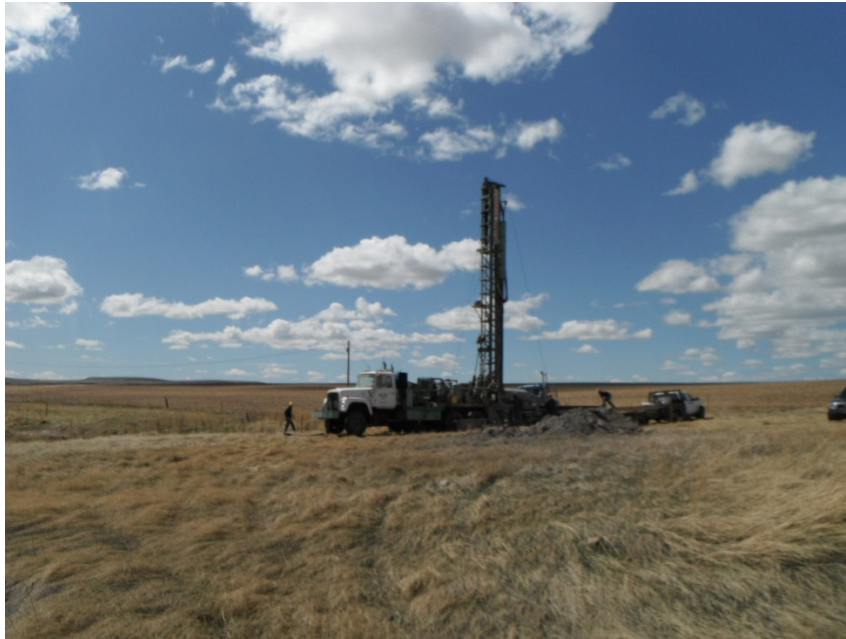


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**WELL COMPLETION REPORT FOR  
SAND COULEE WATER DISTRICT  
PUBLIC WATER SUPPLY  
WELL NO. 6**



Prepared for:

Tom Henderson  
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October 2016

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**WELL COMPLETION REPORT FOR  
SAND COULEE WATER DISTRICT  
PUBLIC WATER SUPPLY  
WELL NO. 6**

**1.0 PROJECT DESCRIPTION**

The Montana Department of Environmental Quality (DEQ) Abandoned Mine Lands Section contracted Hydrometrics, Inc. (Hydrometrics) to oversee installation and testing of a backup public water supply well for the Sand Coulee Water District (Water District). Historically, the Water District has had chronic water shortages due in part to dewatering of the Kootenai Formation by an extensive network of abandoned coal mines. In June 2012, DEQ constructed a new well (Well 5) for the Water District into the Madison Aquifer; the well is capable of supplying sufficient water for the Water District's current and future needs (Hydrometrics, 2012). The Water District currently has two water rights on this well. The original water right (WR No. 41QJ 30063857) is a ground water certificate for 10 acre-feet and a maximum flow rate of 35 gallons per minute (gpm). The Water District received a supplemental water right (WR No. 41QJ 30066324) for 48 acre-feet and maximum flow rate of 121 gpm in July 2014 giving them a combined flow rate of 156 gpm and a total of 58 acre-feet of annual production for Well #5 (Appendix A).

The Water District currently relies on wells completed in the Kootenai Formation for a backup for Well 5. These wells have shown depleted source capacity over time and currently do not meet the DEQ-1 requirements for a backup groundwater source which requires the backup well(s) to be able to meet the maximum daily demand with the largest capacity well out of commission.

The objective for this project was to drill and complete a second 8-inch diameter public water supply well into the Madison aquifer with a targeted completion depth of 800 feet below

ground surface (bgs). The design yield for the well is 156 gpm with a maximum capacity of 234 gpm for purposes of testing. The proposed well design specified drilling an oversized 11-inch hole to 440 feet, setting 8-inch casing, and grouting the annular space to provide a robust seal through the shallow groundwater system before advancing the drill hole into the Madison aquifer to the proposed completion depth of 800 feet. Well design plans were submitted to the DEQ Public Water Supply Division for approval prior to drilling. An electronic copy of the DEQ approval letter is included on a DVD at the end of this report.

Hydrometrics developed the engineering designs for the well, supervised the well installation, and conducted the aquifer testing and water quality sampling for this project. Tom Henderson of the DEQ Remediation Division reviewed design submittals and provided field oversight in conjunction with Hydrometrics' staff. Boland Drilling located in Great Falls, Montana was awarded the contract to drill and complete the well and instrument it for aquifer testing based on an open bidding process. Chris Boland was the project manager for Boland Drilling, and his son Christopher was the driller and acted as their on-site supervisor.

## 2.0 WELL INSTALLATION

Drilling was initiated on May 4, 2016 and completed on May 12, 2016. A chronological description of drilling activities is provided in Table 2-1 and a detailed well log providing descriptions of stratigraphy and well construction is in Appendix B. Below is a summary of the drilling conditions, geology, and well construction.

The new well is referred to as Well 6 based on the Water District's sequential numbering system for their existing wells. The new well is located within the Water District's existing well field immediately west of Sand Coulee (Figure 2-1). The well field has in place an existing protective zone through ownership (shown in Figure 2-1) that encompasses the 100 foot control zone for the new well.

Drilling encountered unconsolidated clayey soils to a depth of 5 feet underlain by bedrock of the Kootenai Formation, which is composed of a mixed sequence of sandstone, siltstone and shale to a depth of 175 feet bgs. Prior to 2012, the Kootenai Formation was the primary source of water to the Water District's existing well field. The Kootenai Formation produced approximately 30 gpm of flow to the drill hole at a depth of 160 feet. There was no additional groundwater inflow observed from the Kootenai Formation below 160 feet.

At 175 to 180 feet bgs, there was a transition from the Kootenai sandstone to black shale of the Morrison Formation. Minor amounts of coal were encountered from 180 to 200 feet bgs. Shales, siltstones, and mudstones of the Morrison Formation continue to the upper contact of the Swift Formation at a depth of 360 feet. There were no significant water producing zones in the Morrison formation.

**TABLE 2-1. CHRONOLOGIC DESCRIPTION OF COMPLETION AND TESTING OF SAND COULEE WATER DISTRICT WELL 6**

Date	Hydrometrics Present	Description
05/04/16	yes	Boland initiates drilling. Set 12" surface casing to 19.5', Set temporary 8" casing to 23'. Drilled 8-inch borehole to 175', hole producing approx. 30 gpm.
05/05/16	yes	Advanced 8-inch borehole to 370' with good circulation. Lost circulation at 375', advanced borehole to 390' with continued lost circulation. Pulled 8-inch bit to start reaming borehole with 11" drill bit.
05/06/16	no	Continue reaming 11" borehole to 375'
05/09/16	no	Finished reaming 11" borehole to 390'; delayed setting 8" casing due to hard rain
05/10/16	no	Set 100' of 8" steel casing, difficulties with continued rain and wet conditions
05/11/16	yes	Set 8" casing to 390' and start drill/drive casing. Casing drove to 425' at end of day. Still in fractured bedrock.
05/12/16	yes	Finalized drill and drive of 8" casing into competent bedrock to 434'. Placed bentonite pellets in bottom annulus followed by 40 bags of cement, 6 bags of sand, and 1 bag of bentonite chips.
05/13/16	yes	Additional grouting: 40 bags of cement, 6 bags of sand, and 1 bag of bentonite chips.
05/16/16	no	Four grout additions: 1) 30 gallons of bentonite pellets, followed by 80 bags of cement mixed with 24 bags of sand and 10 bags of bentonite chips. 2) Cement mixture - with 80 bags cement, 28 bags of sand and 7 bags of bentonite. 3) Cement mixture - with 81 bags cement and 10 bags of bentonite. 4) Cement mixture - with 80 bags cement, 25 bags sand and 7 bags bentonite.
05/17/16	yes	Finalized sealing fractures and annulus with 3 additional batches of sealing. 1) Cement mixture - 137 bags cement, 50 bags sand, and 10 bags bentonite. 2) Cement mixture - 128 bags cement, 50 bags sand, and 60 bags bentonite. 3) Final cement mixture - 40 bags cement, 10 bags sand and 1 bag of bentonite.
05/18/16	yes	Resumed drilling. Drilled from 434 to 454'; lost circulation again at 450'. Conducted air-lift flow test; well did not produce water when drill bit was below casing. Moved bit up into casing and well produced 35 gpm. Installed submersible pump to verify water production of well. Pumped 160 gpm with less than one foot of drawdown. Will complete well at this depth.
05/21/16	yes	Set datalogger pressure transducers to collect background data.
05/24/16	yes	Initiated 72-hour pumping test at average pumping rate of 165 gpm. Produced less than 0.2' of drawdown in well.
05/27/16	yes	Completed pumping test and collected water quality samples. Well fully recovered within a few min. Pulled transducer from well. Submitted samples to Energy Labs in Helena, MT for water quality analysis.
05/31/16	no	Boland removes drop pipe and pump from well.

# LEGEND

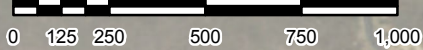
- ⊕ Madison Wells
- - - Discharge Line
- ▭ Water District Property



Well 6  
Well 5

Straight Creek

Scale (feet)



Path: V:\10039\GIS\Well6\Layout.mxd



WELL COMPLETION REPORT FOR  
SAND COULEE WATER DISTRICT  
PUBLIC WATER SUPPLY  
WELL NO. 6

LOCATION MAP

FIGURE  
2-1



The Swift formation extends to a depth of 375 feet. The Swift Formation at this location consists of a very fine to medium grained sandstone, siltstone, and dirty limestone. The Swift Formation is highly fractured and problematic to drill due to loss of circulation in the open fractures. When circulation was lost, the drilling was not advanced any further to avoid having cuttings drop on top of the bit and potentially having the bit being wedged in the borehole.

Eight-inch steel casing was placed in the 11-inch borehole to 427 feet and then driven into competent bedrock to a depth of 434 feet. The annular space between the casing and borehole was sealed with cement/bentonite grout from 427 feet to the ground surface to prevent cross circulation of groundwater between the shallow formations and the Madison limestone. Because the eight-inch casing had to be driven into competent bedrock, grout was top loaded into the hole rather than pressure grouted through the bottom of the casing as originally proposed. A detailed description of the grout additions and materials used is provided in Table 2-2. The initial grouting failed to fill the annular space due to grout losses to open fractures in the formation (Table 2-2). Repeated grouting was required to bring the annular seal up to the surface. Grouting was ultimately successful in sealing the casing to the surface. A total of 37.95 cubic yards of cement were used to grout the casing annulus (details in Table 2-2).

Once grouting was completed and the overlying groundwater sources were sealed off, no groundwater entered the drill hole from the top of the Madison. Hard competent limestone was encountered below the eight-inch casing from 434 to 442 feet bgs. A fractured zone was encountered from 442 feet with increasing fractures to 453 feet where circulation was lost in the borehole. The drill stem was raised up into the casing to approximately 430 feet and the well started to produce about 35 gpm. Since lost circulation typically is an indication of high transmissive material and air can be lost to the formation during air-lift flow tests, the drill bit was removed from the well and a pump was installed in the well to a depth of 403 feet bgs to more accurately assess the productivity of the well. The water level was measured at 373 feet below the measuring point (bmp) prior to starting the pump. The well was pumped at approximately 160 gpm for 30 min with less than one foot of drawdown on April 18, 2016.

**TABLE 2-2. SUMMARY OF GROUT MATERIALS USED**

<b>Date</b>	<b>DEQ Present</b>	<b>Hydrometrics Present</b>	<b>Description</b>	<b>cement (94-lb bag)</b>	<b>sand (50-lb/bag)</b>	<b>CaCl (50-lb bag)</b>	<b>Bentonite Chips (50-lb bag)</b>	<b>Bentonite Pellets (5-gal bucket)</b>
5/12/2016	no	yes	grout well annulus/formation fractures	40	6	1	1	0
5/13/2016	no	yes	grout well annulus/formation fractures	40	6	1	1	2
5/16/2016	no	no	grout well annulus/formation fractures	321	77	8	34	6
5/17/2016	no	yes	grout well annulus	305	110	8	71	0
<b>Subtotal</b>				<b>706</b>	<b>199</b>	<b>18</b>	<b>107</b>	<b>8</b>

The well production was tested again the following day (April 19<sup>th</sup>) at 160 gpm and there was less than 0.1 feet of drawdown in the well. Based on this information, it was determined that the well would supply sufficient quantity of water for a backup well and the well was not advanced to greater depths as originally specified.

### **3.0 AQUIFER TESTING**

Boland Drilling installed the pump, generator, and discharge line for the aquifer test. A 30 horsepower Grundfos submersible pump with a rated capacity of 160 gpm was set at a depth of 403 feet using 2-inch galvanized riser pipe, with a check valve above the pump. A 1-inch I.D. PVC stilling tube was also installed in the well for measuring water levels during testing. The stilling tube was set 5 feet above the pump. Hydrometrics installed a 30 psi Solinst transducer/datalogger in the stilling tube at a depth of 397 feet to record water level fluctuations during testing. A Neptune totalizer flow meter and a regulating valve were installed at the well head to measure and adjust discharge rates. Two-inch diameter PVC piping was laid from the well head to “Straight Ditch” in Sand Coulee to route discharge water during the pumping test to the existing surface water drainage approximately 1,000 feet to the east; this discharge line was the main discharge line for the pumping test. A secondary discharge line was installed into the discharge system through a two-inch wye and a regulating valve to allow for additional discharge if the friction losses in the main discharge line were a limiting factor on the flow discharging from the well. The secondary discharge line discharged to the water tank discharge area located approximately 250 feet to the southeast of Well 6. The layout of the discharge lines is shown on Figure 2-1.

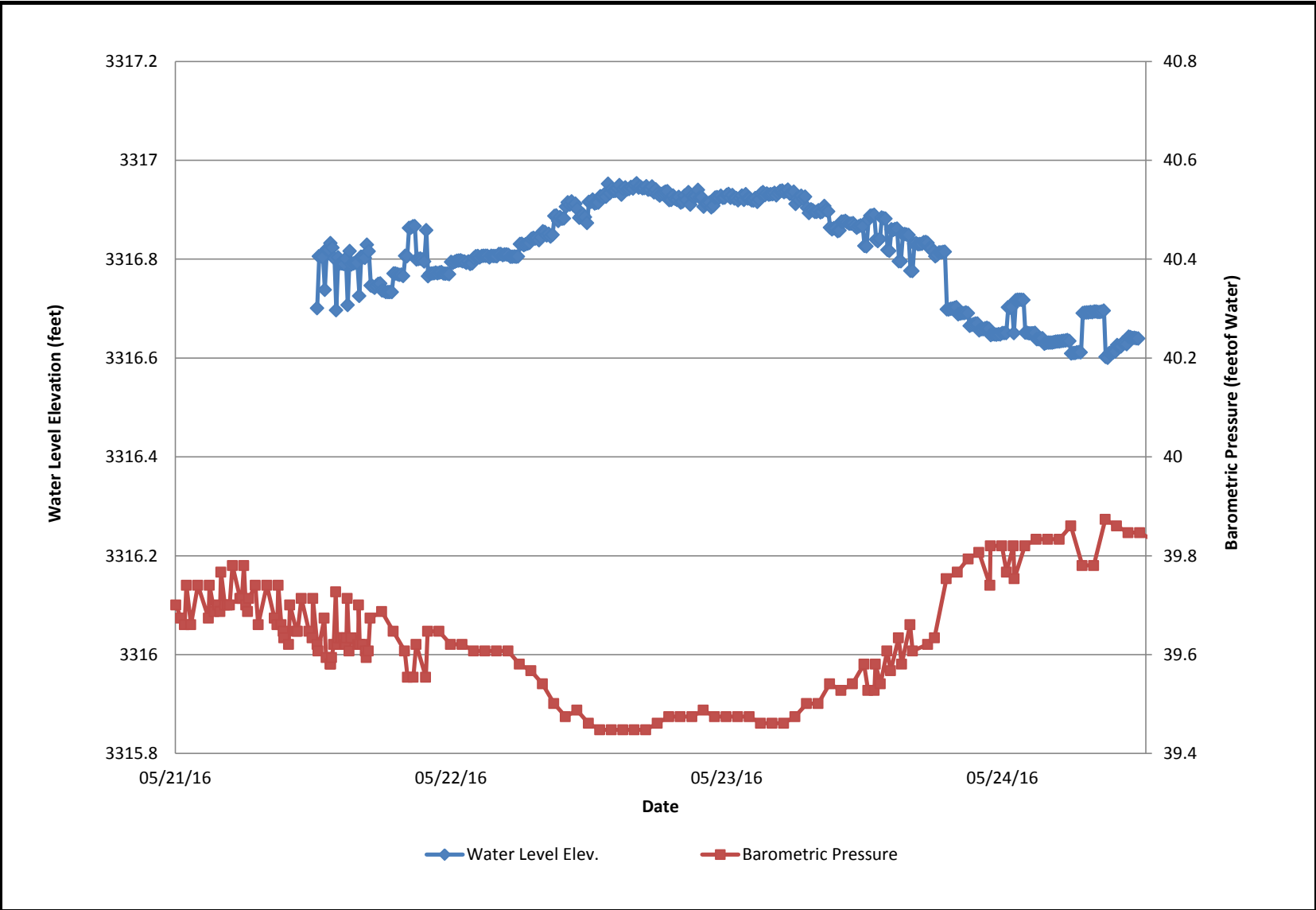
#### **3.1 72-HOUR PUMPING TEST**

Hydrometrics recorded background water level measurements and barometric data from May 21<sup>st</sup> until the 72-hour pumping test was initiated on May 24, 2016. The pumping was started at 1:35 pm on May 24<sup>th</sup>. The pump was operated at its full capacity during the test, which produced an average yield of 165 gpm over the duration of the test. Water level measurements in the test well were recorded on an increasing schedule that logged water levels at an initial frequency of 1 reading per second, gradually decreasing in frequency to a maximum interval of 1 reading every 10 minutes. Periodic manual water level measurements were taken with an electronic water level indicator for confirmation.

Background water level data was compared to barometric pressure data from the Malmstrom Airforce Base weather station. The data shows that water levels in the pumping well are

affected by changes in barometric pressure as is evident to the inverse trends in water levels and barometric pressure (Figure 3-1). After removing barometric pressure changes from the water level data the background water level data was evaluated for regional trends. Figure 3-2 shows the background water level data has a general upward trend approximately 24 hours (1440 mins) prior the start of the test. A linear regression of the final ~17 hours of the background data was used to evaluate background trends, resulting in an average increasing background trend of approximately  $3 \times 10^{-5}$  ft/min.

Pumping produced a brief drawdown surge in the well followed by an oscillatory response within the first few minutes of the test with up to 1 foot of fluctuations within the oscillations. The oscillatory response is an “underdamped” response attributable to inertial effects following a rapid change in water levels in a highly permeable aquifer. The pressure transducer gradually slipped in the stilling well from approximately 100 to 170 minutes after pumping began; the transducer secured further and remained stable after approximately 170 minutes into the pumping test. Manual measurements collected prior to and after the transducer slipped were used to correct the pressure transducer data. Water level drawdown fluctuated between 0.2 and 0.3 feet at the end of the test when background trends were accounted for. The fluctuations in water levels throughout the pumping period may be attributable to turbulent flow in large fractures or voids. Approximately 30 minutes prior to the end of the drawdown test the generator inadvertently shutdown. Due to the inadvertent shutdown, the datalogger transducer was not reset to record water levels at a high frequency to monitor the rapid water level recovery for the initial part of the recovery phase. Manual water levels were collected approximately 4 minutes after the pump was shut down and the transducer was started at a 1 second sample frequency approximately 20 minutes after pumping had ceased. Water levels were mostly recovered prior to manual measurements being collected and were fully recovered prior to the transducer being restarted. The pump was restarted approximately 70 minutes after the generator shutdown to collect water quality samples. Water was purged from the well for 10 minutes at 165 gpm prior to collecting the water quality sample.

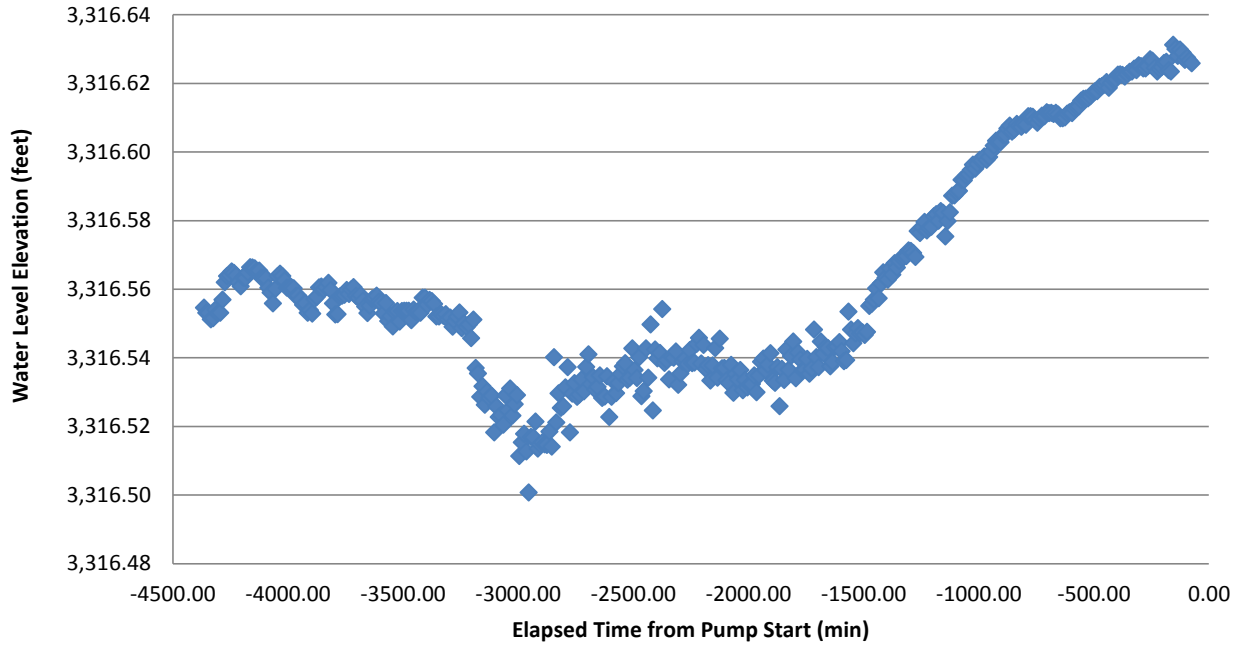


**WELL COMPLETION REPORT FOR  
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PUBLIC WATER SUPPLY  
WELL 6**

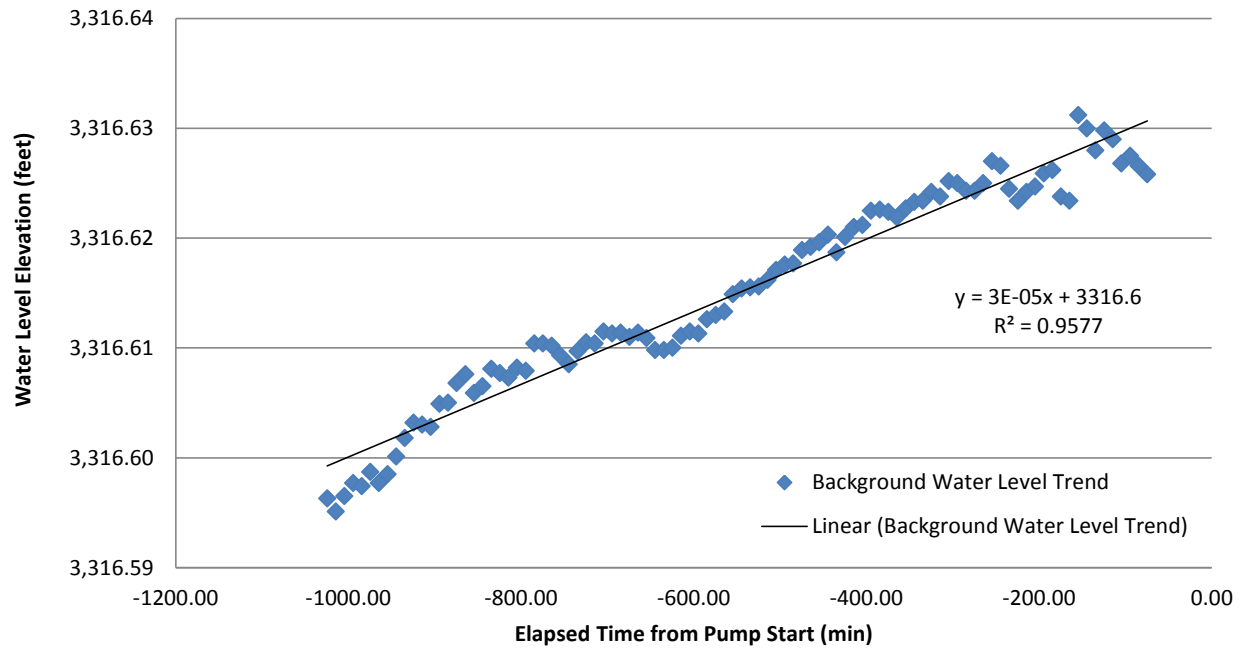
**BACKGROUND WATER LEVEL VERSUS  
BAROMETRIC PRESSURE**

**FIGURE  
3-1**

### Background Water Level Trend



### Background Regression



WELL COMPLETION REPORT FOR  
 SAND COULEE WATER DISTRICT  
 PUBLIC WATER SUPPLY  
 WELL 6

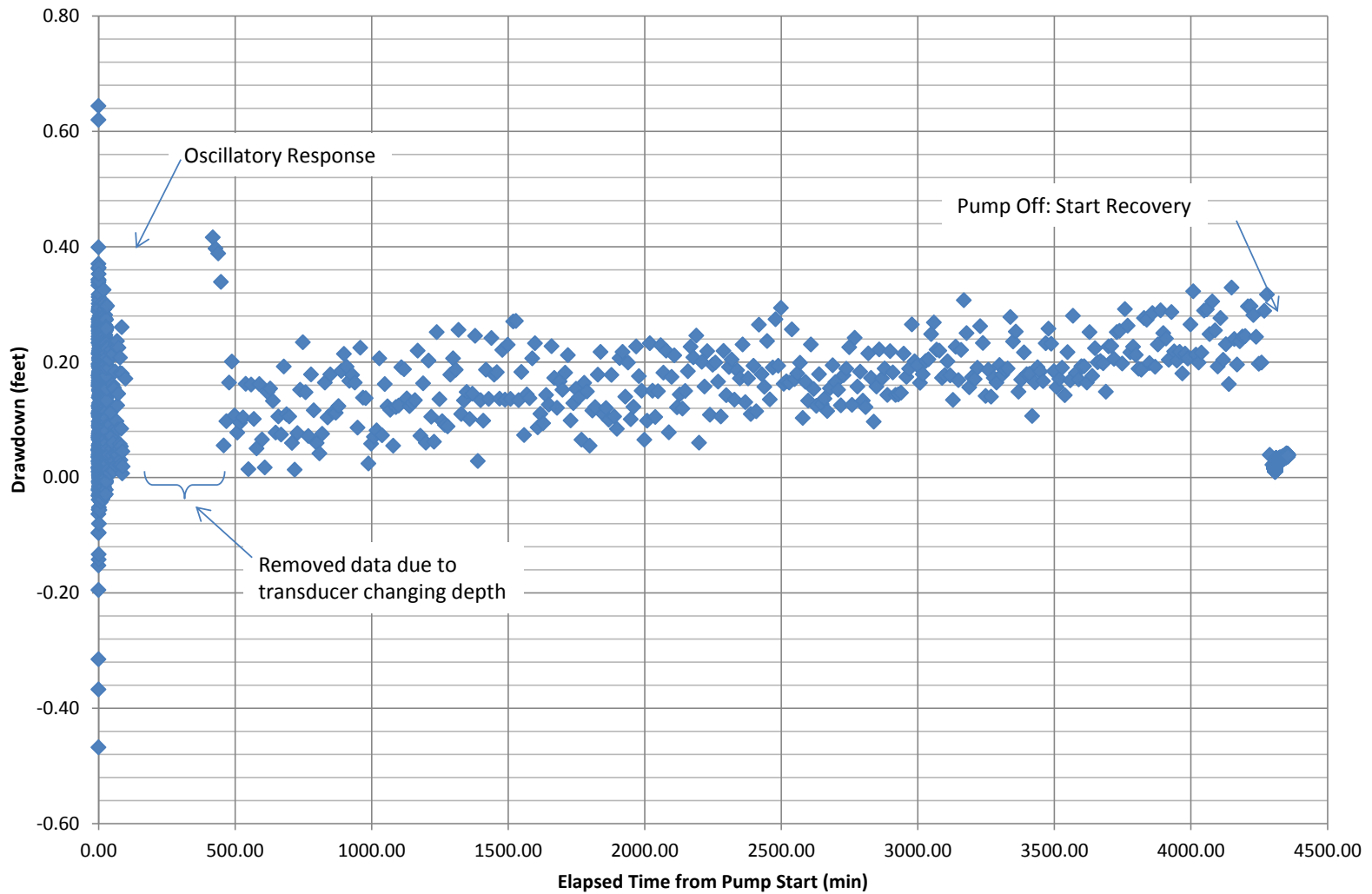
BACKGROUND  
 WATER LEVEL TREND

FIGURE

3-2

Water level data collected from the pumping well were corrected for the transducer slipping in the stilling well. The barometric effects on water levels and the background trend were removed from the water level data prior to analyzing the drawdown data. Figure 3-3 shows the drawdown trends over time during the pumping and recovery tests. The drawdown and discharge data are included in electronic form on the attached DVD. Water level data was corrected for background water level trends and analyzed using AQTESOLV (v.4.5) to calculate the resultant hydraulic conductivity of the aquifer. Applying a fit to the drawdown curve was hindered due to the water levels fluctuating within 30% to 50% of the total drawdown. The data were analyzed using both an equivalent porous media approach (Theis, 1935) and a bedrock solution (Gringarten and Ramey, 1974). Both methods yield hydraulic conductivity estimates on the order of 5,000 to 6,000 feet/day. Graphical curve matching results are shown in Figures 3-4 and 3-5. The 72-hour pumping test results indicate that the fracture system intercepted by this well has a very high hydraulic conductivity, which is consistent with the high yields seen in Well-5 which is completed through the same interval.



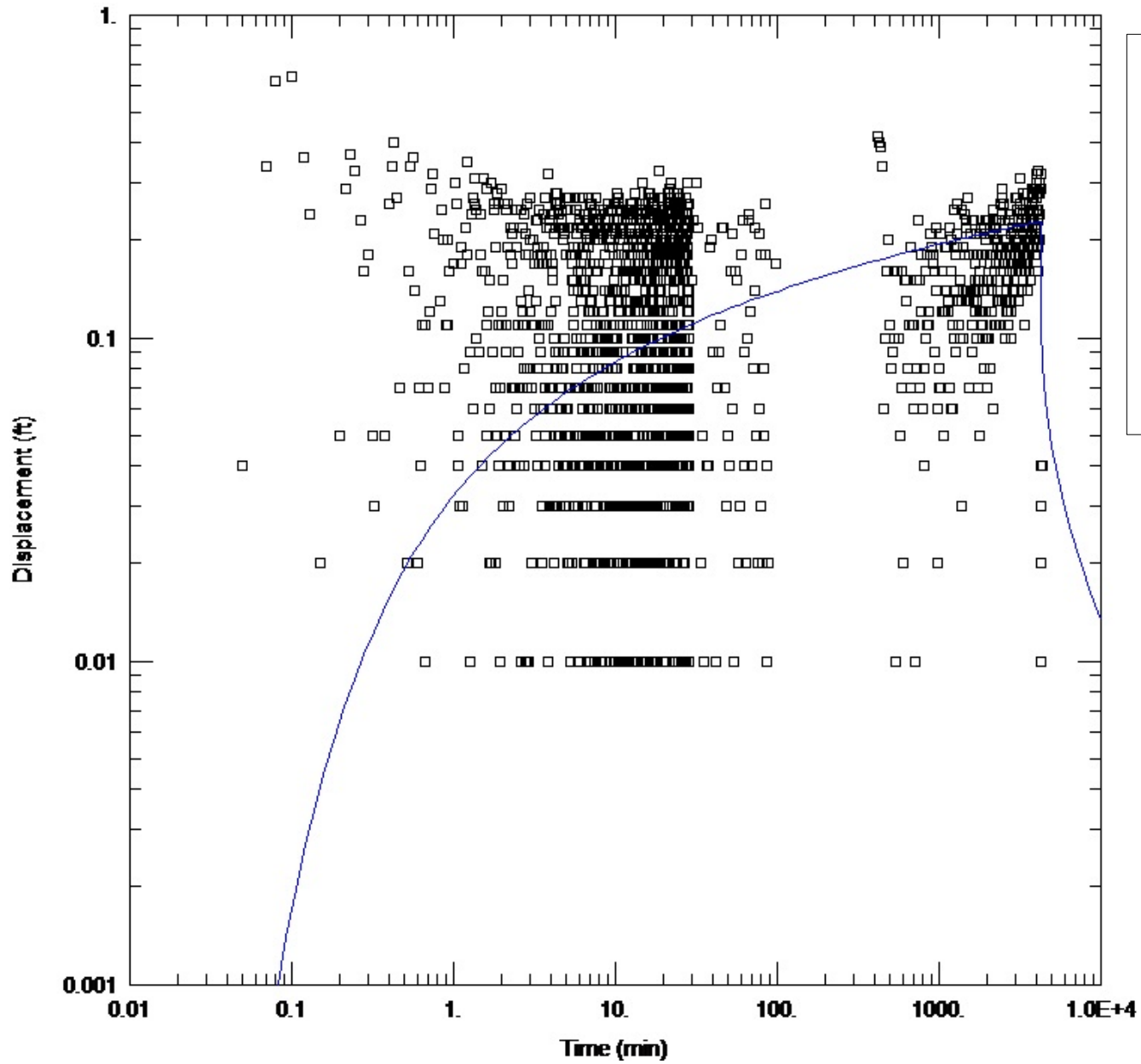


WELL COMPLETION REPORT FOR  
 SAND COULEE WATER DISTRICT  
 PUBLIC WATER SUPPLY  
 WELL 6

WELL 6 PUMPING TEST  
 DRAWDOWN TREND

FIGURE

3-3



Obs. Wells  
 Well-6  
 Aquifer Model  
 Confined  
 Solution  
 Theis  
 Parameters  
 T = 1.05E+5 ft<sup>2</sup>/day  
 K = 5250 ft/day  
 S = 459.9  
 Kz/Kr = 1.  
 b = 19 ft



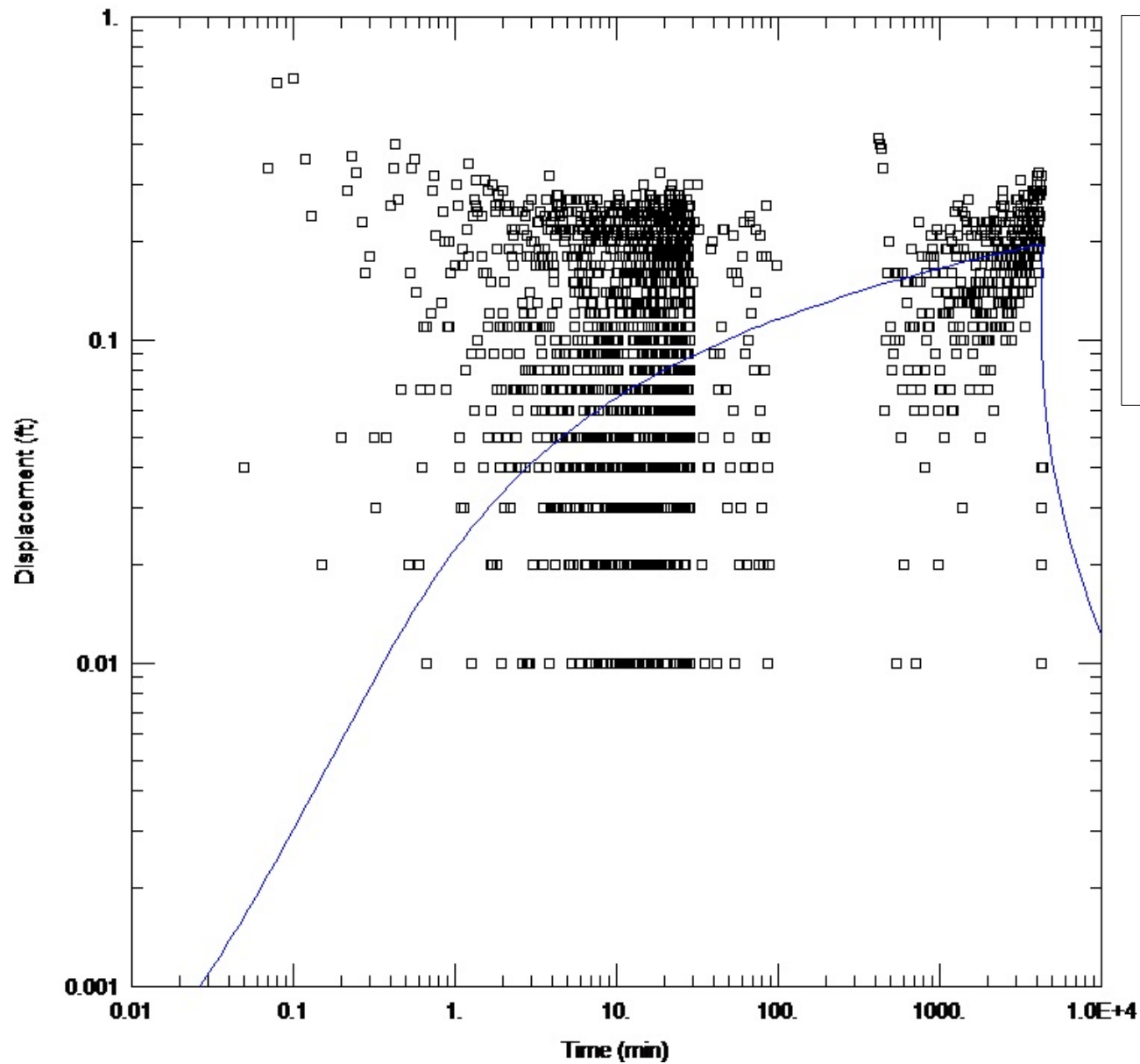
**Hydrometrics, Inc.**  
 Consulting Scientists and Engineers

**WELL COMPLETION REPORT FOR  
 SAND COULEE WATER DISTRICT  
 PUBLIC WATER SUPPLY  
 WELL NO. 6**

**THEIS SOLUTION  
 CURVE MATCHING RESULTS**

**FIGURE**

**3-4**



Obs. Wells  
 Well-6  
 Aquifer Model  
 Confined  
 Solution  
 Gringarten-Ramey w/horizontal fracture  
 Parameters  
 $K_r = 6080.7 \text{ ft/day}$   
 $S_s = 0.001347 \text{ ft}^{-1}$   
 $K_z/K_r = 1.$   
 $R_f = 100. \text{ ft}$



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**WELL COMPLETION REPORT FOR  
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**GRINGARTEN-RAMEY SOLUTION  
 CURVE MATCHING RESULTS**

**FIGURE**

**3-5**

## 4.0 WATER QUALITY TESTING

The Phase II and Phase V rules of the federal Safe Drinking Water Act require community water supplies to monitor for radionuclides, volatile organic compounds (VOCs), synthetic organic chemicals (SOCs), inorganic compounds (IOCs), and microbiological contaminants. Hydrometrics collected water quality samples at the completion of the 72-hour pumping test and submitted the samples under standard chain of custody protocol to Energy Laboratories in Helena, Montana for analysis of Phase II and Phase V VOCs, SOCs, IOCs, and radionuclides. Microbiological testing will be conducted after the piping and pump are installed and the well has been disinfected. Analytical results are summarized in Table 4-1 and the complete laboratory analytical report and chain of custody documentation is included in Appendix C.

The water quality results meet applicable regulatory limits for all constituents and show concentrations of VOCs, SOCs, and metals near or below the detection limit. The water has a high hardness (291 mg/L), which is typical of water derived from the Madison aquifer. High hardness does not adversely affect water quality but may cause scaling on plumbing fixtures and appliances, such as water heaters.

In addition to monitoring for Phase II and Phase V rule contaminants, DEQ requires public water supply wells to be evaluated to determine whether the groundwater source is under the direct influence of surface water (GWUDISW assessment). Sources that have a direct surface water influence have an increased risk of contamination from pathogenic organisms (*Giardia lamblia*, *Cryptosporidium*, viruses, and bacteria); therefore, DEQ has developed a screening process to determine whether there is significant risk that a source is directly influenced by surface water and whether it will be subject to the Surface Water Treatment Rule requirements. DEQ has a preliminary assessment (PA) form that can be used to establish that a source is not directly connected to surface water if it is sufficiently deep, the well has an adequate seal and there is a large set-back from surrounding surface water bodies.

**TABLE 4-1. SUMMARY OF LABORATORY ANALYTICAL RESULTS**

Parameter	Results	Units	Reporting Limit	Regulatory Limit
pH	7.6	s.u.		6.50-8.50
Conductivity	622	umhos/cm	1	
Total Alkalinity	190	mg/L	4	
Calcium	74	mg/L	1	
Magnesium	26	mg/L	1	
Potassium	3	mg/L	1	
Sodium	13	mg/L	1	
Sulfate	131	mg/L	1	
Chloride	6	mg/L	1	
Fluoride	0.6	mg/L	0.1	4
Nitrate+nitrite as N	0.39	mg/L	0.01	10
Hardness	291	mg/L	1	
<b>METALS</b>				
Mercury	ND	mg/L	0.0001	0.002
Antimony	ND	mg/L	0.002	0.006
Barium	ND	mg/L	0.1	2
Beryllium	ND	mg/L	0.001	0.004
Cadmium	ND	mg/L	0.001	0.005
Chromium	ND	mg/L	0.01	0.1
Iron	ND	mg/L	0.03	
Nickel	ND	mg/L	0.01	
Selenium	0.002	mg/L	0.001	0.05
Thallium	ND	mg/L	0.001	0.002
Arsenic	0.002	mg/L	0.001	0.01
<b>RADIONUCLIDES</b>				
Gross Alpha	3.1	pCi/L		15
Gross Alpha Adjusted	2.1	pCi/L		15
Radium 226	0.3	pCi/L		5
Radium 228	0.3	pCi/L		5
Radium 226 + 228	0.7	pCi/L		5
Uranium	0.002	mg/L	0.001	0.03
<b>VOLATILE ORGANIC COMPOUNDS</b>			All below detection limits	
<b>SEMI-VOLATILE COMPOUNDS</b>			All below detection limits	
<b>HERBICIDES</b>			All below detection limits	

*Note: ND = Not Detected at applicable reporting limits.*

Hydrometrics completed the PA Form, a copy of which is included in Appendix D. The resultant ranking classifies the source as groundwater that does not require further evaluation, based on the large depth to the Madison aquifer, the inclusion of an adequate annular seal and the set-back to surface water.

Aquifer and water quality testing indicates that the capacity of the new well exceeds the required design flow of 156 gpm, and that water quality meets applicable requirements for a community water supply well. The Water District has submitted a Redundant Well Construction Notice to the Montana Department of Natural Resources and Conservation to add Well 6 to the two water rights the Water District currently has for the Madison Aquifer. A copy of the redundant well construction notice is included in Appendix E. A final round of microbiological testing will be required prior to putting the well to use, but given the depth of the aquifer and the well completion characteristics problems with microbiological contaminants at this site are not anticipated.

## 5.0 REFERENCES

- Gringarten, A.C. and H.J. Ramey, 1974. Unsteady state pressure distributions created by a well with a single horizontal fracture, partial penetration or restricted entry, Soc. Petrol. Engrs. J., pp. 413-426.
- Hydrometrics, Inc., 2012. Sand Coulee Water District Public Water Supply Well Installation Final Report. Prepared for MTDEQ Remediation Division, August 2012.
- Theis, C.V., 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage, Am. Geophys. Union Trans., vol. 16, pp. 519-524.

**APPENDIX A**

**WATER RIGHT ABSTRACTS**



STATE OF MONTANA  
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION  
1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

# GENERAL ABSTRACT

**Water Right Number:** 41QJ 30063857 GROUND WATER CERTIFICATE  
**Version:** 1 -- ORIGINAL RIGHT

**Version Status:** ACTIVE

**Owners:** SAND COULEE WATER DISTRICT  
PO BOX 97  
SAND COULEE, MT 59472-0097

**Priority Date:** AUGUST 14, 2012 at 01:35 P.M.

**Enforceable Priority Date:** AUGUST 14, 2012 at 01:35 P.M.

**Purpose (use):** MUNICIPAL

**Maximum Flow Rate:** 35.00 GPM

**Maximum Volume:** 10.00 AC-FT

**Source Name:** GROUNDWATER

**Source Type:** GROUNDWATER

**Point of Diversion and Means of Diversion:**

<u>ID</u>	<u>Govt Lot</u>	<u>Qtr Sec</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
1		NENESE	14	19N	4E	CASCADE

**Period of Diversion:** JANUARY 1 TO DECEMBER 31

**Diversion Means:** WELL

**Well Depth:** 785.00 FEET

**Static Water Level:** 373.00 FEET

**Casing Diameter:** 8.00 INCHES

**Purpose (Use):** MUNICIPAL **Purpose Clarification:** WELL #5

**Volume:** 10.00 AC-FT

**Period of Use:** JANUARY 1 to DECEMBER 31

**Place of Use:**

<u>ID</u>	<u>Acres</u>	<u>Govt Lot</u>	<u>Qtr Sec</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
1			E2SESE	14	19N	4E	CASCADE
2			SW	13	19N	4E	CASCADE
3			S2NW	13	19N	4E	CASCADE
4			NWSE	13	19N	4E	CASCADE
5			SWNE	13	19N	4E	CASCADE

**Remarks:**

**ASSOCIATED RIGHT**

WATER RIGHTS #: 41QJ-5056, 41QJ-5057, 41QJ-5058, 41QJ-6174, 41QJ-70692, AND 41QJ-213044 ARE ASSOCIATED. THEY HAVE OVERLAPPING PLACES OF USE.

**IMPORTANT INFORMATION**

WATER WILL BE PUMPED TO AN EXISTING WATER STORAGE TANK LOCATED IN SWNWSW S13, T19N, R4E.

**IMPORTANT INFORMATION**

THIS WELL IS DRILLED INTO THE MADISON FORMATION, AND IS PHYSICALLY MANIFOLDED INTO THE DISTRICT'S EXISTING WATER SUPPLY SYSTEM. THE WELL IS INTENDED TO SUPPLEMENT WATER PROVIDED BY THE DISTRICT'S OTHER WELLS (DRILLED INTO THE KOOTENAI FORMATION). THE DISTRICT WILL DISCONTINUE USE OF THIS WELL EACH YEAR ONCE THE 10 ACRE-FOOT (3,258,510-GALLON) MAXIMUM VOLUME IS REACHED. FLOW METERS WILL BE INSTALLED SUMMER OF 2013.

STATE OF MONTANA  
DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION  
1424 9TH AVENUE P.O.BOX 201601 HELENA, MONTANA 59620-1601

# GENERAL ABSTRACT

**Water Right Number:** 41QJ 30066324 PROVISIONAL PERMIT  
**Version:** 1 -- ORIGINAL RIGHT

**Version Status:** ACTIVE

**Owners:** SAND COULEE WATER DISTRICT  
PO BOX 97  
SAND COULEE, MT 59472-0097

**Priority Date:** MAY 16, 2013 at 10:08 A.M.

**Enforceable Priority Date:** MAY 16, 2013 at 10:08 A.M.

**Purpose (use):** MUNICIPAL

**Maximum Flow Rate:** 121.00 GPM

**Maximum Volume:** 48.00 AC-FT

**Source Name:** GROUNDWATER

**Source Type:** GROUNDWATER

**Point of Diversion and Means of Diversion:**

<u>ID</u>	<u>Govt Lot</u>	<u>Qtr Sec</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
1		SENESE	14	19N	4E	CASCADE

**Period of Diversion:** JANUARY 1 TO DECEMBER 31

**Flow Rate:** 121.00 GPM

**Diversion Means:** WELL

**Well Depth:** 785.00 FEET

**Static Water Level:** 371.00 FEET

**Casing Diameter:** 8.00 INCHES

**Purpose (Use):** MUNICIPAL

**Purpose Clarification:** TOWN OF SAND COULEE - WELL #5

**Climatic Area:** 3 - MODERATE

**Volume:** 48.00 AC-FT

**Period of Use:** JANUARY 1 to DECEMBER 31

**Place of Use:**

<u>ID</u>	<u>Acres</u>	<u>Govt Lot</u>	<u>Qtr Sec</u>	<u>Sec</u>	<u>Twp</u>	<u>Rge</u>	<u>County</u>
1			E2SESE	14	19N	4E	CASCADE
2			SW	13	19N	4E	CASCADE
3			S2NW	13	19N	4E	CASCADE
4			NWSE	13	19N	4E	CASCADE
5			SWNE	13	19N	4E	CASCADE
6			NENE	23	19N	4E	CASCADE

**Remarks:**

**ASSOCIATED RIGHT**

THIS RIGHT IS ASSOCIATED WITH 41QJ 5057 00, 41QJ 6174 00, 41QJ 70692 00, AND 41QJ 30063857. THESE RIGHTS SHARE THE SAME PLACE OF USE IN THE TOWN'S WATER DISTRIBUTION SYSTEM.

**IMPORTANT INFORMATION**

41QJ 30063857 DIVERTS UP TO 35 GPM AND 10 AF FROM THE SAME WELL OF THIS PERMIT (WELL #5). TOGETHER, 41QJ 30066324 AND 41QJ 30063857 MAY DIVERT UP TO 156 GPM AND 58 AF FROM WELL #5 (MADISON AQUIFER WELL).

**IMPORTANT INFORMATION**

WATER WILL BE PUMPED TO A WATER STORAGE TANK LOCATED IN THE NENESE OF SEC 14, T19N, R4E, CASCADE COUNTY.

**IMPORTANT INFORMATION**

THE APPROPRIATOR SHALL INSTALL A DEPARTMENT APPROVED IN-LINE FLOW METER AT A POINT IN THE DELIVERY LINE APPROVED BY THE DEPARTMENT. WATER MUST NOT BE DIVERTED FROM THE MADISON AQUIFER WELL UNDER PERMIT NO. 41QJ 30066324 UNTIL THE REQUIRED MEASURING DEVICE IS IN PLACE AND OPERATING. ON A FORM PROVIDED BY THE DEPARTMENT, THE APPROPRIATOR SHALL KEEP A WRITTEN MONTHLY RECORD OF THE FLOW RATE AND VOLUME OF ALL WATER DIVERTED, INCLUDING THE PERIOD OF TIME. RECORDS WILL BE USED IN COMBINATION WITH MEASUREMENT RECORDS FROM THE KOOTENAI AQUIFER WELLS OF CHANGE APPLICATION

**Remarks:**

41QJ 30066325 TO DEMONSTRATE DIVERSIONS DO NOT EXCEED THE COMBINED AUTHORIZED FLOW OF UP TO 156 GPM AND UP TO 58 AF PER YEAR. RECORDS SHALL BE SUBMITTED BY JANUARY 31 OF EACH YEAR AND UPON REQUEST AT OTHER TIMES DURING THE YEAR. FAILURE TO SUBMIT REPORTS MAY BE CAUSE FOR REVOCATION OF A PERMIT OR CHANGE. THE RECORDS MUST BE SENT TO THE WATER RESOURCES REGIONAL OFFICE. THE APPROPRIATOR SHALL MAINTAIN THE MEASURING DEVICE SO IT ALWAYS OPERATES PROPERLY AND MEASURES FLOW RATE AND VOLUME ACCURATELY.

**IMPORTANT INFORMATION**

THIS IS A COMBINED APPROPRIATION WITH CHANGE AUTHORIZATION 41QJ 30066325, WHERE THE MITIGATION FOR THIS PERMIT IS PROVIDED BY THREE WATER RIGHTS: 41QJ 5057-00, 41QJ 6174-00, AND 41QJ 70692-00.

**APPENDIX B**

**WELL LOG**

Client: Sand Coulee Water District/DEQ  
 Project: 10039  
 County: Cascade                      State: Montana  
 Property Owner: Sand Coulee Water District  
 Legal Description: T19N, R4E, S14 NESE  
 Location Description: Sand Coulee Water District Well Field  
 Recorded By: Doug Parker  
 Drilling Company: Boland Drilling  
 Driller: Christopher Boland  
 Drilling Method: Air Rotary  
 Drilling Fluids Used: Water  
 Purpose of Hole: Public Water Supply Well  
 Target Aquifer: Madison Aquifer  
 Hole Diameter (in): 8 in  
 Total Depth Drilled (ft): 453

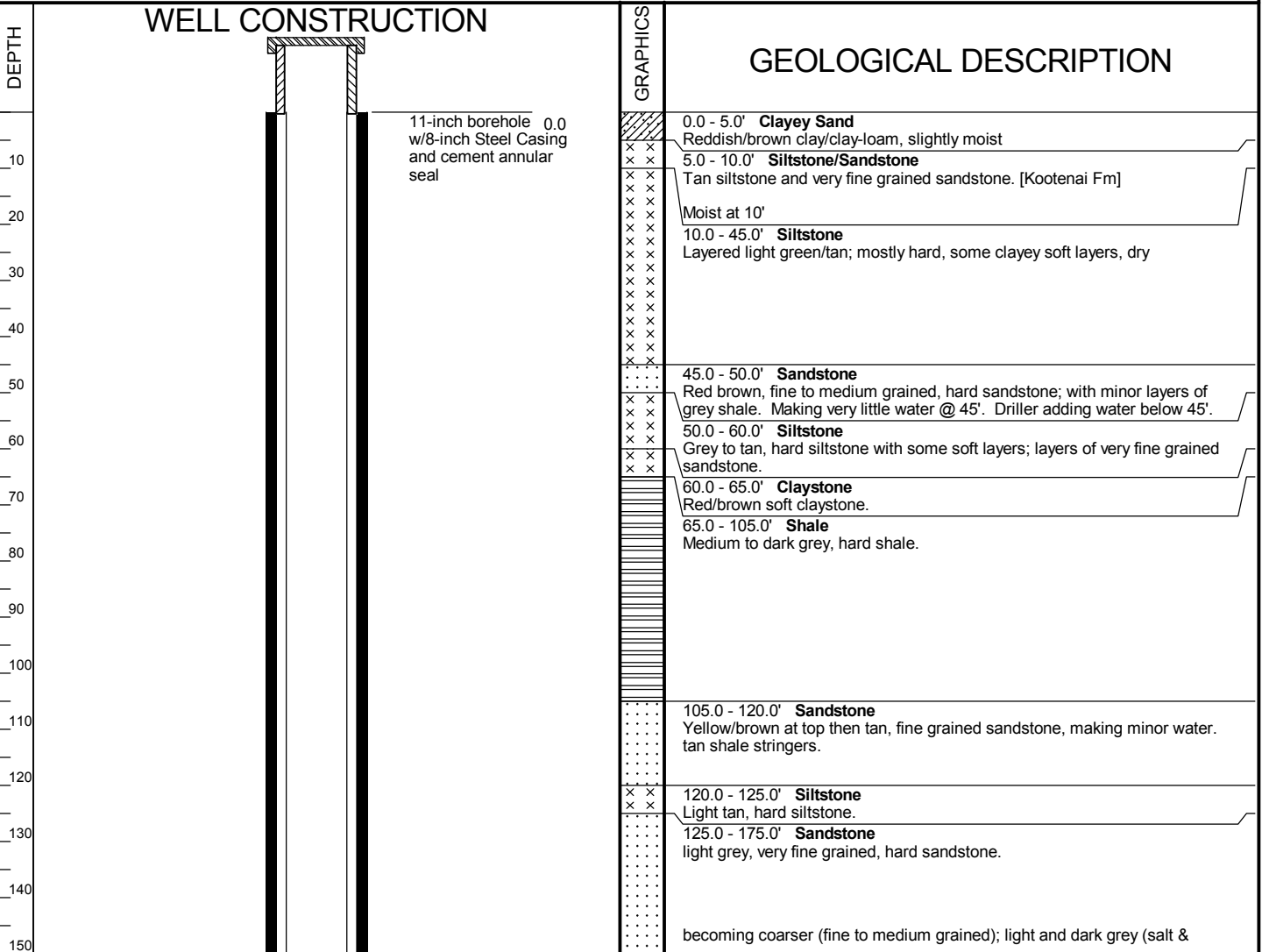
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	8-inch, steel casing	0-434
Surface Casing Used?	Y	12-inch temporary surface casing	0-20
Screen/Perforations?	Y	Open Hole	434-453
Sand Pack?	Y	None	
Annular Seal?	Y	Bentonite/Cement Grout	0-434
Surface Seal?	Y	Bentonite/Cement Grout	0-20'

**DEVELOPMENT/SAMPLING**

Well Developed?	Y	2 hrs pumping at 160 gpm
Water Samples Taken?	Y	IOC, VOC, SOC
Boring Samples Taken?	N	

Northing: 47.398067                      Easting: -111.177032  
 Static Water Level Below MP: 373.3                      Surface Casing Height (ft): +2  
 Date: 5/21/16                      Ground Surface Elevation (ft): 3688  
 MP Description: Top of Steel                      MP Elevation (ft):  
 MP Height Above or Below Ground (ft):

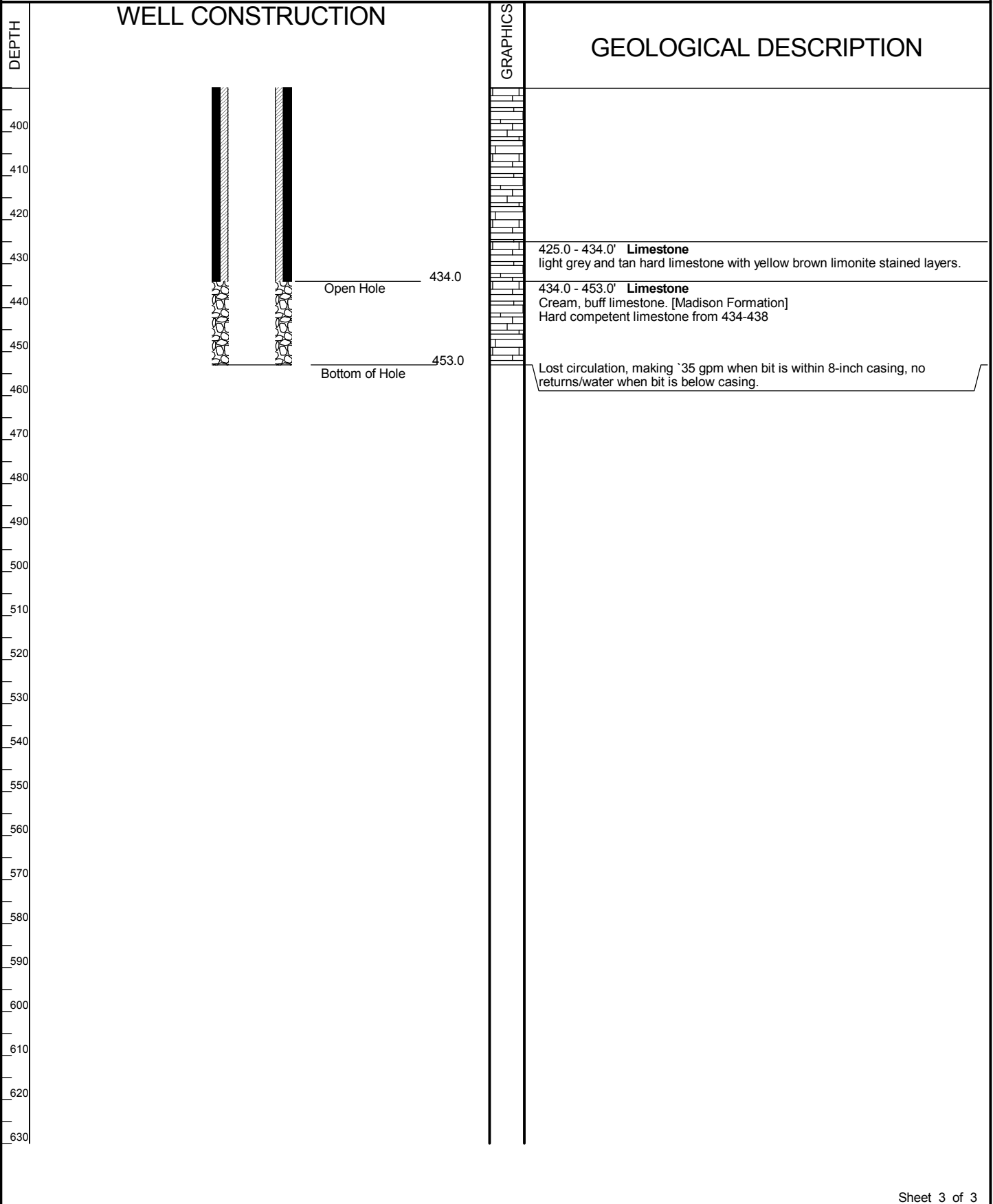
Remarks: 12-inch diameter temporary casing set to 20 feet, then 11-inch diameter borehole completed to 427 feet. 8-inch casing driven to 434 feet and then annular space completely sealed to ground surface with cement/bentonite grout. Drill hole advanced through the Madison limestone from 434 to 453 feet and completed open hole. 72-hr pumping test conducted at 163 gpm produced <0.25 ft of drawdown and recovered in less than 1 minute.



DOMESTIC\_WELL2 K:\GINT\PROJECTS\10039.GPJ HYDHLN2.GDT 8/2/16

DEPTH	WELL CONSTRUCTION	GRAPHICS	GEOLOGICAL DESCRIPTION
160 170			pepper) color.  making ~30 gpm
180 190			<b>175.0 - 180.0' Sandstone/Shale</b> Transition from sandstone (as above) to light grey shale and claystone <b>180.0 - 200.0' Shale/Coal</b> Dark grey to black shale with coal stringers
200 210 220 230 240			<b>200.0 - 205.0' Shale</b> Black shale & soft light grey siltstone <b>205.0 - 295.0' Siltstone</b> Light grey, soft clayey siltstone  minor light grey/green sandy layers
250 260 270 280 290			<b>245.0 - 295.0' Siltstone/Shale</b> light grey to grey/green, hard, siltstone and shale. Minor very fine sandy layers
300 310 320			<b>295.0 - 335.0' Siltstone</b> light grey and yellowish brown siltstone  Tan, hard siltstone Yellow/brown, grey and reddish brown siltstone  Tan, hard siltstone light grey siltstone and claystone tan, mixed with red/brown clayey siltstone
340 350 360			<b>335.0 - 360.0' Claystone</b> light grey, silty claystone.  mica within clayey soft matrix
370			<b>360.0 - 375.0' Sandstone</b> Tan with yellow/brown and red/brown, hard, very fine to fine grained sandstone. [Swift Fm]
380 390			<b>375.0 - 425.0' Limestone</b> Tan limestone with sandstone, siltstone and shale, highly fractured and voids; lost circulation.

DOMESTIC\_WELL2 K:\GINT\PROJECTS\10039.GPJ HYDHLN2.GDT 8/2/16



**APPENDIX C**

**ENERGY LABORATORY ANALYTICAL REPORT**





# ANALYTICAL SUMMARY REPORT

June 17, 2016

MT DEQ-Abandoned Mines  
PO Box 200901  
Helena, MT 59620-0901

Work Order: H16050548  
Project Name: 10039 Sand Coulee

Energy Laboratories Inc Helena MT received the following 2 samples for MT DEQ-Abandoned Mines on 5/31/2016 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H16050548-001	SAC-1605-001	05/27/16 14:00	05/31/16	Drinking Water	Metals by ICP/ICPMS, Drinking Water Alkalinity Conductivity Mercury, Drinking Water Fluoride 515.4-Herbicides, Chlorinated SDWA Hardness as CaCO3 Anions by Ion Chromatography Total Uranium Nitrogen, Nitrate + Nitrite pH Drinking Water Metals Digestion by EPA 200.2 Herbicide Liquid-Liquid Microextraction Digestion, Mercury by CVAA Pesticides, Carbamates SDWA Gross Alpha Calculated Gross Alpha, Gross Beta Radium 226 + Radium 228 Radium 226, Total Radium 228, Total Solids, Total Dissolved Semi-Volatile Organic Compounds Extraction 525-Semi-Volatile Organic Compounds, MT List 524-Purgeable Organics, SDWA
H16050548-002	TB 5562	05/27/16 14:00	05/31/16	Trip Blank	524-Purgeable Organics, SDWA

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:



**CLIENT:** MT DEQ-Abandoned Mines  
**Project:** 10039 Sand Coulee  
**Work Order:** H16050548

**Report Date:** 06/17/16

## CASE NARRATIVE

Tests associated with analyst identified as ELI-B were subcontracted to Energy Laboratories, 1120 S. 27th St., Billings, MT, EPA Number MT00005.

Tests associated with analyst identified as ELI-CA were subcontracted to Energy Laboratories, 2393 Salt Creek Hwy., Casper, WY, EPA Number WY00002 and WY00937.

Comments imported for SUBBED Workorder: C16060079

### COMBINED RA226+RA228 CALCULATION

The result for the combined Ra226/228 calculation is performed by adding the Ra226 activity to the Ra228 activity. If one or both of these activities is negative or less than the 40CFR\_DL, one half the 40CFR\_DL is substituted for the respective value below the 40CFR\_DL. This may produce a value for the combined Radium activities larger than the sum of the two original activities. This method of calculating the sum of the activities for these two radionuclides is in accordance with the guidance in 40CFR141.26(a)(4).

End of comments imported for SUBBED Workorder: C16060079



### LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines  
**Project:** 10039 Sand Coulee  
**Lab ID:** H16050548-001  
**Client Sample ID:** SAC-1605-001

**Report Date:** 06/17/16  
**Collection Date:** 05/27/16 14:00  
**Date Received:** 05/31/16  
**Matrix:** Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>PHYSICAL PROPERTIES</b>							
pH	7.6	s.u.	H	0.1		A4500-H B	06/01/16 10:36 / SRW
Conductivity @ 25 C	622	umhos/cm		1		A2510 B	06/01/16 10:36 / SRW
Solids, Total Dissolved TDS @ 180 C	406	mg/L		10		A2540 C	06/03/16 10:13 / MAC
<b>INORGANICS</b>							
Alkalinity, Total as CaCO3	190	mg/L		4		A2320 B	06/01/16 19:40 / SRW
Bicarbonate as HCO3	230	mg/L		4		A2320 B	06/01/16 19:40 / SRW
Carbonate as CO3	ND	mg/L		4		A2320 B	06/01/16 19:40 / SRW
Chloride	6	mg/L		1		E300.0	06/02/16 12:07 / SRW
Sulfate	131	mg/L		1		E300.0	06/02/16 12:07 / SRW
Fluoride	0.6	mg/L		0.1	4	A4500-F C	06/06/16 14:48 / SRW
Hardness as CaCO3	291	mg/L		1		A2340 B	06/06/16 09:32 / sld
<b>NUTRIENTS</b>							
Nitrogen, Nitrate+Nitrite as N	0.39	mg/L		0.01	10	E353.2	06/01/16 11:00 / cmm
<b>METALS, TOTAL (CONTRACT LAB MT00945)</b>							
Antimony	ND	mg/L		0.001	0.006	E200.8	06/01/16 12:06 / dck
Arsenic	0.002	mg/L		0.001	0.01	E200.8	06/01/16 12:06 / dck
Barium	ND	mg/L		0.05	2	E200.8	06/01/16 12:06 / dck
Beryllium	ND	mg/L		0.001	0.004	E200.8	06/01/16 12:06 / dck
Cadmium	ND	mg/L		0.001	0.005	E200.8	06/01/16 12:06 / dck
Calcium	74	mg/L		1		E200.7	06/03/16 17:17 / sld
Chromium	ND	mg/L		0.005	0.1	E200.8	06/01/16 12:06 / dck
Magnesium	26	mg/L		1		E200.7	06/03/16 17:17 / sld
Nickel	ND	mg/L		0.005		E200.8	06/01/16 12:06 / dck
Potassium	3	mg/L		1		E200.7	06/03/16 17:17 / sld
Selenium	0.002	mg/L		0.001	0.05	E200.8	06/01/16 12:06 / dck
Sodium	13	mg/L		1		E200.7	06/03/16 17:17 / sld
Thallium	ND	mg/L		0.0005	0.002	E200.8	06/01/16 12:06 / dck
<b>RADIONUCLIDES - TOTAL</b>							
Uranium	0.002	mg/L		0.001	0.03	E200.8	06/08/16 22:38 / eli-ca
<b>RADIONUCLIDES - TOTAL</b>							
Gross Alpha	3.1	pCi/L			15	E900.0	06/10/16 14:46 / eli-c
Gross Alpha precision (±)	2.6	pCi/L				E900.0	06/10/16 14:46 / eli-c
Gross Alpha MDC	1.9	pCi/L				E900.0	06/10/16 14:46 / eli-c
Gross Alpha - Adjusted	2.1	pCi/L			15	E900.0	06/13/16 09:49 / eli-ca
Gross Alpha - Adjusted precision (±)	2.6	pCi/L				E900.0	06/13/16 09:49 / eli-ca
Gross Alpha - Adjusted MDC	1.9	pCi/L				E900.0	06/13/16 09:49 / eli-ca
Radium 226	0.3	pCi/L			5	E903.0	06/13/16 14:33 / eli-c
Radium 226 precision (±)	0.1	pCi/L				E903.0	06/13/16 14:33 / eli-c
Radium 226 MDC	0.1	pCi/L				E903.0	06/13/16 14:33 / eli-c

**Report Definitions:**  
RL - Analyte reporting limit.  
QCL - Quality control limit.  
MDC - Minimum detectable concentration  
U - Not detected at minimum detectable concentration

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.  
H - Analysis performed past recommended holding time.



### LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines  
**Project:** 10039 Sand Coulee  
**Lab ID:** H16050548-001  
**Client Sample ID:** SAC-1605-001

**Report Date:** 06/17/16  
**Collection Date:** 05/27/16 14:00  
**Date Received:** 05/31/16  
**Matrix:** Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>RADIONUCLIDES - TOTAL</b>							
Radium 228	0.3	pCi/L	U		5	RA-05	06/10/16 12:17 / eli-c
Radium 228 precision (±)	0.7	pCi/L				RA-05	06/10/16 12:17 / eli-c
Radium 228 MDC	0.7	pCi/L				RA-05	06/10/16 12:17 / eli-c
Radium 226 + Radium 228	0.7	pCi/L	U			A7500-RA	06/14/16 13:01 / eli-ca
Radium 226 + Radium 228 precision (±)	0.7	pCi/L				A7500-RA	06/14/16 13:01 / eli-ca
Radium 226 + Radium 228 MDC	0.7	pCi/L				A7500-RA	06/14/16 13:01 / eli-ca
- See case narrative regarding combined Ra226+Ra228 calculation.							
<b>DRINKING WATER METALS ANALYSES</b>							
Mercury	ND	mg/L		0.0001	0.002	E245.1	06/02/16 12:34 / rgk
<b>VOLATILE ORGANIC COMPOUNDS</b>							
Benzene	ND	ug/L		0.50	5	E524.2	06/03/16 14:10 / kjw
Bromobenzene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Bromochloromethane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Bromodichloromethane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Bromoform	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Bromomethane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
n-Butylbenzene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
sec-Butylbenzene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
tert-Butylbenzene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Carbon tetrachloride	ND	ug/L		0.50	5	E524.2	06/03/16 14:10 / kjw
1,2-Dichloroethane	ND	ug/L		0.50	5	E524.2	06/03/16 14:10 / kjw
Chlorobenzene	ND	ug/L		0.50	100	E524.2	06/03/16 14:10 / kjw
Chlorodibromomethane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Chloroethane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Chloroform	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Chloromethane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
2-Chlorotoluene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
4-Chlorotoluene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0	0.2	E524.2	06/03/16 14:10 / kjw
Dibromomethane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
1,2-Dichlorobenzene	ND	ug/L		0.50	600	E524.2	06/03/16 14:10 / kjw
1,3-Dichlorobenzene	0.068	ug/L	J	0.50		E524.2	06/03/16 14:10 / kjw
1,4-Dichlorobenzene	ND	ug/L		0.50	75	E524.2	06/03/16 14:10 / kjw
Dichlorodifluoromethane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
1,1-Dichloroethane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
1,2-Dibromoethane	ND	ug/L		0.50	0.05	E524.2	06/03/16 14:10 / kjw
1,1-Dichloroethene	ND	ug/L		0.50	7	E524.2	06/03/16 14:10 / kjw
cis-1,2-Dichloroethene	ND	ug/L		0.50	70	E524.2	06/03/16 14:10 / kjw
trans-1,2-Dichloroethene	ND	ug/L		0.50	100	E524.2	06/03/16 14:10 / kjw
1,2-Dichloropropane	ND	ug/L		0.50	5	E524.2	06/03/16 14:10 / kjw
1,3-Dichloropropane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw

**Report Definitions:**  
 RL - Analyte reporting limit.  
 QCL - Quality control limit.  
 MDC - Minimum detectable concentration  
 U - Not detected at minimum detectable concentration  
 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-Abandoned Mines  
**Project:** 10039 Sand Coulee  
**Lab ID:** H16050548-001  
**Client Sample ID:** SAC-1605-001

**Report Date:** 06/17/16  
**Collection Date:** 05/27/16 14:00  
**Date Received:** 05/31/16  
**Matrix:** Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>VOLATILE ORGANIC COMPOUNDS</b>							
2,2-Dichloropropane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
1,1-Dichloropropene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
cis-1,3-Dichloropropene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
trans-1,3-Dichloropropene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Ethylbenzene	ND	ug/L		0.50	700	E524.2	06/03/16 14:10 / kjw
Hexachlorobutadiene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Isopropylbenzene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
p-Isopropyltoluene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Methyl tert-butyl ether (MTBE)	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Methylene chloride	ND	ug/L		0.50	5	E524.2	06/03/16 14:10 / kjw
Naphthalene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
n-Propylbenzene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Styrene	ND	ug/L		0.50	100	E524.2	06/03/16 14:10 / kjw
1,1,1,2-Tetrachloroethane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
1,1,2,2-Tetrachloroethane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Tetrachloroethene	ND	ug/L		0.50	5	E524.2	06/03/16 14:10 / kjw
Toluene	0.17	ug/L	J	0.50	1000	E524.2	06/03/16 14:10 / kjw
1,2,3-Trichlorobenzene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
1,2,4-Trichlorobenzene	ND	ug/L		0.50	70	E524.2	06/03/16 14:10 / kjw
1,1,1-Trichloroethane	ND	ug/L		0.50	200	E524.2	06/03/16 14:10 / kjw
1,1,2-Trichloroethane	ND	ug/L		0.50	5	E524.2	06/03/16 14:10 / kjw
Trichloroethene	ND	ug/L		0.50	5	E524.2	06/03/16 14:10 / kjw
Trichlorofluoromethane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
1,2,3-Trichloropropane	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
1,2,4-Trimethylbenzene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
1,3,5-Trimethylbenzene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Vinyl chloride	ND	ug/L		0.50	2	E524.2	06/03/16 14:10 / kjw
m+p-Xylenes	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
o-Xylene	ND	ug/L		0.50		E524.2	06/03/16 14:10 / kjw
Trihalomethanes, Total	ND	ug/L		0.50	80	E524.2	06/03/16 14:10 / kjw
Xylenes, Total	ND	ug/L		0.50	10000	E524.2	06/03/16 14:10 / kjw
Surr: p-Bromofluorobenzene	100	%REC		70-130		E524.2	06/03/16 14:10 / kjw
Surr: 1,2-Dichloroethane-d4	122	%REC		70-130		E524.2	06/03/16 14:10 / kjw
Surr: Toluene-d8	91.0	%REC		70-130		E524.2	06/03/16 14:10 / kjw

### SEMI-VOLATILE ORGANIC COMPOUNDS

Alachlor	ND	ug/L		0.10	2	E525.2	06/07/16 00:22 / eli-b
Aldrin	ND	ug/L		0.10		E525.2	06/07/16 00:22 / eli-b
Atrazine	ND	ug/L		0.10	3	E525.2	06/07/16 00:22 / eli-b
Benzo(a)pyrene	ND	ug/L		0.10	0.2	E525.2	06/07/16 00:22 / eli-b
Butachlor	ND	ug/L		0.10		E525.2	06/07/16 00:22 / eli-b
Chlordane	ND	ug/L		1.0	2	E525.2	06/07/16 00:22 / eli-b
di(2-ethylhexyl)Adipate	ND	ug/L		0.50	400	E525.2	06/07/16 00:22 / eli-b

**Report** RL - Analyte reporting limit.

MCL - Maximum contaminant level.

**Definitions:** QCL - Quality control limit.

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-Abandoned Mines  
**Project:** 10039 Sand Coulee  
**Lab ID:** H16050548-001  
**Client Sample ID:** SAC-1605-001

**Report Date:** 06/17/16  
**Collection Date:** 05/27/16 14:00  
**Date Received:** 05/31/16  
**Matrix:** Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>SEMI-VOLATILE ORGANIC COMPOUNDS</b>							
di(2-ethylhexyl)Phthalate	ND	ug/L		2.0	6	E525.2	06/07/16 00:22 / eli-b
Dieldrin	ND	ug/L		0.10		E525.2	06/07/16 00:22 / eli-b
Endrin	ND	ug/L		0.10	2	E525.2	06/07/16 00:22 / eli-b
gamma-BHC (Lindane)	ND	ug/L		0.10	0.2	E525.2	06/07/16 00:22 / eli-b
Heptachlor	ND	ug/L		0.10	0.4	E525.2	06/07/16 00:22 / eli-b
Heptachlor epoxide	ND	ug/L		0.10	0.2	E525.2	06/07/16 00:22 / eli-b
Hexachlorobenzene	ND	ug/L		0.10	1	E525.2	06/07/16 00:22 / eli-b
Hexachlorocyclopentadiene	ND	ug/L		0.10	50	E525.2	06/07/16 00:22 / eli-b
Methoxychlor	ND	ug/L		0.10	40	E525.2	06/07/16 00:22 / eli-b
Metolachlor	ND	ug/L		0.10		E525.2	06/07/16 00:22 / eli-b
Metribuzin	ND	ug/L		0.10		E525.2	06/07/16 00:22 / eli-b
Propachlor	ND	ug/L		0.10		E525.2	06/07/16 00:22 / eli-b
Simazine	ND	ug/L		0.10	4	E525.2	06/07/16 00:22 / eli-b
Toxaphene	ND	ug/L		2.0	3	E525.2	06/07/16 00:22 / eli-b
Surr: 1,3-Dimethyl-2-nitrobenzene	98.0	%REC		70-130		E525.2	06/07/16 00:22 / eli-b
Surr: Perylene-d12	94.0	%REC		70-130		E525.2	06/07/16 00:22 / eli-b
Surr: Pyrene-d10	95.0	%REC		70-130		E525.2	06/07/16 00:22 / eli-b
Surr: Triphenylphosphate	115	%REC		70-130		E525.2	06/07/16 00:22 / eli-b
<b>PESTICIDES, BY HPLC (CONTRACT LAB WY00002)</b>							
Aldicarb	ND	ug/L		0.40	3	E531.1	06/07/16 20:37 / eli-ca
Aldicarb sulfone	ND	ug/L		0.40	2	E531.1	06/07/16 20:37 / eli-ca
Aldicarb sulfoxide	ND	ug/L		0.40	4	E531.1	06/07/16 20:37 / eli-ca
Carbaryl	ND	ug/L		0.40		E531.1	06/07/16 20:37 / eli-ca
Carbofuran	ND	ug/L		0.40	40	E531.1	06/07/16 20:37 / eli-ca
3-Hydroxycarbofuran	ND	ug/L		0.40		E531.1	06/07/16 20:37 / eli-ca
Methiocarb	ND	ug/L		0.40		E531.1	06/07/16 20:37 / eli-ca
Methomyl	ND	ug/L		0.40		E531.1	06/07/16 20:37 / eli-ca
Oxamyl	ND	ug/L		0.40	200	E531.1	06/07/16 20:37 / eli-ca
Baygon	ND	ug/L		0.40		E531.1	06/07/16 20:37 / eli-ca
Surr: BDMC	97.0	%REC		70-130		E531.1	06/07/16 20:37 / eli-ca
<b>HERBICIDES</b>							
2,4,5-TP (Silvex)	ND	ug/L		0.25	50	E515.4	06/07/16 03:09 / eli-b
2,4-D	ND	ug/L		1.0	70	E515.4	06/07/16 03:09 / eli-b
2,4-DB	ND	ug/L		1.0		E515.4	06/07/16 03:09 / eli-b
Dalapon	ND	ug/L		2.5	200	E515.4	06/07/16 03:44 / eli-b
Dicamba	ND	ug/L		1.0		E515.4	06/07/16 03:09 / eli-b
Dichlorprop	ND	ug/L		1.0		E515.4	06/07/16 03:09 / eli-b
Dinoseb	ND	ug/L		1.0	7	E515.4	06/07/16 03:09 / eli-b
Pentachlorophenol	ND	ug/L		0.10	1	E515.4	06/07/16 03:09 / eli-b
Picloram	ND	ug/L		0.50	500	E515.4	06/07/16 03:09 / eli-b
Surr: 2,4-Dichlorophenylacetic acid	102	%REC		70-130		E515.4	06/07/16 03:09 / eli-b

**Report** RL - Analyte reporting limit.  
**Definitions:** QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



### LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines  
**Project:** 10039 Sand Coulee  
**Lab ID:** H16050548-002  
**Client Sample ID:** TB 5562

**Report Date:** 06/17/16  
**Collection Date:** 05/27/16 14:00  
**Date Received:** 05/31/16  
**Matrix:** Trip Blank

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>VOLATILE ORGANIC COMPOUNDS</b>							
Benzene	ND	ug/L		0.50	5	E524.2	06/03/16 12:58 / kjw
Bromobenzene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Bromochloromethane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Bromodichloromethane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Bromoform	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Bromomethane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
n-Butylbenzene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
sec-Butylbenzene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
tert-Butylbenzene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Carbon tetrachloride	ND	ug/L		0.50	5	E524.2	06/03/16 12:58 / kjw
1,2-Dichloroethane	ND	ug/L		0.50	5	E524.2	06/03/16 12:58 / kjw
Chlorobenzene	ND	ug/L		0.50	100	E524.2	06/03/16 12:58 / kjw
Chlorodibromomethane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Chloroethane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Chloroform	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Chloromethane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
2-Chlorotoluene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
4-Chlorotoluene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
1,2-Dibromo-3-chloropropane	ND	ug/L		1.0	0.2	E524.2	06/03/16 12:58 / kjw
Dibromomethane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
1,2-Dichlorobenzene	ND	ug/L		0.50	600	E524.2	06/03/16 12:58 / kjw
1,3-Dichlorobenzene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
1,4-Dichlorobenzene	ND	ug/L		0.50	75	E524.2	06/03/16 12:58 / kjw
Dichlorodifluoromethane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
1,1-Dichloroethane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
1,2-Dibromoethane	ND	ug/L		0.50	0.05	E524.2	06/03/16 12:58 / kjw
1,1-Dichloroethene	ND	ug/L		0.50	7	E524.2	06/03/16 12:58 / kjw
cis-1,2-Dichloroethene	ND	ug/L		0.50	70	E524.2	06/03/16 12:58 / kjw
trans-1,2-Dichloroethene	ND	ug/L		0.50	100	E524.2	06/03/16 12:58 / kjw
1,2-Dichloropropane	ND	ug/L		0.50	5	E524.2	06/03/16 12:58 / kjw
1,3-Dichloropropane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
2,2-Dichloropropane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
1,1-Dichloropropene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
cis-1,3-Dichloropropene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
trans-1,3-Dichloropropene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Ethylbenzene	ND	ug/L		0.50	700	E524.2	06/03/16 12:58 / kjw
Hexachlorobutadiene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Isopropylbenzene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
p-Isopropyltoluene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Methyl tert-butyl ether (MTBE)	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Methylene chloride	ND	ug/L		0.50	5	E524.2	06/03/16 12:58 / kjw
Naphthalene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
n-Propylbenzene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw

**Report** RL - Analyte reporting limit.  
**Definitions:** QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



### LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines  
**Project:** 10039 Sand Coulee  
**Lab ID:** H16050548-002  
**Client Sample ID:** TB 5562

**Report Date:** 06/17/16  
**Collection Date:** 05/27/16 14:00  
**Date Received:** 05/31/16  
**Matrix:** Trip Blank

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>VOLATILE ORGANIC COMPOUNDS</b>							
Styrene	ND	ug/L		0.50	100	E524.2	06/03/16 12:58 / kjw
1,1,1,2-Tetrachloroethane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
1,1,2,2-Tetrachloroethane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Tetrachloroethene	ND	ug/L		0.50	5	E524.2	06/03/16 12:58 / kjw
Toluene	ND	ug/L		0.50	1000	E524.2	06/03/16 12:58 / kjw
1,2,3-Trichlorobenzene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
1,2,4-Trichlorobenzene	ND	ug/L		0.50	70	E524.2	06/03/16 12:58 / kjw
1,1,1-Trichloroethane	ND	ug/L		0.50	200	E524.2	06/03/16 12:58 / kjw
1,1,2-Trichloroethane	ND	ug/L		0.50	5	E524.2	06/03/16 12:58 / kjw
Trichloroethene	ND	ug/L		0.50	5	E524.2	06/03/16 12:58 / kjw
Trichlorofluoromethane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
1,2,3-Trichloropropane	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
1,2,4-Trimethylbenzene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
1,3,5-Trimethylbenzene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Vinyl chloride	ND	ug/L		0.50	2	E524.2	06/03/16 12:58 / kjw
m+p-Xylenes	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
o-Xylene	ND	ug/L		0.50		E524.2	06/03/16 12:58 / kjw
Trihalomethanes, Total	ND	ug/L		0.50	80	E524.2	06/03/16 12:58 / kjw
Xylenes, Total	ND	ug/L		0.50	10000	E524.2	06/03/16 12:58 / kjw
Surr: p-Bromofluorobenzene	110	%REC		70-130		E524.2	06/03/16 12:58 / kjw
Surr: 1,2-Dichloroethane-d4	118	%REC		70-130		E524.2	06/03/16 12:58 / kjw
Surr: Toluene-d8	97.0	%REC		70-130		E524.2	06/03/16 12:58 / kjw

**Report** RL - Analyte reporting limit.  
**Definitions:** QCL - Quality control limit.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.





# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method:</b> A2320 B										Batch: R115666
<b>Lab ID:</b> MB		Method Blank								Run: PHSC_101-H_160601A 06/01/16 17:28
Alkalinity, Total as CaCO3	2	mg/L		0.2						
<b>Lab ID:</b> LCS		Laboratory Control Sample								Run: PHSC_101-H_160601A 06/01/16 17:34
Alkalinity, Total as CaCO3	620	mg/L		4.0	103	90	110			
<b>Lab ID:</b> H16050548-001ADUP	3	Sample Duplicate								Run: PHSC_101-H_160601A 06/01/16 19:46
Alkalinity, Total as CaCO3	190	mg/L		4.0				0.2	10	
Bicarbonate as HCO3	230	mg/L		4.0				0.2	10	
Carbonate as CO3	0.30	mg/L		4.0					10	

**Qualifiers:**

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MDC - Minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: A2510 B</b>								Analytical Run: PHSC_101-H_160601A		
<b>Lab ID: CCV - SC 1413</b>	Continuing Calibration Verification Standard							06/01/16 10:16		
Conductivity @ 25 C		1410	umhos/cm	1.0	100	90	110			
<b>Method: A2510 B</b>								Batch: R115666		
<b>Lab ID: SC 150</b>	Initial Calibration Verification Standard							Run: PHSC_101-H_160601A 06/01/16 08:27		
Conductivity @ 25 C		153	umhos/cm	1.0	102	90	110			
<b>Lab ID: SC 5000</b>	Initial Calibration Verification Standard							Run: PHSC_101-H_160601A 06/01/16 08:30		
Conductivity @ 25 C		4920	umhos/cm	1.0	98	90	110			
<b>Lab ID: SC 20000</b>	Initial Calibration Verification Standard							Run: PHSC_101-H_160601A 06/01/16 08:32		
Conductivity @ 25 C		19600	umhos/cm	1.0	98	90	110			
<b>Lab ID: SC 1000</b>	Laboratory Control Sample							Run: PHSC_101-H_160601A 06/01/16 08:35		
Conductivity @ 25 C		1010	umhos/cm	1.0	101	90	110			
<b>Lab ID: H16050547-043BDUP</b>	Sample Duplicate							Run: PHSC_101-H_160601A 06/01/16 10:23		
Conductivity @ 25 C		2210	umhos/cm	1.0				0.3	10	

**Qualifiers:**

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MDC - Minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: A2540 C</b>								Batch: TDS160603A		
<b>Lab ID: MB-1_160603A</b>		Method Blank						Run: ACCU-124 (14410200)_16060	06/03/16 10:12	
Solids, Total Dissolved TDS @ 180 C		8	mg/L	3						
<b>Lab ID: LCS-2_160603A</b>		Laboratory Control Sample						Run: ACCU-124 (14410200)_16060	06/03/16 10:13	
Solids, Total Dissolved TDS @ 180 C		2000	mg/L	20	100	90	110			
<b>Lab ID: H16050548-001A DUP</b>		Sample Duplicate						Run: ACCU-124 (14410200)_16060	06/03/16 10:21	
Solids, Total Dissolved TDS @ 180 C		398	mg/L	10				2.0	5	

**Qualifiers:**

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MDC - Minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual	
<b>Method:</b> A4500-F C								Analytical Run: PH2_160606A			
<b>Lab ID:</b> ICV1_160606A	Initial Calibration Verification Standard										
Fluoride		0.8	mg/L	0.1	103	90	110			06/06/16 14:44	
<b>Method:</b> A4500-F C								Batch: 160606A-F-ISE-W			
<b>Lab ID:</b> MBLK1_160606A	Method Blank										
Fluoride		ND	mg/L	0.01						Run: PH2_160606A 06/06/16 14:46	
<b>Lab ID:</b> H16050548-001ADUP	Sample Duplicate										
Fluoride		0.6	mg/L	0.1				0.0	10	Run: PH2_160606A 06/06/16 14:49	
<b>Lab ID:</b> H16050548-001AMS	Sample Matrix Spike										
Fluoride		1.6	mg/L	0.2	98	85	115			Run: PH2_160606A 06/06/16 14:49	

**Qualifiers:**

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MDC - Minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method:</b> A4500-H B								Analytical Run: PHSC_101-H_160601A		
<b>Lab ID:</b> pH 7		Initial Calibration Verification Standard								06/01/16 08:24
pH		7.0	s.u.	0.1	100	98	102			
<b>Lab ID:</b> CCV - pH 7		Continuing Calibration Verification Standard								06/01/16 10:13
pH		7.0	s.u.	0.1	100	98	102			
<b>Lab ID:</b> CCV - pH 7		Continuing Calibration Verification Standard								06/01/16 10:38
pH		7.0	s.u.	0.1	100	98	102			
<b>Method:</b> A4500-H B								Batch: R115666		
<b>Lab ID:</b> H16050547-043BDUP		Sample Duplicate								06/01/16 10:23
pH		8.4	s.u.	0.1				0.1	3	

**Qualifiers:**

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MDC - Minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E200.7</b> <span style="float: right;">Analytical Run: ICP2-HE_160603A</span>										
<b>Lab ID: ICV</b>	4	Initial Calibration Verification Standard								06/03/16 09:41
Calcium		39.8	mg/L	1.0	99	95	105			
Magnesium		39.3	mg/L	1.0	98	95	105			
Potassium		40.3	mg/L	1.0	101	95	105			
Sodium		40.4	mg/L	1.0	101	95	105			
<b>Lab ID: CCV-1</b>	4	Continuing Calibration Verification Standard								06/03/16 09:45
Calcium		25.0	mg/L	1.0	100	95	105			
Magnesium		24.5	mg/L	1.0	98	95	105			
Potassium		24.9	mg/L	1.0	100	95	105			
Sodium		24.9	mg/L	1.0	100	95	105			
<b>Lab ID: ICSA</b>	4	Interference Check Sample A								06/03/16 10:20
Calcium		468	mg/L	1.0	94	80	120			
Magnesium		489	mg/L	1.0	98	80	120			
Potassium		0.0437	mg/L	1.0		0	0			
Sodium		0.0404	mg/L	1.0		0	0			
<b>Lab ID: ICSAB</b>	4	Interference Check Sample AB								06/03/16 10:24
Calcium		462	mg/L	1.0	92	80	120			
Magnesium		487	mg/L	1.0	97	80	120			
Potassium		19.7	mg/L	1.0	98	80	120			
Sodium		19.6	mg/L	1.0	98	80	120			
<b>Lab ID: CCV</b>	4	Continuing Calibration Verification Standard								06/03/16 17:03
Calcium		24.4	mg/L	1.0	98	90	110			
Magnesium		24.1	mg/L	1.0	96	90	110			
Potassium		25.1	mg/L	1.0	100	90	110			
Sodium		25.1	mg/L	1.0	100	90	110			
<b>Method: E200.7</b> <span style="float: right;">Batch: R115744</span>										
<b>Lab ID: MB</b>	4	Method Blank								Run: ICP2-HE_160603A 06/03/16 10:39
Calcium		ND	mg/L	0.03						
Magnesium		ND	mg/L	0.003						
Potassium		ND	mg/L	0.03						
Sodium		0.02	mg/L	0.02						
<b>Lab ID: LFB</b>	4	Laboratory Fortified Blank								Run: ICP2-HE_160603A 06/03/16 10:43
Calcium		49.9	mg/L	1.0	100	85	115			
Magnesium		48.8	mg/L	1.0	98	85	115			
Potassium		49.6	mg/L	1.0	99	85	115			
Sodium		49.3	mg/L	1.0	99	85	115			
<b>Lab ID: H16050544-001BMS2</b>	4	Sample Matrix Spike								Run: ICP2-HE_160603A 06/03/16 17:10
Calcium		89.8	mg/L	1.0	92	70	130			
Magnesium		60.1	mg/L	1.0	93	70	130			
Potassium		51.4	mg/L	1.0	98	70	130			

**Qualifiers:**

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MDC - Minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E200.7</b> <span style="float: right;">Batch: R115744</span>										
<b>Lab ID:</b> H16050544-001BMS2	4	Sample Matrix Spike								06/03/16 17:10
Sodium		57.4	mg/L	1.0	99	70	130			
Run: ICP2-HE_160603A										
<b>Lab ID:</b> H16050544-001BMSD	4	Sample Matrix Spike Duplicate								06/03/16 17:14
Calcium		90.3	mg/L	1.0	93	70	130	0.5	20	
Magnesium		60.4	mg/L	1.0	94	70	130	0.6	20	
Potassium		51.5	mg/L	1.0	99	70	130	0.3	20	
Sodium		57.6	mg/L	1.0	99	70	130	0.3	20	
Run: ICP2-HE_160603A										
<b>Lab ID:</b> H16060036-001BMS2	4	Sample Matrix Spike								06/03/16 17:36
Calcium		124	mg/L	1.0	91	70	130			
Magnesium		78.7	mg/L	1.0	93	70	130			
Potassium		52.4	mg/L	1.0	94	70	130			
Sodium		50.2	mg/L	1.0	95	70	130			
Run: ICP2-HE_160603A										
<b>Lab ID:</b> H16060036-001BMSD	4	Sample Matrix Spike Duplicate								06/03/16 17:40
Calcium		124	mg/L	1.0	91	70	130	0.0	20	
Magnesium		78.5	mg/L	1.0	93	70	130	0.3	20	
Potassium		54.1	mg/L	1.0	97	70	130	3.1	20	
Sodium		51.9	mg/L	1.0	98	70	130	3.3	20	

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# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual	
<b>Method: E200.8</b>								Analytical Run: ICPMS204-B_160601A			
<b>Lab ID: ICV STD</b>	9	Initial Calibration Verification Standard						06/01/16 10:54			
Antimony		0.0599	mg/L	0.0030	100	90	110				
Arsenic		0.0616	mg/L	0.0050	103	90	110				
Barium		0.0602	mg/L	0.10	100	90	110				
Beryllium		0.0305	mg/L	0.0010	102	90	110				
Cadmium		0.0316	mg/L	0.0010	105	90	110				
Chromium		0.0610	mg/L	0.010	102	90	110				
Nickel		0.0608	mg/L	0.010	101	90	110				
Selenium		0.0622	mg/L	0.0050	104	90	110				
Thallium		0.0592	mg/L	0.0010	99	90	110				
<b>Lab ID: ICSA</b>	9	Interference Check Sample A						06/01/16 10:57			
Antimony		0.000219	mg/L	0.0030							
Arsenic		0.000309	mg/L	0.0050							
Barium		0.000141	mg/L	0.10							
Beryllium		2.90E-05	mg/L	0.0010							
Cadmium		0.00165	mg/L	0.0010							
Chromium		-0.000703	mg/L	0.010							
Nickel		0.00457	mg/L	0.010							
Selenium		-9.00E-05	mg/L	0.0050							
Thallium		7.80E-05	mg/L	0.0010							
<b>Lab ID: ICSAB</b>	9	Interference Check Sample AB						06/01/16 11:02			
Antimony		4.90E-05	mg/L	0.0030		0	0				
Arsenic		0.0104	mg/L	0.0050	104	70	130				
Barium		0.000187	mg/L	0.10		0	0				
Beryllium		-7.00E-06	mg/L	0.0010		0	0				
Cadmium		0.0115	mg/L	0.0010	115	70	130				
Chromium		0.0190	mg/L	0.010	95	70	130				
Nickel		0.0242	mg/L	0.010	121	70	130				
Selenium		0.00892	mg/L	0.0050	89	70	130				
Thallium		-1.40E-05	mg/L	0.0010		0	0				
<b>Method: E200.8</b>								Batch: R115675			
<b>Lab ID: LRB</b>	9	Method Blank						Run: ICPMS204-B_160601A 06/01/16 11:17			
Antimony		ND	mg/L	4E-05							
Arsenic		0.0004	mg/L	0.0003							
Barium		ND	mg/L	8E-05							
Beryllium		ND	mg/L	2E-05							
Cadmium		ND	mg/L	2E-05							
Chromium		ND	mg/L	0.0002							
Nickel		ND	mg/L	5E-05							
Selenium		ND	mg/L	0.0006							
Thallium		ND	mg/L	1E-05							

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# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E200.8</b>										Batch: R115675
<b>Lab ID: LFB</b>	9	Laboratory Fortified Blank			Run: ICPMS204-B_160601A			06/01/16 11:19		
Antimony		0.0473	mg/L	0.0030	95	85	115			
Arsenic		0.0505	mg/L	0.0050	100	85	115			
Barium		0.0476	mg/L	0.10	95	85	115			
Beryllium		0.0492	mg/L	0.0010	98	85	115			
Cadmium		0.0503	mg/L	0.0010	101	85	115			
Chromium		0.0466	mg/L	0.010	93	85	115			
Nickel		0.0490	mg/L	0.010	98	85	115			
Selenium		0.0518	mg/L	0.0050	104	85	115			
Thallium		0.0474	mg/L	0.0010	95	85	115			
<b>Lab ID: H16050506-001AMS</b>	9	Sample Matrix Spike			Run: ICPMS204-B_160601A			06/01/16 11:55		
Antimony		0.0491	mg/L	0.0010	98	70	130			
Arsenic		0.0560	mg/L	0.0010	108	70	130			
Barium		0.0848	mg/L	0.050	98	70	130			
Beryllium		0.0466	mg/L	0.0010	93	70	130			
Cadmium		0.0497	mg/L	0.0010	99	70	130			
Chromium		0.0468	mg/L	0.0050	94	70	130			
Nickel		0.0530	mg/L	0.0050	97	70	130			
Selenium		0.0584	mg/L	0.0010	112	70	130			
Thallium		0.0483	mg/L	0.00050	97	70	130			
<b>Lab ID: H16050506-001AMSD</b>	9	Sample Matrix Spike Duplicate			Run: ICPMS204-B_160601A			06/01/16 11:58		
Antimony		0.0503	mg/L	0.0010	100	70	130	2.3	20	
Arsenic		0.0569	mg/L	0.0010	110	70	130	1.6	20	
Barium		0.0861	mg/L	0.050	100	70	130	1.5	20	
Beryllium		0.0473	mg/L	0.0010	95	70	130	1.5	20	
Cadmium		0.0505	mg/L	0.0010	101	70	130	1.6	20	
Chromium		0.0481	mg/L	0.0050	96	70	130	2.6	20	
Nickel		0.0541	mg/L	0.0050	99	70	130	1.9	20	
Selenium		0.0600	mg/L	0.0010	115	70	130	2.7	20	
Thallium		0.0497	mg/L	0.00050	99	70	130	2.8	20	

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MDC - Minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E200.8</b>								Analytical Run: SUB-C212460		
<b>Lab ID: ICV</b>	Initial Calibration Verification Standard									
Uranium		0.0495	mg/L	0.00030	99	90	110			06/08/16 16:27
<b>Lab ID: ICV</b>	Initial Calibration Verification Standard									
Uranium		0.0506	mg/L	0.00030	101	90	110			06/08/16 21:42
<b>Lab ID: ICV</b>	Initial Calibration Verification Standard									
Uranium		0.0494	mg/L	0.00030	99	90	110			06/09/16 03:48
<b>Method: E200.8</b>								Batch: C_47628		
<b>Lab ID: MB-47628</b>	Method Blank									
Uranium		0.0002	mg/L	4E-06						Run: SUB-C212460 06/08/16 18:13
<b>Lab ID: LCS3-47628</b>	Laboratory Control Sample									
Uranium		0.513	mg/L	0.00030	103	85	115			Run: SUB-C212460 06/08/16 18:44
<b>Lab ID: C16060108-004AMS3</b>	Sample Matrix Spike									
Uranium		0.527	mg/L	0.0010	105	70	130			Run: SUB-C212460 06/08/16 23:34
<b>Lab ID: C16060108-004AMSD</b>	Sample Matrix Spike Duplicate									
Uranium		0.536	mg/L	0.0010	107	70	130	1.7	20	Run: SUB-C212460 06/08/16 23:39

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# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method:</b> E245.1										Analytical Run: HGCV202-H_160602A
<b>Lab ID:</b> ICV		Initial Calibration Verification Standard								06/02/16 10:45
Mercury		0.000192	mg/L	0.00010	96	90	110			
<b>Lab ID:</b> CCV		Continuing Calibration Verification Standard								06/02/16 12:07
Mercury		0.000205	mg/L	0.00010	102	90	110			
<b>Method:</b> E245.1										Batch: 33118
<b>Lab ID:</b> MB-33118		Method Blank								06/02/16 12:12
Mercury		ND	mg/L	1E-06						Run: HGCV202-H_160602A
<b>Lab ID:</b> LCS-33118		Laboratory Control Sample								06/02/16 12:14
Mercury		0.000159	mg/L	0.00010	106	90	110			Run: HGCV202-H_160602A
<b>Lab ID:</b> H16050541-011BMS		Sample Matrix Spike								06/02/16 12:19
Mercury		0.000154	mg/L	0.00010	102	70	130			Run: HGCV202-H_160602A
<b>Lab ID:</b> H16050541-011BMSD		Sample Matrix Spike Duplicate								06/02/16 12:22
Mercury		0.000145	mg/L	0.00010	97	70	130	5.5	20	

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# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual	
<b>Method: E300.0</b>											
Analytical Run: IC102-H_160601A											
<b>Lab ID: ICV</b>	2	Initial Calibration Verification Standard									06/01/16 11:27
Chloride		101	mg/L	1.0	101	90	110				
Sulfate		406	mg/L	1.0	101	90	110				
<b>Lab ID: CCV060116-8</b>	2	Continuing Calibration Verification Standard									06/02/16 10:05
Chloride		101	mg/L	1.0	101	90	110				
Sulfate		409	mg/L	1.0	102	90	110				
<b>Method: E300.0</b>											
Batch: R115712											
<b>Lab ID: ICB</b>	2	Method Blank									06/01/16 11:16
Run: IC102-H_160601A											
Chloride		0.01	mg/L	0.006							
Sulfate		ND	mg/L	0.05							
<b>Lab ID: LFB</b>	2	Laboratory Fortified Blank									06/01/16 11:38
Run: IC102-H_160601A											
Chloride		47.2	mg/L	1.0	94	90	110				
Sulfate		208	mg/L	1.0	104	90	110				
<b>Lab ID: H16050548-001AMS</b>	2	Sample Matrix Spike									06/02/16 12:18
Run: IC102-H_160601A											
Chloride		56.4	mg/L	1.0	100	90	110				
Sulfate		333	mg/L	1.0	101	90	110				
<b>Lab ID: H16050548-001AMSD</b>	2	Sample Matrix Spike Duplicate									06/02/16 12:29
Run: IC102-H_160601A											
Chloride		56.5	mg/L	1.0	101	90	110	0.2	20		
Sulfate		338	mg/L	1.0	103	90	110	1.4	20		

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# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual	
<b>Method: E353.2</b>								Analytical Run: FIA203-HE_160601A			
<b>Lab ID: ICV</b>	Initial Calibration Verification Standard										
Nitrogen, Nitrate+Nitrite as N		0.919	mg/L	0.010	92	90	110			06/01/16 09:38	
<b>Lab ID: ICB</b>	Initial Calibration Blank, Instrument Blank										
Nitrogen, Nitrate+Nitrite as N		-0.00769	mg/L	0.010		0	0			06/01/16 09:39	
<b>Lab ID: CCV</b>	Continuing Calibration Verification Standard										
Nitrogen, Nitrate+Nitrite as N		0.522	mg/L	0.010	104	90	110			06/01/16 10:47	
<b>Method: E353.2</b>								Batch: R115672			
<b>Lab ID: LFB</b>	Laboratory Fortified Blank										
Nitrogen, Nitrate+Nitrite as N		0.956	mg/L	0.011	96	90	110			Run: FIA203-HE_160601A 06/01/16 09:40	
<b>Lab ID: H16050515-002CMS</b>	Sample Matrix Spike										
Nitrogen, Nitrate+Nitrite as N		0.917	mg/L	0.011	91	90	110			Run: FIA203-HE_160601A 06/01/16 11:06	
<b>Lab ID: H16050515-002CMSD</b>	Sample Matrix Spike Duplicate										
Nitrogen, Nitrate+Nitrite as N		0.951	mg/L	0.011	94	90	110	3.7	20	Run: FIA203-HE_160601A 06/01/16 11:07	

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# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E515.4</b>								Analytical Run: B_99802		
<b>Lab ID: CAL1-99802</b>	9	Continuing Calibration Verification Standard						06/06/16 22:26		
2,4,5-TP (Silvex)		0.258	ug/L	0.25	103	50	150			
2,4-D		0.925	ug/L	1.0	93	50	150			
2,4-DB		1.34	ug/L	1.0	134	50	150			
Dicamba		0.460	ug/L	1.0	92	50	150			
Dichlorprop		1.01	ug/L	1.0	101	50	150			
Dinoseb		1.14	ug/L	1.0	114	50	150			
Pentachlorophenol		0.116	ug/L	0.10	116	50	150			
Picloram		0.425	ug/L	0.50	85	50	150			
Surr: 2,4-Dichlorophenylacetic acid					100	70	130			
<b>Method: E515.4</b>								Analytical Run: B_99802		
<b>Lab ID: CAL1-99802</b>		Continuing Calibration Verification Standard						06/06/16 23:01		
Dalapon		1.20	ug/L	2.5	120	50	150			
<b>Method: E515.4</b>								Batch: B_99802		
<b>Lab ID: LCS-99802</b>	9	Laboratory Control Sample				Run: SUB-B262045		06/06/16 23:01		
2,4,5-TP (Silvex)		1.20	ug/L	0.25	96	70	130			
2,4-D		4.46	ug/L	1.0	89	70	130			
2,4-DB		4.13	ug/L	1.0	83	70	130			
Dicamba		1.85	ug/L	1.0	74	70	130			
Dichlorprop		4.38	ug/L	1.0	88	70	130			
Dinoseb		4.01	ug/L	1.0	80	70	130			
Pentachlorophenol		0.413	ug/L	0.10	83	70	130			
Picloram		4.36	ug/L	0.50	87	70	130			
Surr: 2,4-Dichlorophenylacetic acid					84	70	130			
<b>Lab ID: MB-99802</b>	9	Method Blank				Run: SUB-B262045		06/06/16 23:37		
2,4,5-TP (Silvex)		ND	ug/L	0.25						
2,4-D		ND	ug/L	1.0						
2,4-DB		ND	ug/L	1.0						
Dicamba		ND	ug/L	1.0						
Dichlorprop		ND	ug/L	1.0						
Dinoseb		ND	ug/L	1.0						
Pentachlorophenol		ND	ug/L	0.10						
Picloram		ND	ug/L	0.50						
Surr: 2,4-Dichlorophenylacetic acid					100	70	130			
<b>Lab ID: B16051901-001DMS</b>	9	Sample Matrix Spike				Run: SUB-B262045		06/07/16 05:29		
2,4,5-TP (Silvex)		1.18	ug/L	0.25	94	70	130			
2,4-D		4.35	ug/L	1.0	87	70	130			
2,4-DB		4.12	ug/L	1.0	82	70	130			
Dicamba		1.81	ug/L	1.0	72	70	130			
Dichlorprop		4.42	ug/L	1.0	88	70	130			
Dinoseb		3.93	ug/L	1.0	79	70	130			
Pentachlorophenol		0.416	ug/L	0.10	83	70	130			

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# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E515.4</b> <span style="float: right;">Batch: B_99802</span>										
<b>Lab ID: B16051901-001DMS</b>	9	Sample Matrix Spike								06/07/16 05:29
Picloram		4.30	ug/L	0.50	86	70	130			
Surr: 2,4-Dichlorophenylacetic acid					83	70	130			
<b>Lab ID: B16051901-001DMSD</b>	9	Sample Matrix Spike Duplicate								06/07/16 06:04
2,4,5-TP (Silvex)		1.19	ug/L	0.25	95	70	130	0.8	30	
2,4-D		4.57	ug/L	1.0	91	70	130	4.9	30	
2,4-DB		4.03	ug/L	1.0	81	70	130	2.2	30	
Dicamba		1.80	ug/L	1.0	72	70	130	0.6	30	
Dichlorprop		4.44	ug/L	1.0	89	70	130	0.5	30	
Dinoseb		4.00	ug/L	1.0	80	70	130	1.8	30	
Pentachlorophenol		0.416	ug/L	0.10	83	70	130	0.0	30	
Picloram		4.35	ug/L	0.50	87	70	130	1.2	30	
Surr: 2,4-Dichlorophenylacetic acid					83	70	130			
<b>Lab ID: CAL3-99802</b>	9	Continuing Calibration Verification Standard								06/07/16 07:14
2,4,5-TP (Silvex)		0.793	ug/L	0.25	106	70	130			
2,4-D		3.53	ug/L	1.0	118	70	130			
2,4-DB		2.92	ug/L	1.0	97	70	130			
Dicamba		1.45	ug/L	1.0	97	70	130			
Dichlorprop		3.25	ug/L	1.0	108	70	130			
Dinoseb		3.16	ug/L	1.0	105	70	130			
Pentachlorophenol		0.310	ug/L	0.10	103	70	130			
Picloram		1.50	ug/L	0.50	100	70	130			
Surr: 2,4-Dichlorophenylacetic acid					97	70	130			
<b>Lab ID: LCS-99802</b>		Laboratory Control Sample								06/06/16 23:37
Dalapon		3.69	ug/L	2.5	74	70	130			
<b>Lab ID: MB-99802</b>		Method Blank								06/07/16 00:12
Dalapon		ND	ug/L	2.5						
<b>Lab ID: B16051901-001DMS</b>		Sample Matrix Spike								06/07/16 06:04
Dalapon		4.50	ug/L	2.5	90	70	130			
<b>Lab ID: B16051901-001DMSD</b>		Sample Matrix Spike Duplicate								06/07/16 06:39
Dalapon		4.48	ug/L	2.5	90	70	130	0.4	30	
<b>Lab ID: CAL3-99802</b>		Continuing Calibration Verification Standard								06/07/16 07:49
Dalapon		2.98	ug/L	2.5	99	70	130			

**Qualifiers:**

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MDC - Minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E524.2</b>								Analytical Run: R115740		
<b>Lab ID: 060316_CCV_3</b>	65 Continuing Calibration Verification Standard								06/03/16 10:23	
Benzene		4.76	ug/L	0.50	95	70	130			
Bromobenzene		5.00	ug/L	0.50	100	70	130			
Bromochloromethane		4.56	ug/L	0.50	91	70	130			
Bromodichloromethane		5.28	ug/L	0.50	106	70	130			
Bromoform		3.82	ug/L	0.50	76	70	130			
Bromomethane		5.04	ug/L	0.50	101	70	130			
n-Butylbenzene		5.32	ug/L	0.50	106	70	130			
sec-Butylbenzene		5.24	ug/L	0.50	105	70	130			
tert-Butylbenzene		5.28	ug/L	0.50	106	70	130			
Carbon tetrachloride		4.88	ug/L	0.50	98	70	130			
1,2-Dichloroethane		4.36	ug/L	0.50	87	70	130			
Chlorobenzene		4.64	ug/L	0.50	93	70	130			
Chlorodibromomethane		4.76	ug/L	0.50	95	70	130			
Chloroethane		5.52	ug/L	0.50	110	70	130			
Chloroform		4.40	ug/L	0.50	88	70	130			
Chloromethane		5.48	ug/L	0.50	110	70	130			
2-Chlorotoluene		5.32	ug/L	0.50	106	70	130			
4-Chlorotoluene		5.40	ug/L	0.50	108	70	130			
1,2-Dibromo-3-chloropropane		4.48	ug/L	1.0	90	70	130			
Dibromomethane		4.72	ug/L	0.50	94	70	130			
1,2-Dichlorobenzene		4.76	ug/L	0.50	95	70	130			
1,3-Dichlorobenzene		4.84	ug/L	0.50	97	70	130			
1,4-Dichlorobenzene		4.56	ug/L	0.50	91	70	130			
Dichlorodifluoromethane		5.48	ug/L	0.50	110	70	130			
1,1-Dichloroethane		4.64	ug/L	0.50	93	70	130			
1,2-Dibromoethane		4.80	ug/L	0.50	96	70	130			
1,1-Dichloroethene		4.56	ug/L	0.50	91	70	130			
cis-1,2-Dichloroethene		4.76	ug/L	0.50	95	70	130			
trans-1,2-Dichloroethene		5.08	ug/L	0.50	102	70	130			
1,2-Dichloropropane		5.04	ug/L	0.50	101	70	130			
1,3-Dichloropropane		4.56	ug/L	0.50	91	70	130			
2,2-Dichloropropane		5.04	ug/L	0.50	101	70	130			
1,1-Dichloropropene		4.60	ug/L	0.50	92	70	130			
cis-1,3-Dichloropropene		5.20	ug/L	0.50	104	70	130			
trans-1,3-Dichloropropene		4.68	ug/L	0.50	94	70	130			
Ethylbenzene		5.32	ug/L	0.50	106	70	130			
Hexachlorobutadiene		5.12	ug/L	0.50	102	70	130			
Isopropylbenzene		5.36	ug/L	0.50	107	70	130			
p-Isopropyltoluene		5.16	ug/L	0.50	103	70	130			
Methyl tert-butyl ether (MTBE)		4.56	ug/L	0.50	91	70	130			
Methylene chloride		3.61	ug/L	0.50	72	70	130			
Naphthalene		4.16	ug/L	0.50	83	70	130			
n-Propylbenzene		4.96	ug/L	0.50	99	70	130			
Styrene		5.32	ug/L	0.50	106	70	130			

**Qualifiers:**

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MDC - Minimum detectable concentration





# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E524.2</b>								Analytical Run: R115740		
<b>Lab ID: 060316_CCV_3</b>	65 Continuing Calibration Verification Standard							06/03/16 10:23		
1,1,1,2-Tetrachloroethane		5.36	ug/L	0.50	107	70	130			
1,1,2,2-Tetrachloroethane		4.64	ug/L	0.50	93	70	130			
Tetrachloroethene		5.36	ug/L	0.50	107	70	130			
Toluene		5.20	ug/L	0.50	104	70	130			
1,2,3-Trichlorobenzene		4.40	ug/L	0.50	88	70	130			
1,2,4-Trichlorobenzene		4.64	ug/L	0.50	93	70	130			
1,1,1-Trichloroethane		4.48	ug/L	0.50	90	70	130			
1,1,2-Trichloroethane		4.52	ug/L	0.50	90	70	130			
Trichloroethene		5.12	ug/L	0.50	102	70	130			
Trichlorofluoromethane		5.76	ug/L	0.50	115	70	130			
1,2,3-Trichloropropane		4.56	ug/L	0.50	91	70	130			
1,2,4-Trimethylbenzene		5.24	ug/L	0.50	105	70	130			
1,3,5-Trimethylbenzene		5.16	ug/L	0.50	103	70	130			
Vinyl chloride		4.84	ug/L	0.50	97	70	130			
m+p-Xylenes		10.1	ug/L	0.50	101	70	130			
o-Xylene		5.12	ug/L	0.50	102	70	130			
Trihalomethanes, Total		18.3	ug/L	0.50	91	70	130			
Xylenes, Total		15.2	ug/L	0.50	102	70	130			
Surr: p-Bromofluorobenzene				0.50	105	70	130			
Surr: 1,2-Dichloroethane-d4				0.50	100	70	130			
Surr: Toluene-d8				0.50	109	70	130			

<b>Method: E524.2</b>								Batch: R115740		
<b>Lab ID: 060316_LCS_4</b>	65 Laboratory Control Sample							Run: 1SATURN_160603A		
06/03/16 11:06										
Benzene		4.52	ug/L	0.50	90	70	130			
Bromobenzene		4.48	ug/L	0.50	90	70	130			
Bromochloromethane		5.08	ug/L	0.50	102	70	130			
Bromodichloromethane		4.52	ug/L	0.50	90	70	130			
Bromoform		4.28	ug/L	0.50	86	70	130			
Bromomethane		5.76	ug/L	0.50	115	70	130			
n-Butylbenzene		4.96	ug/L	0.50	99	70	130			
sec-Butylbenzene		4.40	ug/L	0.50	88	70	130			
tert-Butylbenzene		4.48	ug/L	0.50	90	70	130			
Carbon tetrachloride		4.72	ug/L	0.50	94	70	130			
1,2-Dichloroethane		4.32	ug/L	0.50	86	70	130			
Chlorobenzene		4.24	ug/L	0.50	85	70	130			
Chlorodibromomethane		4.24	ug/L	0.50	85	70	130			
Chloroethane		5.48	ug/L	0.50	110	70	130			
Chloroform		4.16	ug/L	0.50	83	70	130			
Chloromethane		5.84	ug/L	0.50	117	70	130			
2-Chlorotoluene		4.72	ug/L	0.50	94	70	130			
4-Chlorotoluene		5.00	ug/L	0.50	100	70	130			
1,2-Dibromo-3-chloropropane		4.12	ug/L	1.0	82	70	130			
Dibromomethane		4.32	ug/L	0.50	86	70	130			

**Qualifiers:**

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MDC - Minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E524.2</b>										
Batch: R115740										
<b>Lab ID:</b> 060316_LCS_4	65	Laboratory Control Sample				Run: 1SATURN_160603A			06/03/16 11:06	
1,2-Dichlorobenzene		4.44	ug/L	0.50	89	70	130			
1,3-Dichlorobenzene		4.44	ug/L	0.50	89	70	130			
1,4-Dichlorobenzene		4.16	ug/L	0.50	83	70	130			
Dichlorodifluoromethane		5.44	ug/L	0.50	109	70	130			
1,1-Dichloroethane		4.44	ug/L	0.50	89	70	130			
1,2-Dibromoethane		4.16	ug/L	0.50	83	70	130			
1,1-Dichloroethene		4.20	ug/L	0.50	84	70	130			
cis-1,2-Dichloroethene		4.68	ug/L	0.50	94	70	130			
trans-1,2-Dichloroethene		4.84	ug/L	0.50	97	70	130			
1,2-Dichloropropane		4.60	ug/L	0.50	92	70	130			
1,3-Dichloropropane		4.64	ug/L	0.50	93	70	130			
2,2-Dichloropropane		5.16	ug/L	0.50	103	70	130			
1,1-Dichloropropene		4.28	ug/L	0.50	86	70	130			
cis-1,3-Dichloropropene		4.52	ug/L	0.50	90	70	130			
trans-1,3-Dichloropropene		4.08	ug/L	0.50	82	70	130			
Ethylbenzene		4.72	ug/L	0.50	94	70	130			
Hexachlorobutadiene		4.32	ug/L	0.50	86	70	130			
Isopropylbenzene		4.64	ug/L	0.50	93	70	130			
p-Isopropyltoluene		4.92	ug/L	0.50	98	70	130			
Methyl tert-butyl ether (MTBE)		4.76	ug/L	0.50	95	70	130			
Methylene chloride		3.70	ug/L	0.50	74	70	130			
Naphthalene		3.70	ug/L	0.50	74	70	130			
n-Propylbenzene		4.64	ug/L	0.50	93	70	130			
Styrene		4.68	ug/L	0.50	94	70	130			
1,1,1,2-Tetrachloroethane		4.60	ug/L	0.50	92	70	130			
1,1,2,2-Tetrachloroethane		4.24	ug/L	0.50	85	70	130			
Tetrachloroethene		4.76	ug/L	0.50	95	70	130			
Toluene		4.76	ug/L	0.50	95	70	130			
1,2,3-Trichlorobenzene		3.98	ug/L	0.50	80	70	130			
1,2,4-Trichlorobenzene		4.40	ug/L	0.50	88	70	130			
1,1,1-Trichloroethane		4.60	ug/L	0.50	92	70	130			
1,1,2-Trichloroethane		4.08	ug/L	0.50	82	70	130			
Trichloroethene		4.64	ug/L	0.50	93	70	130			
Trichlorofluoromethane		5.52	ug/L	0.50	110	70	130			
1,2,3-Trichloropropane		4.08	ug/L	0.50	82	70	130			
1,2,4-Trimethylbenzene		4.84	ug/L	0.50	97	70	130			
1,3,5-Trimethylbenzene		4.80	ug/L	0.50	96	70	130			
Vinyl chloride		5.32	ug/L	0.50	106	70	130			
m+p-Xylenes		9.04	ug/L	0.50	90	70	130			
o-Xylene		4.92	ug/L	0.50	98	70	130			
Trihalomethanes, Total		17.2	ug/L	0.50	86	70	130			
Xylenes, Total		14.0	ug/L	0.50	93	70	130			
Surr: p-Bromofluorobenzene				0.50	101	70	130			
Surr: 1,2-Dichloroethane-d4				0.50	104	70	130			

**Qualifiers:**

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MDC - Minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E524.2</b> <span style="float: right;">Batch: R115740</span>										
<b>Lab ID: 060316_LCS_4</b>	65	Laboratory Control Sample								
Surr: Toluene-d8				0.50	102	70	130			Run: 1SATURN_160603A 06/03/16 11:06
<b>Lab ID: 060316_MBLK_7</b>	65	Method Blank								Run: 1SATURN_160603A 06/03/16 12:22
Benzene		ND	ug/L	0.50						
Bromobenzene		ND	ug/L	0.50						
Bromochloromethane		ND	ug/L	0.50						
Bromodichloromethane		ND	ug/L	0.50						
Bromoform		ND	ug/L	0.50						
Bromomethane		ND	ug/L	0.50						
n-Butylbenzene		ND	ug/L	0.50						
sec-Butylbenzene		ND	ug/L	0.50						
tert-Butylbenzene		ND	ug/L	0.50						
Carbon tetrachloride		ND	ug/L	0.50						
1,2-Dichloroethane		ND	ug/L	0.50						
Chlorobenzene		ND	ug/L	0.50						
Chlorodibromomethane		ND	ug/L	0.50						
Chloroethane		ND	ug/L	0.50						
Chloroform		ND	ug/L	0.50						
Chloromethane		ND	ug/L	0.50						
2-Chlorotoluene		ND	ug/L	0.50						
4-Chlorotoluene		ND	ug/L	0.50						
1,2-Dibromo-3-chloropropane		ND	ug/L	1.0						
Dibromomethane		ND	ug/L	0.50						
1,2-Dichlorobenzene		ND	ug/L	0.50						
1,3-Dichlorobenzene		ND	ug/L	0.50						
1,4-Dichlorobenzene		ND	ug/L	0.50						
Dichlorodifluoromethane		ND	ug/L	0.50						
1,1-Dichloroethane		ND	ug/L	0.50						
1,2-Dibromoethane		ND	ug/L	0.50						
1,1-Dichloroethene		ND	ug/L	0.50						
cis-1,2-Dichloroethene		ND	ug/L	0.50						
trans-1,2-Dichloroethene		ND	ug/L	0.50						
1,2-Dichloropropane		ND	ug/L	0.50						
1,3-Dichloropropane		ND	ug/L	0.50						
2,2-Dichloropropane		ND	ug/L	0.50						
1,1-Dichloropropene		ND	ug/L	0.50						
cis-1,3-Dichloropropene		ND	ug/L	0.50						
trans-1,3-Dichloropropene		ND	ug/L	0.50						
Ethylbenzene		ND	ug/L	0.50						
Hexachlorobutadiene		ND	ug/L	0.50						
Isopropylbenzene		ND	ug/L	0.50						
p-Isopropyltoluene		ND	ug/L	0.50						
Methyl tert-butyl ether (MTBE)		ND	ug/L	0.50						
Methylene chloride		ND	ug/L	0.50						

**Qualifiers:**

RL - Analyte reporting limit.

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MDC - Minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/17/16

Project: 10039 Sand Coulee

Work Order: H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E524.2</b>										Batch: R115740
<b>Lab ID: 060316_MBLK_7</b>	65	Method Blank								
						Run: 1SATURN_160603A				06/03/16 12:22
Naphthalene		ND	ug/L	0.50						
n-Propylbenzene		ND	ug/L	0.50						
Styrene		ND	ug/L	0.50						
1,1,1,2-Tetrachloroethane		ND	ug/L	0.50						
1,1,2,2-Tetrachloroethane		ND	ug/L	0.50						
Tetrachloroethene		ND	ug/L	0.50						
Toluene		ND	ug/L	0.50						
1,2,3-Trichlorobenzene		ND	ug/L	0.50						
1,2,4-Trichlorobenzene		ND	ug/L	0.50						
1,1,1-Trichloroethane		ND	ug/L	0.50						
1,1,2-Trichloroethane		ND	ug/L	0.50						
Trichloroethene		ND	ug/L	0.50						
Trichlorofluoromethane		ND	ug/L	0.50						
1,2,3-Trichloropropane		ND	ug/L	0.50						
1,2,4-Trimethylbenzene		ND	ug/L	0.50						
1,3,5-Trimethylbenzene		ND	ug/L	0.50						
Vinyl chloride		ND	ug/L	0.50						
m+p-Xylenes		ND	ug/L	0.50						
o-Xylene		ND	ug/L	0.50						
Trihalomethanes, Total		ND	ug/L	0.50						
Xylenes, Total		ND	ug/L	0.50						
Surr: p-Bromofluorobenzene				0.50	108	70	130			
Surr: 1,2-Dichloroethane-d4				0.50	117	70	130			
Surr: Toluene-d8				0.50	93	70	130			
<b>Lab ID: H16050548-001F</b>	65	Sample Duplicate								
						Run: 1SATURN_160603A				06/03/16 15:25
Benzene		ND	ug/L	0.50						20
Bromobenzene		ND	ug/L	0.50						20
Bromochloromethane		ND	ug/L	0.50						20
Bromodichloromethane		ND	ug/L	0.50						20
Bromoform		ND	ug/L	0.50						20
Bromomethane		ND	ug/L	0.50						20
n-Butylbenzene		ND	ug/L	0.50						20
sec-Butylbenzene		ND	ug/L	0.50						20
tert-Butylbenzene		ND	ug/L	0.50						20
Carbon tetrachloride		ND	ug/L	0.50						20
1,2-Dichloroethane		ND	ug/L	0.50						20
Chlorobenzene		ND	ug/L	0.50						20
Chlorodibromomethane		ND	ug/L	0.50						20
Chloroethane		ND	ug/L	0.50						20
Chloroform		ND	ug/L	0.50						20
Chloromethane		ND	ug/L	0.50						20
2-Chlorotoluene		ND	ug/L	0.50						20
4-Chlorotoluene		ND	ug/L	0.50						20

### Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MDC - Minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual	
<b>Method: E524.2</b>										Batch: R115740	
<b>Lab ID: H16050548-001F</b>	65 Sample Duplicate			Run: 1SATURN_160603A				06/03/16 15:25			
1,2-Dibromo-3-chloropropane		ND	ug/L	1.0						20	
Dibromomethane		ND	ug/L	0.50						20	
1,2-Dichlorobenzene		ND	ug/L	0.50						20	
1,3-Dichlorobenzene		0.0720	ug/L	0.50						20	
1,4-Dichlorobenzene		ND	ug/L	0.50						20	
Dichlorodifluoromethane		ND	ug/L	0.50						20	
1,1-Dichloroethane		ND	ug/L	0.50						20	
1,2-Dibromoethane		ND	ug/L	0.50						20	
1,1-Dichloroethene		ND	ug/L	0.50						20	
cis-1,2-Dichloroethene		ND	ug/L	0.50						20	
trans-1,2-Dichloroethene		ND	ug/L	0.50						20	
1,2-Dichloropropane		ND	ug/L	0.50						20	
1,3-Dichloropropane		ND	ug/L	0.50						20	
2,2-Dichloropropane		ND	ug/L	0.50						20	
1,1-Dichloropropene		ND	ug/L	0.50						20	
cis-1,3-Dichloropropene		ND	ug/L	0.50						20	
trans-1,3-Dichloropropene		ND	ug/L	0.50						20	
Ethylbenzene		ND	ug/L	0.50						20	
Hexachlorobutadiene		ND	ug/L	0.50						20	
Isopropylbenzene		ND	ug/L	0.50						20	
p-Isopropyltoluene		ND	ug/L	0.50						20	
Methyl tert-butyl ether (MTBE)		ND	ug/L	0.50						20	
Methylene chloride		ND	ug/L	0.50						20	
Naphthalene		ND	ug/L	0.50						20	
n-Propylbenzene		ND	ug/L	0.50						20	
Styrene		ND	ug/L	0.50						20	
1,1,1,2-Tetrachloroethane		ND	ug/L	0.50						20	
1,1,2,2-Tetrachloroethane		ND	ug/L	0.50						20	
Tetrachloroethene		ND	ug/L	0.50						20	
Toluene		0.167	ug/L	0.50						20	
1,2,3-Trichlorobenzene		ND	ug/L	0.50						20	
1,2,4-Trichlorobenzene		ND	ug/L	0.50						20	
1,1,1-Trichloroethane		ND	ug/L	0.50						20	
1,1,2-Trichloroethane		ND	ug/L	0.50						20	
Trichloroethene		ND	ug/L	0.50						20	
Trichlorofluoromethane		ND	ug/L	0.50						20	
1,2,3-Trichloropropane		ND	ug/L	0.50						20	
1,2,4-Trimethylbenzene		ND	ug/L	0.50						20	
1,3,5-Trimethylbenzene		ND	ug/L	0.50						20	
Vinyl chloride		ND	ug/L	0.50						20	
m+p-Xylenes		ND	ug/L	0.50						20	
o-Xylene		ND	ug/L	0.50						20	
Trihalomethanes, Total		ND	ug/L	0.50						20	
Xylenes, Total		ND	ug/L	0.50						20	

**Qualifiers:**

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MDC - Minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method:</b> E524.2										Batch: R115740
<b>Lab ID:</b> H16050548-001F	65	Sample Duplicate								Run: 1SATURN_160603A 06/03/16 15:25
Surr: p-Bromofluorobenzene				0.50	103	70	130			
Surr: 1,2-Dichloroethane-d4				0.50	104	70	130			
Surr: Toluene-d8				0.50	94	70	130			

**Qualifiers:**

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# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E525.2</b> <span style="float: right;">Batch: B_99793</span>										
<b>Lab ID: MB-99793</b>	25	Method Blank				Run: SUB-B262080			06/06/16 18:33	
Alachlor		ND	ug/L	0.10						
Aldrin		ND	ug/L	0.10						
Atrazine		ND	ug/L	0.10						
Benzo(a)pyrene		ND	ug/L	0.10						
Butachlor		ND	ug/L	0.10						
Chlordane		ND	ug/L	1.0						
di(2-ethylhexyl)Adipate		ND	ug/L	0.50						
di(2-ethylhexyl)Phthalate		ND	ug/L	0.60						
Dieldrin		ND	ug/L	0.10						
Endrin		ND	ug/L	0.10						
gamma-BHC (Lindane)		ND	ug/L	0.10						
Heptachlor		ND	ug/L	0.10						
Heptachlor epoxide		ND	ug/L	0.10						
Hexachlorobenzene		ND	ug/L	0.10						
Hexachlorocyclopentadiene		ND	ug/L	0.10						
Methoxychlor		ND	ug/L	0.10						
Metolachlor		ND	ug/L	0.10						
Metribuzin		ND	ug/L	0.10						
Propachlor		ND	ug/L	0.10						
Simazine		ND	ug/L	0.10						
Toxaphene		ND	ug/L	2.0						
Surr: 1,3-Dimethyl-2-nitrobenzene				0.10	99	70	130			
Surr: Perylene-d12				0.10	94	70	130			
Surr: Pyrene-d10				0.10	91	70	130			
Surr: Triphenylphosphate				0.10	108	70	130			
<b>Lab ID: LCS-99793</b>	23	Laboratory Control Sample				Run: SUB-B262080			06/06/16 19:51	
Alachlor		1.95	ug/L	0.10	98	70	130			
Aldrin		1.83	ug/L	0.10	92	70	130			
Atrazine		2.22	ug/L	0.10	111	70	130			
Benzo(a)pyrene		1.92	ug/L	0.10	96	70	130			
Butachlor		1.94	ug/L	0.10	97	70	130			
di(2-ethylhexyl)Adipate		2.13	ug/L	0.50	106	70	130			
di(2-ethylhexyl)Phthalate		2.18	ug/L	0.60	109	70	130			
Dieldrin		2.05	ug/L	0.10	102	70	130			
Endrin		1.96	ug/L	0.10	98	70	130			
gamma-BHC (Lindane)		2.01	ug/L	0.10	100	70	130			
Heptachlor		1.98	ug/L	0.10	99	70	130			
Heptachlor epoxide		1.90	ug/L	0.10	95	70	130			
Hexachlorobenzene		2.09	ug/L	0.10	104	70	130			
Hexachlorocyclopentadiene		1.93	ug/L	0.10	97	70	130			
Methoxychlor		2.05	ug/L	0.10	102	70	130			
Metolachlor		2.14	ug/L	0.10	107	70	130			
Metribuzin		1.74	ug/L	0.10	87	70	130			

**Qualifiers:**

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# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E525.2</b> <span style="float: right;">Batch: B_99793</span>										
<b>Lab ID: LCS-99793</b>	23	Laboratory Control Sample					Run: SUB-B262080			06/06/16 19:51
Propachlor		2.40	ug/L	0.10	120	70	130			
Simazine		2.12	ug/L	0.10	106	70	130			
Surr: 1,3-Dimethyl-2-nitrobenzene				0.10	102	70	130			
Surr: Perylene-d12				0.10	98	70	130			
Surr: Pyrene-d10				0.10	93	70	130			
Surr: Triphenylphosphate				0.10	109	70	130			
<b>Lab ID: CLD-99793</b>	5	Laboratory Control Sample					Run: SUB-B262080			06/06/16 21:47
Chlordane		20.7	ug/L	1.0	103	70	130			
Surr: 1,3-Dimethyl-2-nitrobenzene				0.10	100	70	130			
Surr: Perylene-d12				0.10	94	70	130			
Surr: Pyrene-d10				0.10	93	70	130			
Surr: Triphenylphosphate				0.10	116	70	130			
<b>Lab ID: B16060259-001FMS</b>	23	Sample Matrix Spike					Run: SUB-B262080			06/06/16 20:29
Alachlor		3.90	ug/L	0.20	98	70	130			
Aldrin		3.54	ug/L	0.20	89	70	130			
Atrazine		4.56	ug/L	0.20	114	70	130			
Benzo(a)pyrene		3.76	ug/L	0.20	94	70	130			
Butachlor		3.86	ug/L	0.20	97	70	130			
di(2-ethylhexyl)Adipate		3.82	ug/L	1.0	96	70	130			
di(2-ethylhexyl)Phthalate		3.98	ug/L	1.2	100	70	130			
Dieldrin		3.78	ug/L	0.20	94	70	130			
Endrin		3.36	ug/L	0.20	84	70	130			
gamma-BHC (Lindane)		3.94	ug/L	0.20	99	70	130			
Heptachlor		3.60	ug/L	0.20	90	70	130			
Heptachlor epoxide		3.80	ug/L	0.20	95	70	130			
Hexachlorobenzene		3.96	ug/L	0.20	99	70	130			
Hexachlorocyclopentadiene		3.38	ug/L	0.20	84	70	130			
Methoxychlor		3.94	ug/L	0.20	99	70	130			
Metolachlor		4.38	ug/L	0.20	109	70	130			
Metribuzin		3.96	ug/L	0.20	99	70	130			
Propachlor		4.50	ug/L	0.20	113	70	130			
Simazine		4.34	ug/L	0.20	108	70	130			
Surr: 1,3-Dimethyl-2-nitrobenzene				0.20	101	70	130			
Surr: Perylene-d12				0.20	96	70	130			
Surr: Pyrene-d10				0.20	99	70	130			
Surr: Triphenylphosphate				0.20	113	70	130			
<b>Lab ID: B16060259-001FMSD</b>	23	Sample Matrix Spike Duplicate					Run: SUB-B262080			06/06/16 21:08
Alachlor		4.00	ug/L	0.20	100	70	130	2.5	40	
Aldrin		3.72	ug/L	0.20	93	70	130	5.0	40	
Atrazine		4.38	ug/L	0.20	109	70	130	4.0	40	
Benzo(a)pyrene		4.16	ug/L	0.20	104	70	130	10	40	
Butachlor		4.04	ug/L	0.20	101	70	130	4.6	40	

**Qualifiers:**

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# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E525.2</b>										
Batch: B_99793										
<b>Lab ID:</b>	<b>B16060259-001FMSD</b>	23	Sample Matrix Spike Duplicate							
						Run: SUB-B262080				06/06/16 21:08
di(2-ethylhexyl)Adipate		4.26	ug/L	1.0	106	70	130	11		40
di(2-ethylhexyl)Phthalate		4.48	ug/L	1.2	112	70	130	12		40
Dieldrin		3.42	ug/L	0.20	86	70	130	10		40
Endrin		3.56	ug/L	0.20	89	70	130	5.8		40
gamma-BHC (Lindane)		4.08	ug/L	0.20	102	70	130	3.5		40
Heptachlor		4.04	ug/L	0.20	101	70	130	12		40
Heptachlor epoxide		3.84	ug/L	0.20	96	70	130	1.0		40
Hexachlorobenzene		3.98	ug/L	0.20	100	70	130	0.5		40
Hexachlorocyclopentadiene		3.62	ug/L	0.20	91	70	130	6.9		40
Methoxychlor		4.28	ug/L	0.20	107	70	130	8.3		40
Metolachlor		4.14	ug/L	0.20	103	70	130	5.6		40
Metribuzin		3.90	ug/L	0.20	98	70	130	1.5		40
Propachlor		4.70	ug/L	0.20	118	70	130	4.3		40
Simazine		4.28	ug/L	0.20	107	70	130	1.4		40
Surr: 1,3-Dimethyl-2-nitrobenzene				0.20	102	70	130			
Surr: Perylene-d12				0.20	100	70	130			
Surr: Pyrene-d10				0.20	95	70	130			
Surr: Triphenylphosphate				0.20	113	70	130			

**Qualifiers:**

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# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual	
<b>Method: E525.2</b>								Analytical Run: B_R262080			
<b>Lab ID: 525_CCV_5</b>	23	Continuing Calibration Verification Standard									06/06/16 15:18
Alachlor		1.91	ug/L	0.10	96	70	130				
Aldrin		1.97	ug/L	0.10	99	70	130				
Atrazine		2.26	ug/L	0.10	113	70	130				
Benzo(a)pyrene		2.08	ug/L	0.10	104	70	130				
Butachlor		1.89	ug/L	0.10	95	70	130				
di(2-ethylhexyl)Adipate		2.11	ug/L	0.50	105	70	130				
di(2-ethylhexyl)Phthalate		2.15	ug/L	0.60	107	70	130				
Dieldrin		1.94	ug/L	0.10	97	70	130				
Endrin		2.24	ug/L	0.10	112	70	130				
gamma-BHC (Lindane)		2.00	ug/L	0.10	100	70	130				
Heptachlor		1.99	ug/L	0.10	100	70	130				
Heptachlor epoxide		1.98	ug/L	0.10	99	70	130				
Hexachlorobenzene		2.09	ug/L	0.10	104	70	130				
Hexachlorocyclopentadiene		1.96	ug/L	0.10	98	70	130				
Methoxychlor		2.21	ug/L	0.10	110	70	130				
Metolachlor		1.92	ug/L	0.10	96	70	130				
Metribuzin		2.01	ug/L	0.10	100	70	130				
Propachlor		2.07	ug/L	0.10	103	70	130				
Simazine		2.26	ug/L	0.10	113	70	130				
Surr: 1,3-Dimethyl-2-nitrobenzene				0.10	102	70	130				
Surr: Perylene-d12				0.10	85	70	130				
Surr: Pyrene-d10				0.10	90	70	130				
Surr: Triphenylphosphate				0.10	108	70	130				
<b>Lab ID: CLD_CCV_5</b>	5	Continuing Calibration Verification Standard									06/06/16 16:36
Chlordane		19.6	ug/L	1.0	98	70	130				
Surr: 1,3-Dimethyl-2-nitrobenzene				0.10	104	70	130				
Surr: Perylene-d12				0.10	89	70	130				
Surr: Pyrene-d10				0.10	87	70	130				
Surr: Triphenylphosphate				0.10	109	70	130				
<b>Lab ID: TOX_CCV_5</b>	5	Continuing Calibration Verification Standard									06/06/16 17:15
Toxaphene		41.6	ug/L	2.0	104	70	130				
Surr: 1,3-Dimethyl-2-nitrobenzene				0.10	102	70	130				
Surr: Perylene-d12				0.10	87	70	130				
Surr: Pyrene-d10				0.10	94	70	130				
Surr: Triphenylphosphate				0.10	110	70	130				

**Qualifiers:**

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# QA/QC Summary Report

Prepared by Helena, MT Branch

Client: MT DEQ-Abandoned Mines

Report Date: 06/17/16

Project: 10039 Sand Coulee

Work Order: H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E531.1</b>								Analytical Run: C_R212499		
<b>Lab ID: CCV</b>	11 Continuing Calibration Verification Standard							06/08/16 03:28		
Aldicarb		8.1	ug/L	0.40	101	80	120			
Aldicarb sulfone		8.2	ug/L	0.40	102	80	120			
Aldicarb sulfoxide		7.4	ug/L	0.40	93	80	120			
Carbaryl		8.3	ug/L	0.40	103	80	120			
Carbofuran		8.2	ug/L	0.40	102	80	120			
3-Hydroxycarbofuran		8.0	ug/L	0.40	100	80	120			
Methiocarb		8.4	ug/L	0.40	104	80	120			
Methomyl		8.1	ug/L	0.40	101	80	120			
Oxamyl		8.0	ug/L	0.40	100	80	120			
Baygon		7.7	ug/L	0.40	97	80	120			
Surr: BDMC				0.40	100	70	130			
<b>Method: E531.1</b>								Batch: C_R212499		
<b>Lab ID: H16050548-001G</b>	11 Sample Matrix Spike					Run: SUB-C212499		06/07/16 21:28		
Aldicarb		9.3	ug/L	0.40	116	65	135			
Aldicarb sulfone		9.0	ug/L	0.40	113	65	135			
Aldicarb sulfoxide		8.4	ug/L	0.40	105	65	135			
Carbaryl		9.2	ug/L	0.40	116	65	135			
Carbofuran		9.1	ug/L	0.40	114	65	135			
3-Hydroxycarbofuran		8.9	ug/L	0.40	112	65	135			
Methiocarb		9.2	ug/L	0.40	115	65	135			
Methomyl		9.0	ug/L	0.40	113	65	135			
Oxamyl		8.8	ug/L	0.40	110	65	135			
Baygon		8.8	ug/L	0.40	110	65	135			
Surr: BDMC				0.40	110	70	130			
<b>Lab ID: H16050548-001G</b>	11 Sample Matrix Spike Duplicate					Run: SUB-C212499		06/07/16 22:20		
Aldicarb		9.0	ug/L	0.40	112	65	135	3.2	20	
Aldicarb sulfone		9.2	ug/L	0.40	116	65	135	2.5	20	
Aldicarb sulfoxide		8.5	ug/L	0.40	107	65	135	1.7	20	
Carbaryl		8.9	ug/L	0.40	111	65	135	3.7	20	
Carbofuran		8.8	ug/L	0.40	110	65	135	3.0	20	
3-Hydroxycarbofuran		9.0	ug/L	0.40	112	65	135	0.4	20	
Methiocarb		8.9	ug/L	0.40	111	65	135	3.4	20	
Methomyl		9.0	ug/L	0.40	113	65	135	0.2	20	
Oxamyl		9.0	ug/L	0.40	113	65	135	2.3	20	
Baygon		8.6	ug/L	0.40	107	65	135	2.1	20	
Surr: BDMC				0.40	104	70	130	0.0	20	
<b>Lab ID: LCS</b>	11 Laboratory Control Sample					Run: SUB-C212499		06/07/16 18:54		
Aldicarb		8.6	ug/L	0.40	107	80	120			
Aldicarb sulfone		8.1	ug/L	0.40	101	80	120			
Aldicarb sulfoxide		7.3	ug/L	0.40	92	80	120			
Carbaryl		8.7	ug/L	0.40	108	80	120			
Carbofuran		8.5	ug/L	0.40	106	80	120			

### Qualifiers:

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# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E531.1</b> <span style="float: right;">Batch: C_R212499</span>										
<b>Lab ID: LCS</b>	11	Laboratory Control Sample					Run: SUB-C212499			06/07/16 18:54
3-Hydroxycarbofuran		8.0	ug/L	0.40	100	80	120			
Methiocarb		9.0	ug/L	0.40	112	80	120			
Methomyl		8.0	ug/L	0.40	100	80	120			
Oxamyl		7.8	ug/L	0.40	98	80	120			
Baygon		8.2	ug/L	0.40	102	80	120			
Surr: BDMC				0.40	107	70	130			
<b>Lab ID: MBLK</b> <span style="float: right;">Run: SUB-C212499 06/07/16 19:45</span>										
	11	Method Blank								
Aldicarb		ND	ug/L	0.40						
Aldicarb sulfone		ND	ug/L	0.40						
Aldicarb sulfoxide		ND	ug/L	0.40						
Carbaryl		ND	ug/L	0.40						
Carbofuran		ND	ug/L	0.40						
3-Hydroxycarbofuran		ND	ug/L	0.40						
Methiocarb		ND	ug/L	0.40						
Methomyl		ND	ug/L	0.40						
Oxamyl		ND	ug/L	0.40						
Baygon		ND	ug/L	0.40						
Surr: BDMC				0.40	96	70	130			

**Qualifiers:**

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# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E900.0</b>								Batch: C_GrDW-0853		
<b>Lab ID: Th230-GrDW-0853</b>	Laboratory Control Sample			Run: SUB-C212517			06/10/16 14:46			
Gross Alpha		95	pCi/L	95		80	120			
<b>Lab ID: MB-GrDW-0853</b>	3	Method Blank		Run: SUB-C212517			06/10/16 14:46			
Gross Alpha		0.3	pCi/L							U
Gross Alpha precision (±)		0.9	pCi/L							
Gross Alpha MDC		1.0	pCi/L							
<b>Lab ID: C16060041-001DMS</b>	Sample Matrix Spike			Run: SUB-C212517			06/10/16 14:46			
Gross Alpha		130	pCi/L	105		70	130			
<b>Lab ID: C16060041-001DMSD</b>	Sample Matrix Spike Duplicate			Run: SUB-C212517			06/10/16 14:46			
Gross Alpha		110	pCi/L	90		70	130	13	20	

**Qualifiers:**

RL - Analyte reporting limit.

MDC - Minimum detectable concentration

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U - Not detected at minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E903.0</b>								Batch: C_RA226DW-0410		
<b>Lab ID: LCS-RA226DW-0410</b>	Laboratory Control Sample			Run: SUB-C212561			06/13/16 14:33			
Radium 226	10	pCi/L	99	90	110					
<b>Lab ID: MB-RA226DW-0410</b>	3	Method Blank		Run: SUB-C212561			06/13/16 14:33			
Radium 226	0.1	pCi/L								U
Radium 226 precision (±)	0.1	pCi/L								
Radium 226 MDC	0.1	pCi/L								
<b>Lab ID: H16050548-001I</b>	Sample Matrix Spike			Run: SUB-C212561			06/13/16 14:33			
Radium 226	25	pCi/L	108	80	120					
<b>Lab ID: H16050548-001I</b>	Sample Matrix Spike Duplicate			Run: SUB-C212561			06/13/16 14:33			
Radium 226	20	pCi/L	88	80	120	22	20			R

- Duplicate RPD is outside of the acceptance range for this analysis. However, the RER of 1.8 is less than the limit of 2.0. This batch is approved.

### Qualifiers:

RL - Analyte reporting limit.

MDC - Minimum detectable concentration

U - Not detected at minimum detectable concentration

ND - Not detected at the reporting limit.

R - RPD exceeds advisory limit.



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: RA-05</b>								Batch: C_RA228DW-0407		
<b>Lab ID:</b> LCS-228-RA228DW-0	Laboratory Control Sample			Run: SUB-C212516			06/10/16 12:17			
Radium 228		7.3	pCi/L	86		80	120			
<b>Lab ID:</b> MB-228-RA228DW-04	3	Method Blank		Run: SUB-C212516			06/10/16 12:17			
Radium 228		1	pCi/L							
Radium 228 precision (±)		0.6	pCi/L							
Radium 228 MDC		0.5	pCi/L							
<b>Lab ID:</b> C16050822-001MMS	Sample Matrix Spike			Run: SUB-C212516			06/10/16 12:17			
Radium 228		14	pCi/L	86		70	130			
<b>Lab ID:</b> C16050822-001MMSD	Sample Matrix Spike Duplicate			Run: SUB-C212516			06/10/16 12:17			
Radium 228		13	pCi/L	83		70	130	2.1	52	

**Qualifiers:**

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MDC - Minimum detectable concentration



# QA/QC Summary Report

Prepared by Helena, MT Branch

**Client:** MT DEQ-Abandoned Mines

**Report Date:** 06/17/16

**Project:** 10039 Sand Coulee

**Work Order:** H16050548

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method:</b> SW6020										Analytical Run: SUB-C212460
<b>Lab ID:</b> ICV		Initial Calibration Verification Standard								06/08/16 16:27
Uranium		0.0495	mg/L	0.00030	99	90	110			
<b>Lab ID:</b> ICSA		Interference Check Sample A								06/08/16 16:33
Uranium		0.000223	mg/L	0.00030						
<b>Lab ID:</b> ICSAB		Interference Check Sample AB								06/08/16 16:39
Uranium		1.29E-05	mg/L	0.00030						

**Qualifiers:**

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MDC - Minimum detectable concentration





# Work Order Receipt Checklist

MT DEQ-Abandoned Mines

H16050548

Login completed by: Tracy L. Lorash

Date Received: 5/31/2016

Reviewed by: BL2000\rwilliams

Received by: TLL

Reviewed Date: 6/2/2016

Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on all shipping container(s)/cooler(s)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on all sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Applicable <input type="checkbox"/>
Container/Temp Blank temperature:	3.4°C Blue Ice		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Not Applicable <input type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Applicable <input type="checkbox"/>

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## 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.

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## Contact and Corrective Action Comments:

No sample ID or collection date and time on COC. Logged in with ID, date and time from bottles.  
One vial for Volatile Organics analysis contains headspace gas bubble(s) greater than 1/4 inch in diameter for sample 524. Headspace was 1 inch. tl 5/31/16 Per T. Henderson the results/invoice are to be sent to the DEQ. wj 6/6/16





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College Station, TX 888.690.2218 • Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

# BOTTLE ORDER 20873



## SHIPPED TO: Hydrometrics Inc

Contact: Ashton

3020 Bozeman Ave  
Helena MT 59601

Phone:

Project: Sand Coulee 10039

Order Created by: Wanda Johnson

Shipped From: Helena, MT

Ship Date: 5/25/2016

VIA: Hand Del

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
<b>Domestic Suite-Companies</b>							
500 mL Plastic	1	A2510 B	Conductivity			Alkalinity: Bicarbonate, Carbonate.	1
		A2320 B	Alkalinity			Anions by Ion Chromatography:	
		A4500-H B	pH	0.24 hrs		Chloride, Sulfate.	
		A2540 C	Solids, Total Dissolved				
		E300.0	Anions by Ion Chromatography				
250 mL Plastic	1	E353.2	Nitrogen, Nitrate + Nitrite		<input type="checkbox"/> H2SO4		1
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Drinking Water		<input checked="" type="checkbox"/> HNO3	Hardness-Calcium, Magnesium, Sodium & Potassium	1

## Phase 2/5 Complete

250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Drinking Water		<input checked="" type="checkbox"/> HNO3	Phase II: Barium, Cadmium, Chromium, Mercury, Selenium. Phase V: Antimony, Beryllium, Nickel, Thallium. Other: Arsenic	1
250 mL Plastic	1	E353.2	Nitrogen, Nitrate + Nitrite		<input type="checkbox"/> H2SO4		1
250 mL Plastic	1	A4500-F C	Fluoride				1
40 mL Clear Glass VOA	3	E524.2	524-Purgeable Organics, SDWA		<input checked="" type="checkbox"/> HCL	Do Not Rinse, Contains Additive Zero headspace	1
1 Liter Amber Glass Narrow Mouth	2	E525.2	525-Semi-Volatile Organic Compounds, MT List		<input checked="" type="checkbox"/> HCL	Do Not Rinse - Contains Additive	1

40 mL Clear Glass VOA	2	E531.1	Pesticides, Carbarnates SDWA		Do Not Rinse - Contains Additive	1
250 mL Amber Glass	1	E515.4	515.4-Herbicides, Chlorinated SDWA		Do Not Rinse - Contains Additive	1

**RAD-DW**

1 Gallon Plastic	1	E200.8	Total Uranium	<input checked="" type="checkbox"/> HNO3		1
		E900.0	Gross Alpha, Gross Beta			
		E903.0	Radium 226, Total			
		RA-05	Radium 228, Total			
		E900.0	Gross Alpha Calculated			
		A7500-RA	Radium 226 + Radium 228			

**Trip Blank 524 DW**

40 mL Clear Glass VOA	1	E524.2	524-Purgeable Organics, SDWA	<input checked="" type="checkbox"/> HCL	Trip Blank. Do not open, return with cooler. Zero headspace	1
-----------------------	---	--------	------------------------------	---	---	---

HNO3 - Nitric Acid     H2SO4 - Sulfuric Acid     NaOH - Sodium Hydroxide    **We strongly suggest that the samples are shipped the same day as they are collected.**  
 ZnAc - Zinc Acetate     HCl - Hydrochloric Acid     H3PO4 - Phosphoric Acid  
**Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets**  
**Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.**  
 Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

**APPENDIX D**

**PRELIMINARY ASSESSMENT FORM  
FOR GROUNDWATER UNDER THE DIRECT  
INFLUENCE OF SURFACE WATER**

# MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Metcalf Building 1520 East Sixth Avenue P.O. Box 200901 Helena, MT 59620-0901

## PRELIMINARY ASSESSMENT WORKSHEET

Preliminary Assessment of Ground Water Sources that may be Under the Direct Influence of Surface Water

<b>PWS System and Source Facility Information</b>			
<b>PWS Name:</b>	SAND COULEE WATER DISTRICT	<b>PWS ID#:</b> <small>(MT000nnnn)</small>	MT000325
<b>Type (C, NTNC, NC):</b>	C	<b>County:</b>	CASCADE
<b>Source Facility Name:</b>	WELL 6 - MADISON AQUIFER	<b>SDWIS Facility ID:</b> <small>(WL00n,SP00n,IG00n)</small>	<b>Date:</b> <small>(m/d/yy)</small>
			160
			7/22/16

<b>COMPUTE PA SCORE</b> Mark (X) ONE option that applies and enter option index pts at right	<b>Points</b>
<b>A. TYPE OF STRUCTURE</b>	
Spring (40) ___      Horizontal Well (40) ___      Well (0) <b>X</b>	<b>0</b>
<b>B. HISTORICAL PATHOGENIC ORGANISM CONTAMINATION:</b> History or suspected outbreak of Giardia, or other pathogenic organisms associated with surface water, with current system configuration.	
Yes (40) ___      No (0) <b>X</b>	<b>0</b>
<b>C. HISTORICAL MICROBIOLOGICAL CONTAMINATION:</b>	
I) Record of <b>acute</b> (boil order or fecal positive sample) MCL violations of the Total Coliform Rule during the last 3 years. <b>Number of violations:</b>	
None (0) <b>X</b> One (5) ___      Two (10) ___      Three (15) ___	<b>0</b>
II) Record of <b>non-acute</b> (two coliform positive samples in one month) MCL violations of the Total Coliform Rule during the last 3 years. <b>Number of violations:</b>	
None or One (0) <b>X</b> Two (5) ___      Three (10) ___      Turbidity Complaints (DEQ verified) (5) ___	<b>0</b>
<b>D. HYDROLOGICAL FEATURES:</b> Horizontal distance between surface water & source.	
> 250 ft (0) <b>X</b> 175 - 250 ft (10) ___      100 - 174 ft (20) ___      < 100 ft (40) ___	<b>0</b>
<b>E. WELL SEAL:</b> Poorly constructed well (uncased, or annular space not sealed to depth of at least 18 feet below land surface), or casing construction is unknown.	
Yes (15) ___      No (0) <b>X</b>	<b>0</b>
<b>F. WELL INTAKE CONSTRUCTION:</b> In wells tapping unconfined or semi-confined aquifers, the depth below land surface to top of perforated interval or screen is:	
>100 ft (0) <b>X</b> 50-100 ft (5) ___      25-49 ft (10) ___      0-24 ft (15) ___      Unkn (15) ___	<b>0</b>
<b>G. STATIC WATER LEVEL:</b> In wells tapping unconfined or semi-confined aquifers, the depth to static water level below land surface is:	
>100 ft (0) <b>X</b> 50-100 ft (5) ___      25-49 ft (10) ___      0-24 ft (15) ___      Unkn (15) ___	<b>0</b>
<b>H. WELL CAP CONSTRUCTION:</b> Poor sanitary seal, or seal without acceptable material.	
Yes (15) ___      No (0) <b>X</b>	<b>0</b>
<b>TOTAL PA SCORE</b> (Right click in cell to right and select Update Field.)	<b>0</b>

Continued other side ...

**PRELIMINARY ASSESSMENT WORKSHEET (continued)**

<b>I. PRELIMINARY ASSESSMENT DETERMINATION</b>	<b>Mark (X) ONE</b>
<b>1. PASS:</b> Source is not under the direct influence of surface water.	<b>X</b>
<b>2. FAIL:</b> Well must undergo further GWUDISW analysis.	—
<b>3. FAIL:</b> Spring, must undergo further GWUDISW analysis.	—
<b>4. FAIL:</b> Well or horizontal well less than 100 feet from surface water, <b>must undergo further GWUDISW analysis.</b>	—
<b>5. FAIL:</b> Well <b>will</b> PASS if well construction deficiencies (section E or F) are repaired.	—
<b>6. FAIL:</b> Well <b>may</b> PASS if well construction details (section E, F, or G) become available.	—

<b>ANALYST INFORMATION AND COMMENTS</b>	
NAME:	GREG BRYCE
AFFILIATION:	Hydrometrics, Inc.
<b>COMMENTS</b>	

**Electronic Entry Instructions:** Open the WORD document template (DOT) as a WORD document (DOC) with an appropriate name and location. The document is protected from all edits other than form entry. Enter the requested information in the form fields and tab forward between fields. All character entries will be converted to upper case. In the Compute PA Score table for questions A through H, mark with an X the one option which applies to each, then enter the score corresponding to that option in the field to the right under the Points column. When scores A-H have been entered right click on the Total PA Score field and select Update Field. The total score will be computed. Select the PA Determination option by marking with an X. Fill out the Analyst Information and Comments table. Save the document with your entries.

**APPENDIX E**

**REDUNDANT WELL CONSTRUCTION NOTICE**



# REDUNDANT WELL CONSTRUCTION NOTICE

FOR REDUNDANT WELLS IN A PUBLIC WATER SUPPLY SYSTEM AS DEFINED IN 75-6-102.

- WATER RIGHTS:** Attach copies of the existing water rights for the public water supply system.
- WELL LOG:** Attach copies of the existing well log(s) and the well log for the redundant well.
- MAP:** Attach a map showing the redundant well location.

**FILING FEE: \$50.00**

### FOR DEPARTMENT USE ONLY

NOTICE No. \_\_\_\_\_ BASIN \_\_\_\_\_  
 DATE RECEIVED \_\_\_\_\_ TIME \_\_\_\_\_ AM / PM  
 REC'D BY \_\_\_\_\_  
 FEE REC'D \$ \_\_\_\_\_  
 CHECK No. \_\_\_\_\_  
 PAYOR \_\_\_\_\_  
 Refund \$ \_\_\_\_\_ Date \_\_\_\_\_

### IMPORTANT NOTICE

The flow rate and volume of all wells, including redundant wells cannot exceed the flow rate or volume authorized by the water rights for the public water supply system.

1. **PUBLIC WATER SUPPLY SYSTEM NAME** Sand Coulee Water District  
 Mailing Address P.O. Box 97  
 City Sand Coulee State Montana Zip 59472  
 Home Phone (406)-736-5103 Daytime Phone (406)-590-5183

2. **REDUNDANT WELL LOCATION**  
NE 1/4 NE 1/4 SE 1/4 Section 14 Twp 19N N / S Rge 04E E / W County Cascade  
 Lot NA Block NA Tract No. NA Subdivision Name NA  
 Government Lot No. NA  
 Street or Road Address, including City, State & Zip Code of the Development NA

### 3. CHECK THE BOX THAT CORRECTLY ANSWERS EACH QUESTION:

- Yes  No Is the redundant well withdrawing water from the same ground water source as the original well(s)?
- Yes  No Is the redundant well required by a state or federal agency?

### 4. AFFIDAVIT

I affirm that statements appearing here are to the best of my knowledge true and correct.

Authorized Signature Kent E. Luoma Date 9-27-16  
 \_\_\_\_\_ Date \_\_\_\_\_

State of Montana  
 County of CASCADE

Signed or acknowledged before me on 27 Sept 2016 by Kent E. Luoma  
 Notary's Signature Rhonda M. Umphres  
 Notary's Name (Printed) Rhonda M. Umphres  
 Notary public for the State of MONTANA  
 Residing at Stockett  
 My commission expires 29 May 2018

