M Cost	$2,600		$2,451
3	Annual O&M Cost	$2,600		$2,379
4	Annual O&M Cost	$2,600		$2,310
5	Annual O&M Cost	$2,600		$2,243
6	Annual O&M Cost	$2,600		$2,177
7	Annual O&M Cost	$2,600		$2,114
8	Annual O&M Cost	$2,600		$2,052
9	Annual O&M Cost	$2,600		$1,993
10	Annual O&M Cost	$2,600		$1,935
11	Annual O&M Cost	$2,600		$1,878
12	Annual O&M Cost	$2,600		$1,824
13	Annual O&M Cost	$2,600		$1,770
14	Annual O&M Cost	$2,600		$1,719
15	Annual O&M Cost	$2,600		$1,669
16	Annual O&M Cost	$2,600		$1,620
17	Annual O&M Cost	$2,600		$1,573
18	Annual O&M Cost	$2,600		$1,527
19	Annual O&M Cost	$2,600		$1,483
20	Annual O&M Cost	$2,600		$1,440
21	Annual O&M Cost	$2,600		$1,398
22	Annual O&M Cost	$2,600		$1,357
23	Annual O&M Cost	$2,600		$1,317
24	Annual O&M Cost	$2,600		$1,279
25	Annual O&M Cost	$2,600		$1,242
26	Annual O&M Cost	$2,600		$1,206
27	Annual O&M Cost	$2,600		$1,170
28	Annual O&M Cost	$2,600		$1,136
29	Annual O&M Cost	$2,600		$1,103
30	Annual O&M Cost	$2,600		$1,071
	Total Capital Cost:	**$16,500**	**Total NPV**	**$67,500**
	Total O&M Cost:	**$78,000**		

BNSF Mission Wye FS Rev 3
Cost Estimate Backup

Site	BNSF Mission Wye
Location	Livingston, MT
Phase	Feasibility Study REV 3
Task	Post-Remediation Groundwater Monitoring Cost Estimate Backup

Post-Remediation Groundwater Monitoring		
Post-Remediation GW Monitoring - Annual Cost	$	22,800
Two years of Monitoring	$	45,600

Key Assumptions

Annual groundwater monitoring at the site for a period of 2 years for closure monitoring. Assumes groundwater monitoring includes VOC analysis at 8 sample locations and collection of 2 QA/QC samples and measurement of groundwater depth at 23 locations. Annual reporting.

Work Description	Quantity	Units	Unit Cost	Total
Annual Groundwater Monitoring and Reporting				
Annual GW Sampling	1	Each	$12,000	$12,000
Pace Analytical	1	Each	$600	$600
Annual Report	1	Each	$6,150	$6,150
MDEQ Oversight	1	Each	$4,000	$4,000
TOTAL ANNUAL COSTS				**$22,750**