



2017 Annual Groundwater Monitoring and Corrective Action Report

Scrubber Pond and Temporary Storage Area

Lewis & Clark Station

Sidney, Montana

Prepared for
Montana Dakota Utilities

January 2018

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Acronyms

Acronym	Description
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
FGD	Flue-Gas Desulfurization
MDU	Montana Dakota Utilities
SSI	Statistically Significant Increase
TSP	Temporary Storage Pad

1.0 Introduction

Montana-Dakota Utilities Co. (MDU) owns and operates Lewis & Clark Station, a coal-fired generation unit near Sidney, Montana (Figure 1). Two coal combustion residuals (CCR) surface impoundments and a CCR pile, as defined by 40 CFR 257.53, are situated at the property. The surface impoundments are named the East and West Scrubber Ponds. The Scrubber Ponds are used to store sluiced flue-gas desulfurization (FGD) solids. The CCR pile is located on a temporary storage pad (TSP) where FGD solids (excavated from the Scrubber Ponds) are stored and allowed to dry prior to loading and hauling for disposal.

The locations of the Scrubber Ponds and TSP are shown on Figure 1. The groundwater monitoring system is a multiunit groundwater monitoring system, as allowed in §257.91 (d). It is not feasible to install a separate groundwater monitoring system for each CCR unit. This 2017 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) describes the monitoring program and results for the Scrubber Ponds and TSP at MDU's Lewis & Clark Station (Site).

1.1 Purpose

As stated in Section §257.90(e), the purpose of the Annual Report is to:

- Document the status of monitoring and corrective action program for the CCR unit
- Summarize key actions completed
- Describe any problems encountered
- Discuss actions to resolve the problems
- Highlight key activities for the upcoming year

1.2 Status of the Groundwater Monitoring and Corrective Action Program.

Baseline monitoring was completed prior to October 17, 2017. The detection monitoring program was initiated by October 17, 2017. The evaluation of groundwater monitoring data for statistically significant increases over background levels for the constituents listed in Appendix III from the CCR Rule began by October 17, 2017.

1.3 CCR Rule Requirements

This Annual Report has been prepared in accordance with the requirements of §257.90(e) of the CCR Rule, as outlined in the following Table 1.

Table 1 CCR Rule Requirements

CCR Rule Reference	Content Required in Report	Location
§257.90(e)(1)	Map showing the CCR unit and all monitoring wells that are part of the groundwater monitoring system	Section 2.1.1 Documentation; see Figure 1
§257.90(e)(2)	Discuss any new or decommissioned monitoring wells	Section 2.1.2 Changes to Monitoring System
§257.90(e)(3)	Provide the number and date groundwater samples were collected, and the monitoring data (i.e., detection or assessment)	Section 2.2 Monitoring and Analytical Results
§257.90(e)(4)	Discuss any transition between monitoring programs	Section 2.2 Monitoring and Analytical Results
§257.90(e)(5)	Other information specified in §257.90 through §257.98	Other information not required in this report

2.0 Groundwater Monitoring and Corrective Action Program

This section documents the status of the groundwater monitoring and corrective action program for the CCR unit for the period starting with the effective date of the Rule through the end of 2017. The groundwater monitoring system is described in Section 2.1, the monitoring and analytical results are described in Section 2.2, key actions completed and problems encountered are described in Section 2.3, and key activities planned for 2018 are described in Section 2.4.

2.1 Groundwater Monitoring System

2.1.1 Documentation

Figure 1 shows an aerial image of the CCR units and all background (or upgradient) and downgradient monitoring wells in the groundwater monitoring system, including the well identification numbers, that are part of the groundwater monitoring program, as required by §257.90(e)(1). Further details on the groundwater monitoring system for the CCR unit monitoring wells are included in Groundwater Monitoring System Certification Report, Lewis & Clark Station (Barr, 2017a).

2.1.2 Changes to Monitoring System

The groundwater monitoring system was unchanged in 2017.

2.2 Monitoring and Analytical Results

CCR Rule provisions §257.90(e)(3) and §257.94(b) require collection of eight independent samples to establish background water quality for the detection monitoring program. A total of 56 (seven monitoring wells and eight sampling events) groundwater samples were collected and analyzed for the constituents listed in Appendices III and IV (Part 257) before October 17, 2017. Dates of sampling are reported on the field data sheets and analytical laboratory reports in Appendix A.

The monitoring program transitioned from baseline monitoring to detection monitoring by October 17, 2017.

2.3 Key Actions Completed/Problems Encountered

The following key actions were completed for the groundwater monitoring program through 2017:

- Baseline monitoring groundwater samples were collected and analyzed for the constituents listed in Appendices III and IV from the CCR Rule.
- One round of detection monitoring samples were collected and analyzed for the constituents listed in Appendix III from the CCR Rule.

No problems were encountered during the report period.

2.4 Key Activities for Upcoming Year

The following key groundwater monitoring program activities are planned for 2018:

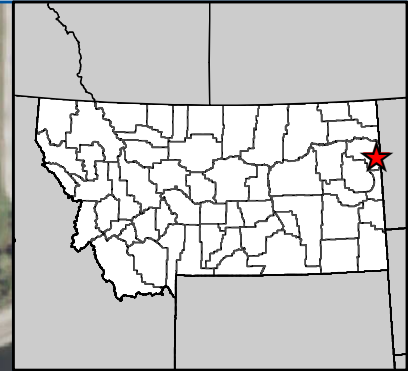
- Install a new monitoring well and abandon monitoring well MW-102. The proposed monitoring well will be located downgradient of the CCR units in a location allowed by the CCR rule.
- Evaluate analytical results from detection monitoring events for statistically significant increases (SSIs) according to the Statistical Method Selection Certification (Barr, 2017b).
- Continue the groundwater monitoring program in accordance with the CCR rule.

3.0 References

Barr, 2017a, Groundwater Monitoring System Certification, Prepared for Montana Dakota Utilities Company. October 2017.

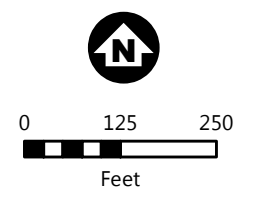
Barr, 2017b, Statistical Method Selection Certification, Prepared for Montana Dakota Utilities Company. October 2017.

Figures



- Upgradient Monitoring Well
- Downgradient Monitoring Well
- Scrubber Ponds
- Temporary Storage Pad (TSP)

Privileged & Confidential
Attorney-Client Work Product
Prepared in Anticipation for Litigation



SITE LOCATION
Lewis and Clark Station
Montana-Dakota Utilities Co.
Richland County, Montana

FIGURE 1

Appendices

Appendix A

Laboratory Reports and Field Sheets



CASE NARRATIVE – AMENDED 16 JUN 16

MVTL Lab Reference No/SDG: 201682-0770
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – March 2016 Event
MVTL Laboratory Identifications: 16-W590 through 16-W600
Page 1 of 2

Table with 2 columns: MDU Sample Identification, MVTL Laboratory #. Rows include MW110, MW119, MW210, MW102, MW118, MW111, MW117, Dup 1, Field Blank (FB), MW103, MW109.

- I. RECEIPT
• All samples were received at the laboratory on 1 April 2016 at 0800.
• Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
• Samples were received on ice and evidence of cooling had begun.
• All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
• No other exceptions on sample receipt were encountered on this sample set unless noted here.

- I. HOLDING TIMES
• With the exception of laboratory pH, all holding times were met for both preparation and analysis unless noted here.

- II. METHODS
• Approved methodology was followed for all sample analyses.
• Methods 6010D and Method 6020B were used to analyze the metals.



CASE NARRATIVE – AMENDED 16 JUN 16

MVTl Lab Reference No/SDG: 201682-0770
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – March 2016 Event
MVTl Laboratory Identifications: 16-W590 through 16-W600
Page 2 of 2

III. ANALYSIS

- All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted here and/or flagged on the individual analytical laboratory report.
For some metals, the reported results were elevated due to instrument performance at the lower limit of quantitation (LLOQ).
For some metals, the reported results were elevated due to additional dilutions required to minimize the effects of sample matrix.
One selenium matrix spike duplicate recovery was outside the acceptable limits. Recovery for the matrix spike was acceptable. RPD for the matrix spike and matrix spike recoveries was within limits. No further action was taken.

IV. REPORTING

- Per email from Barr Engineering upon review of the data package, on 16 Jun 2016, the case narrative was amended to include the narrative regarding one matrix spike duplicate recovery that was outside the acceptance limits. In addition, sample reports for MW111 and MW117 were amended due to changes on the field data sheets. Lastly, the QC report was amended to include the LCS information for dissolved lithium.

All laboratory data has been approved by MVTl Laboratories.

SIGNED: Claudette Carroll DATE: 16 JUN 16
Claudette Carroll - MVTl Bismarck Laboratory Manager



June 15, 2016

Montana Dakota Utilities
Attn: Samantha Marshall
400 N. 4th St.
Bismarck, ND 58501

RE: Groundwater Sampling Event - March 2016 at MDU Lewis & Clark Site

Dear Ms. Marshall:

It was brought to my attention by BARR Eng. that well MW117 (sampled on March 31, 2016) temp., cond, and pH on the chain of custody (COC) did not match the sampling readings on the field sheets, but were rather the final field readings before recharge. Also the sampled date of March 31, 2016 on the COC for well MW111 was incorrect, the field sheet notes sampling on March 30, 2016 which is the correct sample date. After my review of the chain of custody and field sheets I found that the above transcription errors to be true and made corrections to the chain of custody and field data report.

Please see the attached items with corrections and the MW117 and MW111 field sheets.

If you have any questions, please call me at (701) 391-4900.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeremy Meyer", is written over a light blue horizontal line.

Jeremy Meyer
MVTL Field Services



MVTL Laboratories Inc.
FIELD DATA REPORT

MDU Lewis and Clark

Quarterly CCR Sampling

Attn: Samantha Marshall
400 North 4th St
Bismarck, ND 58501

WO# 82-0770
82-0771

WELL ID	PURGE DATE	START PURGE TIME	SAMPLE DATE	TIME OF SAMPLE	WATER LEVEL START (FT)	TOTAL DEPTH (FT)	WATER LEVEL END (FT)	VOLUME IN WELL (Liters)	VOLUME REMOVED (mL)	SAMPLE METHOD	FIELD READINGS			SAMPLE APPEARANCE
											TEMP (°C)	EC	pH	
MW110	30-Mar-16	10:41	30-Mar-16	12:06	10.11	16.95	10.22	4.2	8500.0	Bladder	7.62	971	7.43	clear
MW119	30-Mar-16	13:10	30-Mar-16	13:55	9.96	16.65	10.05	4.1	4500.0	Bladder	7.80	998	7.84	clear
MW210	30-Mar-16	15:57	30-Mar-16	17:17	10.18	35.43	11.59	15.6	8000.0	Bladder	9.26	1408	7.71	clear
MW102	30-Mar-16	18:22	30-Mar-16	19:12	19.92	24.74	20.23	3.0	5000.0	Bladder	9.03	6064	7.01	clear
MW118*	5-Apr-16	11:10	5-Apr-16	13:10	9.23	11.90	9.23	1.6	12000.0	Bladder	8.32	1634	8.01	clear
MW111 ⁺	30-Mar-16	8:52	30-Mar-16	8:57	8.47	17.80	8.50	5.7	6500.0	Bladder	6.53	3037	7.36	clear
MW117 [#]	31-Mar-16	7:28	31-Mar-16	18:09	6.29	11.52	10.98	3.2	6500.0	Bladder	7.39	7038	7.49	clear
MW103	31-Mar-16	16:17	31-Mar-16	17:07	11.46	21.15	11.49	6.0	5000.0	Bladder	8.12	1514	7.47	clear
MW109	31-Mar-16	13:34	31-Mar-16	15:14	11.30	17.05	11.34	3.5	10000.0	Bladder	7.42	1631	7.41	clear
MW101	NA	NA	30-Mar-16	10:22	10.04	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW103	NA	NA	30-Mar-16	10:20	11.15	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW105	NA	NA	30-Mar-16	10:12	9.55	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW106	NA	NA	30-Mar-16	10:08	10.13	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW107	NA	NA	30-Mar-16	10:25	4.96	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW108	NA	NA	30-Mar-16	10:04	17.38	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW109	NA	NA	30-Mar-16	10:15	11.33	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW116	NA	NA	30-Mar-16	10:00	11.24	NA	NA	NA	NA	WL	NA	NA	NA	Water Level

*Well MW118 was resampled on 5 Apr 16 due to the pump moving on 31 Mar 16 which caused the water to become unstable. See field sheets for further detail.

Well MW117 field readings were found to be incorrect and were updated on 15 June 2016.

Well MW111 had the incorrect date and was changed to the correct date of 30 March 2016



2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
 Event: March
 Sample ID: MW103
 Sampling Personal: Parren Niesavaag

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
116	1647	8.23	1521	7.46	0.67	93.3	6.69	11.49	500	clear
127	1652	8.06	1516	7.47	0.39	97.5	4.84	11.49	500	clear
138	1657	8.12	1515	7.47	0.37	98.1	3.99	11.49	500	clear
149	1702	8.11	1514	7.47	0.37	98.4	3.74	11.49	500	clear
150	1707	8.12	1514	7.47	0.36	100.1	3.65	11.49	500	clear
16										
17										
18										
19										
20										
21										
22										
23										
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25										
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27										
28										
29										
30										

Stabilized: Yes No
 Comments:

Total Volume Removed: 5000 mL



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark (MDU L&C)

Sample ID: *MW111 MW 09

Date: 31 March 16

Sampling Personal: Darren Nieswang

Weather Conditions: Temp: 49 °F Wind: W 15-20 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	<input checked="" type="radio"/> No
Well Labeled?	<input checked="" type="radio"/> Yes	No
Casing Straight?	<input checked="" type="radio"/> Yes	No
Grout Seal Intact?	Yes	<input checked="" type="radio"/> No Not Visible
Repairs Necessary:		
Casing Diameter:	2"	
Water Level Before Purge:	11.30	Ft
Well Depth:	17.05	Ft
Well Volume:	3.6	Liters
Water Level After Sample:	11.34	Ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Sampling Method:	SS Geosub	Bailer	Peristaltic	<input checked="" type="radio"/> Bladder	Whale	Grab	
Other:							
Dedicated Equipment?	Yes	<input checked="" type="radio"/> No					
Duplicate Sample?	Yes	<input checked="" type="radio"/> No ID: —					
Pumping Rate:	100	ml/min					
Time Purging Began:	1334	* am / pm 1334 *31 March 16 on					
Time of Sampling:	1514	am / pm					
Well Purged Dry?	Yes	<input checked="" type="radio"/> No					
Time Purged Dry:	—	am / pm					
Sample Appearance:	<input checked="" type="radio"/> Clear	<input type="radio"/> Slightly Turbid			<input type="radio"/> Turbid		Phase: —
Color:	—	Odor: —					

Field Measurements

SEQ #	Time	Temp	Cond.	pH	DO mg/L	ORP mV	Turbidity	water level	Liters Removed	Appearance
1	1339	8.46	1800	7.46	1.88	92.3	59.8	11.34	500	clear
2	1344	7.83	1718	7.40	0.37	90.6	84.3	11.34	500	clear
3	1349	7.62	1673	7.40	0.44	93.0	79.4	11.34	500	clear
4	1354	7.92	1664	7.40	0.27	94.0	80.3	11.34	500	clear
5	1359	7.97	1667	7.40	0.44	92.8	70.6	11.34	500	clear

Stabilized: Yes No

Total Liters Removed: _____

Bottles Collected

- ~~250 mL H₂SO₄~~ 31 March 16 on
- 500 mL HNO₃
- 500 mL HNO₃ (Filtered)
- 1 Liter Raw
- 4 Liter HNO₃

Comments: Continued on next page



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: Nash

Sample ID: MW 109

Sampling Personal: Darren Nisswaag

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
146	1404	7.72	1652	7.40	0.28	92.1	54.8	11.34	500	clear
147	1409	7.47	1603	7.41	0.66	43.4	52.5	11.34	500	clear
148	1414	7.56	1632	7.40	0.41	40.5	56.3	11.34	500	clear
149	1419	8.11	1620	7.40	0.45	51.6	51.9	11.34	500	clear
1510	1424	7.45	1616	7.40	0.20	44.7	46.2	11.34	500	clear
1811	1429	7.47	1633	7.40	0.26	48.7	35.0	11.34	500	clear
1712	1434	7.54	1630	7.40	0.17	47.7	35.0	11.34	500	clear
1813	1439	7.67	1633	7.40	0.15	46.2	27.1	11.34	500	clear
1914	1444	7.71	1634	7.40	0.16	45.2	17.5	11.34	500	clear
2015	1449	7.45	1637	7.41	0.15	42.0	13.1	11.34	500	clear
2116	1454	7.42	1630	7.40	0.15	40.9	10.3	11.34	500	clear
2217	1459	7.36	1630	7.41	0.15	39.6	7.77	11.34	500	clear
2318	1504	7.38	1634	7.41	0.16	38.2	7.58	11.34	500	clear
2419	1509	7.41	1630	7.40	0.16	36.5	7.43	11.34	500	clear
2520	1514	7.42	1631	7.41	0.15	33.8	7.20	11.34	500	clear
26										
27										
28										
29										
30										

Stabilized: Yes No

Total Volume Removed: 10,000 mL

Comments:



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: March

Sample ID: MW110

Sampling Personal: Barren Nieswang

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	1136	7.63	971	7.43	2.13	197.4 197.4	15.2	10.22	500	clear
12	1141	7.63	971	7.42	2.13	196.6	15.7	10.22	500	clear
13	1146	7.63	971	7.40	2.11	194.6	13.4	10.22	500	clear
14	1151	7.63	972	7.41	2.10	194.4	14.0	10.22	500	clear
15	1156	7.61	971	7.44	2.08	193.0	11.8	10.22	500	clear
16	1201	7.69	971	7.44	2.08	191.5	12.4	10.22	500	clear
17	1206	7.62	971	7.43	2.10	189.6	12.3	10.22	500	clear
18										
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29										
30										

Stabilized: Yes No

Total Volume Removed: 8500 mL

Comments:



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: March
Sample ID: MW119
Sampling Personal: Darren Nieswaag

Weather Conditions: Temp: 53 °F Wind: WS Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	9.96	ft	
Total Well Depth:	16.65	ft	
Well Volume:	4.2	liters	
Depth to Top of Pump:	11.80	ft	
Water Level After Sample:	10.05	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder	Control Settings		
Sampling Method:	Bladder	Purge:	3	sec.
Dedicated Equip?:	No	Recover:	55	sec.
Duplicate Sample?:	Yes	PSI:	70	
Duplicate Sample ID:	DUP-1			
Pumping Rate:	100 ml/min			
Purge Date:	30 March 16	Time Purging Began:	1310	am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/>	Time Purged Dry:	—	am/pm
Sample Date:	30 March 16	Time of Sampling:	1355	am/pm
Sample Appearance:	Visibility	Color	Odor	Phase
	Clear	—	—	—

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
1	1315	8.27	978	7.84	1.84	158.4	16.0	10.05	500	Clear
2	1320	7.78	985	7.84	1.64	133.5	18.6	10.05	500	Clear
3	1325	7.63	992	7.84	1.57	104.8	12.2	10.05	500	Clear
4	1330	7.76	997	7.83	1.64	96.2	10.9	10.05	500	Clear
5	1335	7.67	998	7.84	1.70	95.8	6.96	10.05	500	Clear
6	1340	7.55	997	7.85	1.72	96.3	5.75	10.05	500	Clear
7	1345	7.52	997	7.84	1.75	97.2	4.05	10.05	500	Clear
8	1350	7.57	997	7.84	1.80	98.2	4.17	10.05	500	Clear
9	1355	7.80	998	7.84	1.80	99.1	4.11	10.05	500	Clear
10										

Stabilized: Yes No
Comments:

Total Volume Removed: 4500 mL

Bottle List:

- 500 mL Nitric
- 500 mL Nitric (filtered)
- 1 Liter Raw
- 4 - 1 Liter Nitric
- 30 March 16
- DN



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: March

Sample ID: MW210

Sampling Personal: Darren Nieswag

30 March 16

Weather Conditions: Temp: 62 °F Wind: W 5-10 Precip: Sunny / Partly Cloudy (Cloudy)

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Not Visible
Repairs Necessary:		
Casing Diameter:	2"	
Water Level Before Purge:	10.18	ft
Total Well Depth:	35.43	ft
Well Volume:	15.6	liters
Depth to Top of Pump:	30.46	ft
Water Level After Sample:	11.59	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder	Control Settings		
Sampling Method:	Bladder	Purge:	34	sec.
Dedicated Equip?:	No	Recover:	50756	sec.
Duplicate Sample?:	no	PSI:	20	
Duplicate Sample ID:				
Pumping Rate:	100 ml/min			
Purge Date:	30 March 16	Time Purging Began:	1557	am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Time Purged Dry:		am/pm
Sample Date:	30 March 16	Time of Sampling:	1717	am/pm
Sample Appearance:	Visibility	Color	Odor	Phase
	Clear	—	—	—

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
1	1602	9.22	1407	7.72	1.93	179.1	106	10.46	500	Clear
2	1607	9.36	1410	7.72	2.80	171.2	155	10.91	500	Clear
3	1612	9.34	1409	7.71	1.15	165.5	130	11.27	500	Clear
4	1617	9.38	1411	7.70	1.08	172.1	153	11.52	500	Clear
5	1622	9.30	1412	7.70	1.00	171.0	73.4	11.56	500	Clear
6	1627	9.36	1408	7.71	1.06	169.0	48.6	11.56	500	Clear
7	1632	9.34	1409	7.70	0.91	167.1	47.1	11.58	500	Clear
8	1637	9.36	1410	7.73	0.86	168.0	32.6	11.58	500	Clear
9	1642	9.35	1409	7.71	0.80	166.2	30.3	11.59	500	Clear
10	1647	9.30	1409	7.71	0.77	164.8	27.5	11.59	500	Clear

Bottle List:
500 mL Nitric
500 mL Nitric (filtered)
1 Liter Raw
4 - 1 Liter Nitric
30 March 16
DN

Stabilized: Yes ~~No~~

Total Volume Removed: — mL

Comments:

Continued on next page

** 10.91 water level Line 2
30 March 16
DN*



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: March

Sample ID: MW210

Sampling Personal: Darren Nicksaas

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	1652	9.32	1409	7.72	0.71	162.5	23.0	11.59	500	clear
12	1657	9.36	1409	7.72	0.68	161.0	18.7	11.59	500	clear
13	1702 1702	9.35	1409	7.72	0.68	158.9 158.9	17.2	11.59	500	clear
14	1707	9.28	1408	7.71	0.69	155.9	14.2	11.59	500	clear
15	1712	9.26	1408	7.72	0.67	152.8	13.9	11.59	500	clear
16	1717 1717	9.26	1408	7.71	0.65	150.8	13.1	11.59	500	clear
17	1717	9.26 9.26								
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Stabilized: Yes No

Total Volume Removed: 5000 mL

Comments:

*20 March 16



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: March

Sample ID: MW102

Sampling Personal: *Darren Wisniewski*

Weather Conditions: Temp: 48 °F Wind: W 5-10 Precip: Sunny / Partly Cloudy / **Cloudy**

Well Information

Well Locked?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Casing Straight?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<i>30 March 16</i>
Grout Seal Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<u>Not Visible</u>
Repairs Necessary:		
Casing Diameter:	<u>2"</u>	
Water Level Before Purge:	<u>19.92</u>	ft
Total Well Depth:	<u>24.74</u>	ft
Well Volume:	<u>3.0</u>	liters
Depth to Top of Pump:	<i>30 March 16</i> <u>21.36</u>	ft
Water Level After Sample:	<u>20.23</u>	ft
Measurement Method:	<u>Electric Water Level Indicator</u>	

Sampling Information

Purging Method:	<u>Bladder</u>	Control Settings	
Sampling Method:	<u>Bladder</u>	Purge:	<u>4</u> sec.
Dedicated Equip?:	<u>No</u>	Recover:	<u>56</u> sec. <i>30 March 16</i>
Duplicate Sample?:	<u>No</u>	PSI:	<u>15-20</u>
Duplicate Sample ID:	<u>---</u>		
Pumping Rate:	<u>100</u> ml/min		
Purge Date:	<u>30 March 16</u>	Time Purging Began:	<u>1822</u> am/pm
Well Purged Dry?	<u>Yes</u> <input checked="" type="checkbox"/> No <input type="checkbox"/>	Time Purged Dry:	<u>---</u> am/pm
Sample Date:	<u>30 March 16</u>	Time of Sampling:	<u>1912</u> am/pm
Sample Appearance:	Visibility <u>Clear</u>	Color <u>---</u>	Odor <u>---</u> Phase <u>---</u>

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
1	1827	9.64	5994	6.95	0.52	152.0	6.4	20.18	500	Clear
2	1832	9.14	6010	6.97	0.80	116.9	36.9	20.18	500	Clear
3	1837	9.12	6023	6.99	0.65	80.2	24.8	20.21	500	Clear
4	1842	9.15	6028	6.99	0.51	71.2	24.7	20.22	500	Clear
5	1847	9.12	6049	7.00	0.42	61.6	12.9	20.23	500	Clear
6	1852	9.10	6066	7.00	0.35	54.2	8.41	20.23	500	Clear
7	1857	9.08	6074	7.01	0.30	49.8	6.51	20.23	500	Clear
8	1902	9.02	6077	7.01	0.25	46.2	5.40	20.23	500	Clear
9	1907	9.02	6073	7.01	0.23	43.4	4.99	20.23	500	Clear
10	1912	9.03	6064	7.01	0.23	41.1	5.31	20.23	500	Clear

Bottle List:

- 500 mL Nitric
- 500 mL Nitric (filtered)
- 1 Liter Raw
- 4* - 1 Liter Nitric *30 March 16*

Stabilized: Yes No

Total Volume Removed: 5000 mL

Comments:

**30 March 16*



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: March
Sample ID: MW118
Sampling Personal: Darren Nieswady

Weather Conditions: Temp: 4.5 °F Wind: W 5-10 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Not Visible
Repairs Necessary:		
Casing Diameter:	2"	
Water Level Before Purge:	9.21	ft
Total Well Depth:	9.21 / 11.90	ft
Well Volume:	11.9 / 1.7	liters
Depth to Top of Pump:	9.90	ft
Water Level After Sample:	9.23	ft
Measurement Method:	Electric Water Level Indicator	

31 March 16 on
31 March 16 on

Sampling Information

Purging Method:	Bladder	Control Settings	
Sampling Method:	Bladder	Purge:	3 sec.
Dedicated Equip?:	No	Recover:	57 sec.
Duplicate Sample?:	No	PSI:	10-15
Duplicate Sample ID:			
Pumping Rate:	100 ml/min		
Purge Date:	31 March 16	Time Purging Began:	1102 am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Time Purged Dry:	
Sample Date:	31 March 16	Time of Sampling:	1227 am/pm
Sample Appearance:	Visibility	Color	Odor
	Clear		

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
1	1107	7.92	1638	8.06	3.28	162.9	869	9.21	500	Turbid
2	1112	7.16	1599	8.11	2.19	153.2	532	9.21	500	Turbid
3	1117	6.95	1573	8.16	1.77	141.9	361	9.22	500	Slightly Turbid
4	1122	6.86	1552	8.19	1.67	132.6	140	9.23	500	Slightly turbid
5	1127	6.76	1540	8.21	1.43	119.4	81.3	9.23	500	clear
6	1132	6.70	1533	8.20	1.31	105.9	44.6	9.23	500	clear
7	1137	6.67	1530	8.22	1.34	91.2	28.6	9.23	500	clear
8	1142	6.62	1530	8.21	1.20	77.3	22.0	9.23	500	clear
9	1147	6.56	1532	8.22	1.13	47.4	17.7	9.23	500	clear
10	1152	6.53	1537	8.20	1.14	31.7	13.9	9.23	500	clear

31 March 16 on

- Bottle List:
- 500 mL Nitric
 - 500 mL Nitric (filtered)
 - 1 Liter Raw
 - 4 - 1 Liter Nitric
- 31 March 16 on*

Stabilized: Yes No

Total Volume Removed: mL

Comments:

Continued on next page

pump moved a little bit when changing bottles. There will be 2 bottles a little bit turbid.



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: March

Sample ID: mw 118

Sampling Personal: Darren Nieswang

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	1157	6.47	1540	8.19	1.10	16.5	10.1	9.23	500	Clear
12	1202	6.47	1544	8.18	1.09	2.2	6.61	9.23	500	Clear
13	1207	6.42	1547	8.17	1.08	-7.5	6.37	9.23	500	Clear
14	1212	6.58	1556	8.16	1.08	-7.0	5.18	9.23	500	Clear
15	1217	6.51	1558	8.16	1.09	-28.2	4.96	9.23	500	Clear
16	1222	6.53	1565	8.13	1.10	-25.5	4.81	9.23	500	Clear
17	1227	6.51	1568	8.13	1.10	-33.4	4.95	9.23	500	Clear
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Stabilized: Yes No

Total Volume Removed: 8500 mL

Comments:



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: March
Sample ID: MW111
Sampling Personal: Damen Niswaga

Weather Conditions: Temp: 39 °F Wind: W5 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input checked="" type="radio"/> No <input type="radio"/>	
Well Labeled?	Yes <input checked="" type="radio"/> No <input type="radio"/>	
Casing Straight?	<input checked="" type="radio"/> Yes <input type="radio"/> No	
Grout Seal Intact?	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Visible	
Repairs Necessary:		
Casing Diameter:	<u>2"</u>	
Water Level Before Purge:	<u>8.47</u>	ft
Total Well Depth:	<u>17.80</u>	ft
Well Volume:	<u>5.8</u>	liters
Depth to Top of Pump:	<u>12.56</u>	ft
Water Level After Sample:	<u>8.50</u>	ft
Measurement Method:	<u>Electric Water Level Indicator</u>	

Sampling Information

Purging Method:	<u>Bladder</u>	Control Settings	
Sampling Method:	<u>Bladder</u>	Purge:	<u>4</u> sec.
Dedicated Equip?:	<u>No</u>	Recover:	<u>56</u> sec.
Duplicate Sample?:	<u>NO</u>	PSI:	<u>10-15</u>
Duplicate Sample ID:	<u>---</u>		
Pumping Rate:	<u>100</u> ml/min		
Purge Date:	<u>30 March 16</u>	Time Purging Began:	<u>0852</u> am/pm
Well Purged Dry?:	<u>Yes</u> <input checked="" type="radio"/> No <input type="radio"/>	Time Purged Dry:	<u>---</u> am/pm
Sample Date:	<u>30 March 16</u>	Time of Sampling:	<u>0957</u> am/pm
Sample Appearance:	Visibility <u>clear</u>	Color <u>-</u>	Odor <u>-</u> Phase <u>-</u>

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
1	0857	7.47	3842	7.10	5.38	181.6	32.0	8.49	500	clear
2	0902	7.18	3823	7.09	0.94	151.3	40.5	8.50	500	clear
3	0907	7.04	3748	7.11	0.58	144.6	41.9	8.50	500	clear
4	0912	6.77	3355	7.22	1.70	144.5	23.5	8.50	500	clear
5	0917	6.73	3240	7.26	2.04	144.8	22.7	8.50	500	clear
6	0922	6.70	3113	7.30	2.45	147.0	26.5	8.50	500	clear
7	0927	6.58	3071	7.33	2.72	150.2	16.6	8.50	500	clear
8	0932	6.54	3052	7.34	2.88	153.5	9.53	8.50	500	clear
9	0937	6.56	3043	7.34	2.98	156.3	8.27	8.50	500	clear
10	0942	6.40	3033	7.35	3.00	159.1	6.55	8.50	500	clear

Stabilized: Yes No

Total Volume Removed: 5000 mL

Comments:

Bottle List:

- 500 mL Nitric
 - 500 mL Nitric (filtered)
 - 1 Liter Raw
 - 4 1 Liter Nitric
- 30 March 16
DN

Continued on next page



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: March

Sample ID: MW11

Sampling Personal: Darren Nieswaag

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	0847	6.71	3036	7.35	3.10	161.4	5.26	8.50	500	clear
12	0852	6.52	3030	7.36	3.13	162.8	4.99	8.50	500	clear
13	0857	6.53	3037	7.36	3.20	163.7	5.04	8.50	500	clear
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Stabilized: Yes No

Total Volume Removed: 6500 mL

Comments: (circled)



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: March
Sample ID: MW117
Sampling Personal: Daren Nieswaag

Weather Conditions: Temp: 40 °F Wind: W 10-15 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Not Visible
Repairs Necessary:		
Casing Diameter:	2"	
Water Level Before Purge:	6.29	ft
Total Well Depth:	11.52	ft
Well Volume:	3.3	liters
Depth to Top of Pump:	-	ft
Water Level After Sample:	10.98	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder	Control Settings	
Sampling Method:	Bladder	Purge:	3 sec.
Dedicated Equip?:	No	Recover:	57 sec.
Duplicate Sample?:	NO	PSI:	10-15
Duplicate Sample ID:			
Pumping Rate:	100 ml/min	31 March 16 ON	
Purge Date:	31 March 16	Time Purging Began:	0728 am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Time Purged Dry:	0833 am/pm
Sample Date:	31 March 16	Time of Sampling:	1809 am/pm
Sample Appearance:	Visibility	Color	Odor
	Clear	-	-
			Phase
			-

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
1	0733	4.55	7137	7.33	12.17	224.6	38.4	6.60	500	Clear
2	0738	4.50	7011	7.35	11.19	200.7	34.7	6.94	500	Clear
3	0743	4.46	6856	7.37	10.72	192.7	35.9	7.10	500	Clear
4	0748	4.45	6850	7.37	9.91	191.1	48.6	7.44	500	Clear
5	0753	4.42	6920	7.34	9.95	199.2	56.9	7.66	500	Clear
6	0758	4.46	6960	7.34	9.88	210.3	76.0	7.87	500	Clear
7	0803	4.55	7006	7.33	9.72	210.0	97.0	7.91	500	Clear
8	0808	4.64	7119	7.32	9.43	206.7	113.0	8.18	500	Clear
9	0813	5.13	7287	7.35	9.48	206.5	44.5	8.33	500	Clear
10	0818	5.06	7266	7.34	9.53	206.8	43.3	8.54	500	Clear

Bottle List:
500 mL Nitric
500 mL Nitric (filtered)
1 Liter Raw
3 # 2 - 1 Liter Nitric
31 March 16 ON

Total Volume Removed: _____ mL

Filtered: Yes No



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: March
Sample ID: MW117
Sampling Personal: Parren Nieswaga

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	0823	5.03	7233	7.33	9.51	207.7	18.8	8.82	500	Clear
12	0828	5.01	7147	7.34	9.46	205.9	8.13	9.10	500	Clear
13	0833	5.09	7119	7.35	9.58	203.9	3.57	9.15	500	clear
14								top of pump		
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29	<i>almost on</i>									
30	081809	7.39	7038	7.49	8.28	189.2	18.9	8.11	—	recharge

Stabilized: Yes No

Total Volume Removed: 6500 mL

Comments:



Field Datasheet

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Water Level

Sampling Personnel:

Darren Niesowag

Company:

MDU Lewis and Clark

Well ID	Date	Time	Depth to Water	Comments
MW101	30 March 16	1022	10.04	
MW103	30 March 16	1020	11.45	
MW105	30 March 16	1012	9.55	
MW106	30 March 16	1008	10.13	
MW107	30 March 16	1025	4.96	
MW108	30 March 16	1004	17.38	
MW109	30 March 16	1015	11.33	
MW116	30 March 16	1000	11.24	

MVTL Calibration Worksheet

Site: MDU Lewis & Clark

Technician: Parren Nieswaag

Date: <u>30 March 16</u>		Time: <u>0557</u>						
Instrument (Circle One):		pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
#1 650 MDS 08F100203		Buffer 7	<u>16.50</u>	<u>7.02</u>	<u>7.00</u>	6.95-7.05	<u>20.4</u>	0 +/- 50
#2 650 MDS 04H14736		Buffer 10	<u>16.54</u>	<u>10.06</u>	<u>10.00</u>	9.95-10.05	<u>-167.6</u>	-180 +/- 50
<u>#3 556 MPS 12E102056</u>		Conductivity	Temp °C	Pre Cal	Post Cal	Post Cal Range		
Other:		Buffer 1413	<u>16.56</u>	<u>1460</u>	<u>1414</u>	1387-1426		
Comments:		ORP	Temp °C	Pre Cal	Post Cal	Post Cal Range		
<u>Calibrated DO out in the field</u>		231 mV @ 25C	<u>16.32</u>	<u>310.4</u>	<u>256.8</u>	±10 mV		
		DO	Temp °C	Pre Cal	Post Cal	Post Cal Range	Barometric Pressure (mm Hg)	
			<u>16.47</u>	<u>9.28</u>	<u>8.94</u>	mg/L	<u>706.7</u>	

Date: <u>31 March 16</u>		Time: <u>0626</u>						
Instrument (Circle One):		pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
#1 650 MDS 08F100203		Buffer 7	<u>19.48</u>	<u>6.98</u>	<u>7.00</u>	6.95-7.05	<u>19.4</u>	0 +/- 50
#2 650 MDS 04H14736		Buffer 10	<u>19.55</u>	<u>9.99</u>	<u>10.00</u>	9.95-10.05	<u>-197.7</u>	-180 +/- 50
<u>#3 556 MPS 12E102056</u>		Conductivity	Temp °C	Pre Cal	Post Cal	Post Cal Range		
Other:		Buffer 1413	<u>19.55</u>	<u>1383</u>	<u>1413</u>	1387-1426		
Comments:		ORP	Temp °C	Pre Cal	Post Cal	Post Cal Range		
		231 mV @ 25C	<u>19.62</u>	<u>249.0</u>	<u>257.0</u>	±10 mV		
		DO	Temp °C	Pre Cal	Post Cal	Post Cal Range	Barometric Pressure (mm Hg)	
			<u>19.93</u>	<u>6.42</u>	<u>8.42</u>	mg/L	<u>709.4</u>	



Laboratories, Inc.

2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name: MDU Lewis and Clark CCR Groundwater March Event				Name of Sampler(s): <i>Darren Nieswaag</i>			
Report To: MDU Attn: Samantha Marshall Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-222-7829				Carbon Copy: Attn: Address:			
				Work Order Number: 82-0770			

Sample Information						Bottle Type				Field Parameters			Analysis
Lab Number	Sample ID	Date	Time	Sample Type	Gradient	500 ml HNO ₃	1 liter	500 ml HNO ₃ (filtered)	500mL	Field Temperature °C	Field Spec. Cond.	Field pH	Analysis Required
W590	MW110	30 March 16	1206	GW	Up	X	X	X		7.62	971	7.43	MDU CCR List with TSS and Dissolved CCR Metals. No RadChem. <i>Temp: 7.39 Spec Cond: 7038 pH: 7.49</i>
W591	MW119	30 March 16	1355	GW	Up	X	X	X		7.80	998	7.84	
W592	MW210	30 March 16	1717	GW	Up	X	X	X		9.26	1408	7.71	
W593	MW102	30 March 16	1912	GW	Down	X	X	X		9.03	6064	7.01	
W594	MW118	31 March 16	1227	GW	Down	X	X	X		6.51	1568	8.13	
W595	MW111 <i>30 March 16</i>	31 March 16	0857	GW	Down	X	X	X		6.53	3037	7.36	
W596	MW117	31 March 16	1809	GW	Down	X	X	X		5.09	7119	7.35	
W597	Dup 1	30 March 16	NA	W		X	X	X		NA	NA	NA	
W598	Field Blank (FB)	31 March 16	NA	W		X	X	X	2	NA	NA	NA	

Comments: * 15 June 16 Jeremy Meyer
Corrections made by Jeremy Meyer on 15 June 16 *J. Meyer*

	Transferred by:	Sample Condition	Date/Time	Received by:	Sample Condition	Date/Time	°C
1	<i>John Meyer</i>	Log in	1 April 16 0758	C. Jackson		1 April 16 0800	3.2°C
2							TM588
3							



Laboratories, Inc.

2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name:				Name of Sampler(s):			
MDU	Lewis and Clark	CCR Groundwater	March Event	<i>Parren Niesnaas</i>			
Report To: MDU			Carbon Copy:			Work Order Number:	
Attn: Samantha Marshall			Attn:			82-0770	
Address: 400 N. 4th St			Address:				
Bismarck, ND 58501							
Phone: 701-222-7829							

Sample Information						Bottle Type			Field Parameters			Analysis			
Lab Number	Sample ID	Date	Time	Sample Type	Gradient	500 ml HNO ₃	1 liter	500 ml HNO ₃ (filtered)			Field Temperature °C	Field Spec. Cond.	Field pH	Analysis Required	
W599	MW103	31 March 16	1707	GW		X	X	X			8.12	9574	7.47	MDU CCR List with TSS and Dissolved CCR Metals. No RadChem.	
W600	MW109	31 March 16	1514	GW		X	X	X			7.42	1631	7.41		

Comments:

	Transferred by:	Sample Condition	Date/Time	Received by:	Sample Condition	Date/Time	°C
1	<i>Parren Niesnaas</i>	Log in	1 April 16 0958	C. Jackson		1 April 16 0800	3.2°C
2							TM588 ROZ
3							CJ @ 1 April 16



MINNESOTA VALLEY TESTING LABORATORIES, INC.

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Quality Control Report

Lab IDs: 16-W590 to 16-W600

Project: CCR Groundwater/March Event

Work Order: 201682-0770

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Antimony - Dissolved mg/l	0.1000	105	80-120	0.100	16-W599QC	0.0043	0.1054	101	75-125	0.1054	0.1104	106	4.6	20	-	-	< 0.001
				0.100	16-W702QC	< 0.001	0.1043	104	75-125	0.1043	0.1096	110	5.0	20	-	-	
Antimony - Total mg/l	0.1000	96	80-120	0.400	16-W556	< 0.001	0.4142	104	75-125	0.4142	0.4140	104	0.0	20	-	-	< 0.001
				0.400	16-W575	< 0.001	0.4210	105	75-125	0.4210	0.4062	102	3.6	20	-	-	
				0.400	16-W592	< 0.001	0.3924	98	75-125	0.3924	0.4060	102	3.4	20	-	-	
				0.400	16-W600	0.0044	0.4178	103	75-125	0.4178	0.4208	104	0.7	20	-	-	
				0.400	16-W615	< 0.001	0.4014	100	75-125	0.4014	0.4122	103	2.7	20	-	-	
Arsenic - Dissolved mg/l	0.1000	107	80-120	0.100	16-W599QC	0.0040	0.1087	105	75-125	0.1087	0.1108	107	1.9	20	-	-	< 0.002
				0.100	16-W702QC	< 0.002	0.1138	114	75-125	0.1138	0.1114	111	2.1	20	-	-	
Arsenic - Total mg/l	0.1000	98	80-120	0.400	16-W554	< 0.01	0.4124	103	75-125	0.4124	0.4022	101	2.5	20	-	-	< 0.002
				0.400	16-W556	< 0.01	0.4180	104	75-125	0.4180	0.4050	101	3.2	20	-	-	
				0.400	16-W575	< 0.01	0.4198	105	75-125	0.4198	0.4220	106	0.5	20	-	-	
				0.400	16-W592	< 0.01	0.4000	100	75-125	0.4000	0.4056	101	1.4	20	-	-	
				0.400	16-W600	< 0.01	0.4314	108	75-125	0.4314	0.4150	104	3.9	20	-	-	
				0.400	16-W615	< 0.01	0.3986	100	75-125	0.3986	0.3882	97	2.6	20	-	-	
Barium - Dissolved mg/l	0.1000	110	80-120	0.100	16-W599QC	0.0220	0.1270	105	75-125	0.1270	0.1325	110	4.2	20	-	-	< 0.002
				0.100	16-W702QC	0.0315	0.1322	101	75-125	0.1322	0.1338	102	1.2	20	-	-	
Barium - Total mg/l	0.1000	101	80-120	0.400	16-W592	0.0298	0.4430	103	75-125	0.4430	0.4428	103	0.0	20	-	-	< 0.002
				0.400	16-W600	0.0231	0.4724	112	75-125	0.4724	0.4440	105	6.2	20	-	-	
				0.400	16-W615	0.0666	0.4994	108	75-125	0.4994	0.4922	106	1.5	20	-	-	
Beryllium - Dissolved mg/l	0.1000	112	80-120	0.100	16-W599	< 0.001	0.1041	104	75-125	0.1041	0.1084	108	4.0	20	-	-	< 0.0005
				0.100	16-W702QC	< 0.001	0.1064	106	75-125	0.1064	0.1062	106	0.2	20	-	-	
Beryllium - Total mg/l	0.1000	103	80-120	0.400	16-W556	< 0.0005	0.4406	110	75-125	0.4406	0.4330	108	1.7	20	-	-	< 0.0005
				0.400	16-W575	< 0.0005	0.4602	115	75-125	0.4602	0.4398	110	4.5	20	-	-	
				0.400	16-W592	< 0.0005	0.4350	109	75-125	0.4350	0.4468	112	2.7	20	-	-	
				0.400	16-W600	< 0.0005	0.4784	120	75-125	0.4784	0.4358	109	9.3	20	-	-	
				0.400	16-W615	< 0.0005	0.4398	110	75-125	0.4398	0.4226	106	4.0	20	-	-	



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Quality Control Report

Lab IDs: 16-W590 to 16-W600

Project: CCR Groundwater/March Event

Work Order: 201682-0770

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Boron - Dissolved mg/l	0.40	95	80-120	0.300	16-W590	0.20	0.49	97	75-125	0.49	0.48	93	2.1	20	-	-	< 0.1
															-	-	< 0.1
															-	-	< 0.1
															-	-	< 0.1
Boron - Total mg/l	0.40	100	80-120	0.400	16-W575	0.47	0.86	98	75-125	0.86	0.85	95	1.2	20	-	-	< 0.1
	0.40	92	80-120	0.400	16-W592	0.15	0.51	90	75-125	0.51	0.52	92	1.9	20	-	-	< 0.1
	0.40	95	80-120	0.300	16-W600	1.82	2.08	87	75-125	2.08	2.09	90	0.5	20	-	-	< 0.1
				0.400	16-W592	0.18	0.58	100	75-125	0.58	0.58	100	0.0	20	-	-	< 0.1
				0.400	16-W639	1.76	2.19	108	75-125	2.19	2.14	95	2.3	20	-	-	< 0.1
				0.600	16-W648	0.44	1.03	98	75-125	1.03	1.02	97	1.0	20	-	-	< 0.1
															-	-	< 0.1
Cadmium - Dissolved mg/l	0.1000	108	80-120	0.100	16-W599QC	< 0.0005	0.1036	104	75-125	0.1036	0.1099	110	5.9	20	-	-	< 0.0005
				0.100	16-W702QC	< 0.0005	0.1070	107	75-125	0.1070	0.1112	111	3.8	20	-	-	< 0.0005
Cadmium - Total mg/l	0.1000	98	80-120	0.400	16-W554	< 0.0005	0.4218	105	75-125	0.4218	0.4090	102	3.1	20	-	-	< 0.0005
				0.400	16-W592	< 0.0005	0.3970	99	75-125	0.3970	0.4018	100	1.2	20	-	-	< 0.0005
				0.400	16-W600	< 0.0005	0.4238	106	75-125	0.4238	0.4256	106	0.4	20	-	-	< 0.0005
				0.400	16-W615	< 0.0005	0.4134	103	75-125	0.4134	0.4230	106	2.3	20	-	-	< 0.0005
Calcium - Dissolved mg/l	200	108	80-120	100	16-W590	80.5	179	98	75-125	179	180	100	0.6	20	-	-	< 1
Calcium - Total mg/l	20.0	116	80-120	100	16-W590	80.4	178	98	75-125	178	180	100	1.1	20	-	-	< 1
	20.0	116	80-120	100	16-W597	84.1	181	97	75-125	181	183	99	1.1	20	-	-	< 1
	20.0	113	80-120	100	16-W621	< 1	106	106	75-125	106	105	105	0.9	20	-	-	< 1
															-	-	< 1
Chloride mg/l	30.0	102	80-120	30.0	16-W572	6.1	35.1	97	80-120	35.1	35.6	98	1.4	20	-	-	< 1
	30.0	100	80-120	30.0	16-W593	49.2	77.2	93	80-120	77.2	77.3	94	0.1	20	-	-	< 1
															-	-	< 1



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Quality Control Report

Lab IDs: 16-W590 to 16-W600

Project: CCR Groundwater/March Event

Work Order: 201682-0770

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/Dup Orig Result	MSD/Dup Result	MSD Rec %	MSD/Dup RPD	MSD/Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Chromium - Dissolved mg/l	0.1000	102	80-120	0.100	16-W599QC	< 0.002	0.1008	101	75-125	0.1008	0.1042	104	3.3	20	-	-	< 0.002
				0.100	16-W702QC	0.0087	0.1117	103	75-125	0.1117	0.1086	100	2.8	20	-	-	-
Chromium - Total mg/l	0.1000	95	80-120	0.400	16-W556	0.0020	0.4040	100	75-125	0.4040	0.3802	95	6.1	20	-	-	< 0.002
				0.400	16-W575	< 0.002	0.4036	101	75-125	0.4036	0.4058	101	0.5	20	-	-	-
				0.400	16-W592	< 0.002	0.3886	97	75-125	0.3886	0.4014	100	3.2	20	-	-	-
				0.400	16-W600	< 0.002	0.4124	103	75-125	0.4124	0.3770	94	9.0	20	-	-	-
				0.400	16-W615	0.0022	0.3784	94	75-125	0.3784	0.3698	92	2.3	20	-	-	-
Cobalt - Dissolved mg/l	0.1000	101	80-120	0.100	16-W599QC	< 0.002	0.0988	99	75-125	0.0988	0.1023	102	3.5	20	-	-	< 0.002
				0.100	16-W702QC	< 0.002	0.1030	103	75-125	0.1030	0.1023	102	0.7	20	-	-	-
Cobalt - Total mg/l	0.1000	93	80-120	0.400	16-W592	< 0.002	0.3692	92	75-125	0.3692	0.3888	97	5.2	20	-	-	< 0.002
				0.400	16-W600	< 0.002	0.3944	99	75-125	0.3944	0.3802	95	3.7	20	-	-	-
Fluoride mg/l	0.50	100	90-110	0.500	16-W593	1.49	1.96	94	80-120	1.96	1.89	80	3.6	20	-	-	< 0.1
				0.500	16-W599	0.72	1.15	86	80-120	1.15	1.17	90	1.7	20	-	-	< 0.1
Lead - Dissolved mg/l	0.1000	103	80-120	0.100	16-W599QC	< 0.0005	0.0968	97	75-125	0.0968	0.0966	97	0.2	20	-	-	< 0.0005
				0.100	16-W702QC	0.0006	0.0934	93	75-125	0.0934	0.0936	93	0.2	20	-	-	-
Lead - Total mg/l	0.1000	98	80-120	0.400	16-W554	0.0014	0.3938	98	75-125	0.3938	0.3842	96	2.5	20	-	-	< 0.0005
				0.400	16-W556	< 0.0005	0.3846	96	75-125	0.3846	0.3888	97	1.1	20	-	-	-
				0.400	16-W575	< 0.0005	0.3910	98	75-125	0.3910	0.3940	98	0.8	20	-	-	-
				0.400	16-W592	< 0.0005	0.3920	98	75-125	0.3920	0.3996	100	1.9	20	-	-	-
				0.400	16-W600	< 0.0005	0.4178	104	75-125	0.4178	0.3922	98	6.3	20	-	-	-
0.400	16-W615	0.0009	0.3972	99	75-125	0.3972	0.3876	97	2.4	20	-	-	-				
Lithium - Dissolved mg/l	0.40	105	80-120	0.400	16-W600	0.07	0.52	112	75-125	0.52	0.52	112	0.0	20	-	-	
Lithium - Total mg/l	0.40	105	80-120	0.400	16-W592	< 0.1	0.48	120	75-125	0.48	0.49	122	2.1	20	-	-	< 0.1
				0.400	16-W600	0.06	0.54	120	75-125	0.54	0.53	118	1.9	20	-	-	< 0.1
Magnesium - Dissolved mg/l	200	107	80-120	100	16-W590	48.4	149	101	75-125	149	149	101	0.0	20	-	-	< 1



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Quality Control Report

Lab IDs: 16-W590 to 16-W600

Project: CCR Groundwater/March Event

Work Order: 201682-0770

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Magnesium - Total mg/l	20.0	116	80-120	100	16-W590	48.2	147	99	75-125	147	148	100	0.7	20	-	-	< 1
	20.0	115	80-120	100	16-W597	50.3	149	99	75-125	149	150	100	0.7	20	-	-	< 1
	20.0	113	80-120	100	16-W621	< 1	106	106	75-125	106	104	104	1.9	20	-	-	< 1
Mercury - Dissolved mg/l	0.0020	95	85-115	0.002	16-W600	< 0.0002	0.0018	90	70-130	0.0018	0.0018	90	0.0	20	-	-	< 0.0002
Mercury - Total mg/l	0.0020	95	85-115	0.002	A10074	< 0.0002	0.0017	85	70-130	0.0017	0.0018	90	5.7	20	-	-	< 0.0002
	0.0020	95	85-115	0.002	16-W595	< 0.0002	0.0018	90	70-130	0.0018	0.0018	90	0.0	20	-	-	< 0.0002
				0.002	16-W600	< 0.0002	0.0017	85	70-130	0.0017	0.0018	90	5.7	20	-	-	< 0.0002
Molybdenum - Dissolved mg/l	0.1000	89	80-120	0.100	16-W599QC	0.0187	0.1062	88	75-125	0.1062	0.1157	97	8.6	20	-	-	< 0.002
				0.100	16-W702QC	0.0036	0.0922	89	75-125	0.0922	0.1003	97	8.4	20	-	-	< 0.002
Molybdenum - Total mg/l	0.1000	81	80-120	0.400	16-W592	0.0058	0.3120	77	75-125	0.3120	0.3442	85	9.8	20	-	-	< 0.002
				0.400	16-W600	0.0238	0.3500	82	75-125	0.3500	0.3668	86	4.7	20	-	-	< 0.002
pH units	-	-	-	-	-	-	-	-	-	7.2	7.2	-	0.0	20	-	-	-
	-	-	-	-	-	-	-	-	-	7.3	7.3	-	0.0	20	-	-	-
Potassium - Dissolved mg/l	200	101	80-120	20.0	16-W590	5.9	25.9	100	75-125	25.9	25.9	100	0.0	20	-	-	< 1
Potassium - Total mg/l	10.0	106	80-120	20.0	16-W590	5.8	25.5	98	75-125	25.5	25.8	100	1.2	20	-	-	< 1
	10.0	106	80-120	20.0	16-W597	7.8	27.4	98	75-125	27.4	27.6	99	0.7	20	-	-	< 1
	10.0	104	80-120	20.0	16-W621	< 1	21.1	106	75-125	21.1	20.7	104	1.9	20	-	-	< 1
Selenium - Dissolved mg/l	0.1000	113	80-120	0.100	16-W599	0.0717	0.1950	123	75-125	0.1950	0.2006	129	2.8	20	-	-	< 0.002
				0.100	16-W702	< 0.002	0.1186	119	75-125	0.1186	0.1204	120	1.5	20	-	-	< 0.002



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Lab IDs: 16-W590 to 16-W600

Project: CCR Groundwater/March Event

Work Order: 201682-0770

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Selenium - Total mg/l	0.1000	105	80-120	0.400	16-W554	< 0.005	0.4450	111	75-125	0.4450	0.4388	110	1.4	20	-	-	< 0.002
				0.400	16-W556	< 0.005	0.4536	113	75-125	0.4536	0.4460	112	1.7	20	-	-	-
				0.400	16-W575	< 0.005	0.4548	114	75-125	0.4548	0.4494	112	1.2	20	-	-	-
				0.400	16-W592	< 0.005	0.4318	108	75-125	0.4318	0.4412	110	2.2	20	-	-	-
				0.400	16-W600	0.0880	0.5320	111	75-125	0.5320	0.5284	110	0.7	20	-	-	-
				0.400	16-W615	< 0.005	0.4302	108	75-125	0.4302	0.4202	105	2.4	20	-	-	-
Sodium - Dissolved mg/l	200	104	80-120	100	16-W590	79.5	176	96	75-125	176	176	96	0.0	20	-	-	< 1
Sodium - Total mg/l	20.0	108	80-120	100	16-W590	78.2	173	95	75-125	173	172	94	0.6	20	-	-	< 1
	20.0	107	80-120	100	16-W597	87.6	181	93	75-125	181	182	94	0.6	20	-	-	< 1
	20.0	108	80-120	100	16-W621	152	247	95	75-125	247	243	91	1.6	20	-	-	< 1
Sulfate mg/l	100	102	90-110	100	16-W590	167	260	93	80-120	260	261	94	0.4	20	-	-	< 5
	100	101	90-110	100	16-W598	< 5	101	101	80-120	101	97.1	97	3.9	20	-	-	< 5
Thallium - Dissolved mg/l	0.1000	101	80-120	0.100	16-W599QC	< 0.0005	0.0986	99	75-125	0.0986	0.1000	100	1.4	20	-	-	< 0.0005
				0.100	16-W702QC	< 0.0005	0.0962	96	75-125	0.0962	0.0969	97	0.7	20	-	-	-
Thallium - Total mg/l	0.1000	87	80-120	0.400	16-W592	< 0.001	0.3542	89	75-125	0.3542	0.3726	93	5.1	20	-	-	< 0.0005
				0.400	16-W600	< 0.001	0.3038	76	75-125	0.3038	0.3236	81	6.3	20	-	-	-
				0.400	16-W615	< 0.001	0.3368	84	75-125	0.3368	0.3764	94	11.1	20	-	-	-
Total Alkalinity mg/l CaCO3	410	93	90-110	410	16-W590	292	652	88	80-120	652	638	84	2.2	20	97	80-120	< 20
				410	16-W596	322	685	89	80-120	685	682	88	0.4	20	-	-	-
Total Dissolved Solids mg/l	-	-	-	-	-	-	-	-	-	852	833	-	2.3	20	-	-	< 5
	-	-	-	-	-	-	-	-	-	1080	1090	-	0.9	20	-	-	-
Total Suspended Solids mg/l	-	-	-	-	-	-	-	-	-	732	752	-	2.7	20	-	-	< 1
	-	-	-	-	-	-	-	-	-	75	77	-	2.6	20	-	-	< 1
	-	-	-	-	-	-	-	-	-	61	62	-	1.6	20	-	-	-

Amended
C. Cause

Approved by:

16 JUN 16



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Page: 1 of 2

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 13 Apr 16
 Lab Number: 16-W593
 Work Order #: 82-0770
 Account #: 002800
 Date Sampled: 30 Mar 16 19:12
 Date Received: 1 Apr 16 8:00
 Sampled By: MVTL Field Services

Project Name: CCR Groundwater/March Event

Sample Description: MW102
 Sample Site: MDU Lewis and Clark

PO #: 160249 OP

Temp at Receipt: 3.2C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	1 Apr 16	ML
pH	* 6.9	units	N/A	SM4500 H+ B	1 Apr 16 16:00	ML
Total Suspended Solids	9	mg/l	1	I3765-85	1 Apr 16 16:22	ML
pH - Field	7.01	units	NA	SM 4500 H+ B	30 Mar 16 19:12	DJN
Temperature - Field	9.03	Degrees C	NA	SM 2550B	30 Mar 16 19:12	DJN
Total Alkalinity	345	mg/l CaCO3	20	SM2320-B	1 Apr 16 16:00	ML
Conductivity - Field	6064	umhos/cm	1	EPA 120.1	30 Mar 16 19:12	DJN
Fluoride	1.49	mg/l	0.10	SM4500-F-C	1 Apr 16 16:00	ML
Sulfate	4630	mg/l	5.00	ASTM D516-07	7 Apr 16 9:23	EMS
Chloride	49.2	mg/l	1.0	SM4500-Cl-E	1 Apr 16 15:33	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	4 Apr 16 11:41	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	4 Apr 16 12:42	EV
Total Dissolved Solids	6490	mg/l	5	I1750-85	1 Apr 16 12:29	ML
Calcium - Total	293	mg/l	1.0	6010	5 Apr 16 10:47	SZ
Magnesium - Total	1040	mg/l	1.0	6010	5 Apr 16 10:47	SZ
Sodium - Total	189	mg/l	1.0	6010	5 Apr 16 10:47	SZ
Potassium - Total	21.8	mg/l	1.0	6010	5 Apr 16 10:47	SZ
Lithium - Total	< 0.5 @	mg/l	0.10	6010	7 Apr 16 9:30	SZ
Boron - Total	19.2	mg/l	0.10	6010	5 Apr 16 15:37	KMD
Calcium - Dissolved	296	mg/l	1.0	6010	5 Apr 16 12:15	SZ
Magnesium - Dissolved	1060	mg/l	1.0	6010	5 Apr 16 12:15	SZ
Sodium - Dissolved	191	mg/l	1.0	6010	5 Apr 16 12:15	SZ
Potassium - Dissolved	22.0	mg/l	1.0	6010	5 Apr 16 12:15	SZ
Lithium - Dissolved	< 0.5 @	mg/l	0.10	6010	7 Apr 16 10:20	SZ
Boron - Dissolved	19.6	mg/l	0.10	6010	6 Apr 16 16:42	KMD
Antimony - Total	< 0.001	mg/l	0.0010	6020	6 Apr 16 14:30	KMD
Arsenic - Total	< 0.01 ^	mg/l	0.0020	6020	7 Apr 16 9:25	KMD
Barium - Total	0.0163	mg/l	0.0020	6020	6 Apr 16 14:30	KMD
Beryllium - Total	< 0.0005	mg/l	0.0005	6020	6 Apr 16 14:30	KMD
Cadmium - Total	< 0.0005	mg/l	0.0005	6020	6 Apr 16 14:30	KMD
Chromium - Total	0.0024	mg/l	0.0020	6020	6 Apr 16 14:30	KMD
Cobalt - Total	0.0059	mg/l	0.0020	6020	6 Apr 16 14:30	KMD
Lead - Total	< 0.0005	mg/l	0.0005	6020	6 Apr 16 14:30	KMD
Molybdenum - Total	0.0862	mg/l	0.0020	6020	6 Apr 16 14:30	KMD
Selenium - Total	< 0.005 ^	mg/l	0.0020	6020	6 Apr 16 9:50	KMD
Thallium - Total	< 0.001 ^	mg/l	0.0005	6020	7 Apr 16 9:25	KMD
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020	9 Apr 16 13:00	KMD

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 1 of 1

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 13 Apr 16
Lab Number: 16-W594
Work Order #: 82-0770
Account #: 002800
Date Sampled: 31 Mar 16 12:27
Date Received: 1 Apr 16 8:00
Sampled By: MVTL Field Services

Project Name: CCR Groundwater/March Event

PO #: 160249 OP

Sample Description: MW118
Sample Site: MDU Lewis and Clark

Temp at Receipt: 3.2C

As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
--------------------	-----------	------------------	---------------	---------

Cancel analysis due to pump issue. See 118 field sheet.
JM 1 Apr 16

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix	# = Due to concentration of other analytes
! = Due to sample quantity	+ = Due to internal standard response

CERTIFICATION: ND # ND-00016

CC
26 Apr 16



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Page: 1 of 2

Amended 16Jun16 (Sample date)

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 13 Apr 16
 Lab Number: 16-W595
 Work Order #: 82-0770
 Account #: 002800
 Date Sampled: 30 Mar 16 8:57
 Date Received: 1 Apr 16 8:00
 Sampled By: MVTL Field Services

Project Name: CCR Groundwater/March Event

PO #: 160249 OP

Sample Description: MW111
 Sample Site: MDU Lewis and Clark

Temp at Receipt: 3.2C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	1 Apr 16	ML
pH	* 7.2	units	N/A	SM4500 H+ B	1 Apr 16 16:00	ML
Total Suspended Solids	< 1	mg/l	1	I3765-85	1 Apr 16 16:22	ML
pH - Field	7.36	units	NA	SM 4500 H+ B	31 Mar 16 8:57	DJN
Temperature - Field	6.53	Degrees C	NA	SM 2550B	31 Mar 16 8:57	DJN
Total Alkalinity	334	mg/l CaCO3	20	SM2320-B	1 Apr 16 16:00	ML
Conductivity - Field	3037	umhos/cm	1	EPA 120.1	31 Mar 16 8:57	DJN
Fluoride	2.10	mg/l	0.10	SM4500-F-C	1 Apr 16 16:00	ML
Sulfate	1630	mg/l	5.00	ASTM D516-07	7 Apr 16 9:23	EMS
Chloride	29.0	mg/l	1.0	SM4500-CL-E	1 Apr 16 15:33	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	4 Apr 16 11:41	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	4 Apr 16 12:42	EV
Total Dissolved Solids	2580	mg/l	5	I1750-85	1 Apr 16 12:29	ML
Calcium - Total	138	mg/l	1.0	6010	5 Apr 16 10:47	SZ
Magnesium - Total	389	mg/l	1.0	6010	5 Apr 16 10:47	SZ
Sodium - Total	108	mg/l	1.0	6010	5 Apr 16 10:47	SZ
Potassium - Total	8.6	mg/l	1.0	6010	5 Apr 16 10:47	SZ
Lithium - Total	0.16	mg/l	0.10	6010	7 Apr 16 9:30	SZ
Boron - Total	6.50	mg/l	0.10	6010	5 Apr 16 15:37	KMD
Calcium - Dissolved	143	mg/l	1.0	6010	5 Apr 16 12:15	SZ
Magnesium - Dissolved	404	mg/l	1.0	6010	5 Apr 16 12:15	SZ
Sodium - Dissolved	112	mg/l	1.0	6010	5 Apr 16 12:15	SZ
Potassium - Dissolved	8.9	mg/l	1.0	6010	5 Apr 16 12:15	SZ
Lithium - Dissolved	0.16	mg/l	0.10	6010	7 Apr 16 10:20	SZ
Boron - Dissolved	6.99	mg/l	0.10	6010	6 Apr 16 16:42	KMD
Antimony - Total	< 0.001	mg/l	0.0010	6020	6 Apr 16 14:30	KMD
Arsenic - Total	< 0.01 ^	mg/l	0.0020	6020	7 Apr 16 9:25	KMD
Barium - Total	0.0189	mg/l	0.0020	6020	6 Apr 16 14:30	KMD
Beryllium - Total	< 0.0005	mg/l	0.0005	6020	6 Apr 16 14:30	KMD
Cadmium - Total	< 0.0005	mg/l	0.0005	6020	6 Apr 16 14:30	KMD
Chromium - Total	0.0021	mg/l	0.0020	6020	6 Apr 16 14:30	KMD
Cobalt - Total	< 0.002	mg/l	0.0020	6020	6 Apr 16 14:30	KMD
Lead - Total	< 0.0005	mg/l	0.0005	6020	6 Apr 16 14:30	KMD
Molybdenum - Total	0.0624	mg/l	0.0020	6020	6 Apr 16 14:30	KMD
Selenium - Total	0.0999	mg/l	0.0020	6020	6 Apr 16 9:50	KMD
Thallium - Total	< 0.001 ^	mg/l	0.0005	6020	7 Apr 16 9:25	KMD

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 1 of 2

Amended 16Jun16 (Field Data)

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 13 Apr 16
 Lab Number: 16-W596
 Work Order #: 82-0770
 Account #: 002800
 Date Sampled: 31 Mar 16 18:09
 Date Received: 1 Apr 16 8:00
 Sampled By: MVTL Field Services

Project Name: CCR Groundwater/March Event

PO #: 160249 OP

Sample Description: MW117
 Sample Site: MDU Lewis and Clark

Temp at Receipt: 3.2C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	1 Apr 16	ML
pH	* 7.4	units	N/A	SM4500 H+ B	1 Apr 16 16:00	ML
Total Suspended Solids	61	mg/l	1	I3765-85	1 Apr 16 16:22	ML
pH - Field	7.49	units	NA	SM 4500 H+ B	31 Mar 16 18:09	DJN
Temperature - Field	7.39	Degrees C	NA	SM 2550B	31 Mar 16 18:09	DJN
Total Alkalinity	322	mg/l CaCO3	20	SM2320-B	1 Apr 16 16:00	ML
Conductivity - Field	7038	umhos/cm	1	EPA 120.1	31 Mar 16 18:09	DJN
Fluoride	0.27	mg/l	0.10	SM4500-F-C	1 Apr 16 16:00	ML
Sulfate	5470	mg/l	5.00	ASTM D516-07	7 Apr 16 9:23	EMS
Chloride	40.0	mg/l	1.0	SM4500-Cl-E	1 Apr 16 15:33	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	4 Apr 16 11:41	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	4 Apr 16 12:42	EV
Total Dissolved Solids	7130	mg/l	5	I1750-85	1 Apr 16 12:29	ML
Calcium - Total	424	mg/l	1.0	6010	5 Apr 16 10:47	SZ
Magnesium - Total	1050	mg/l	1.0	6010	5 Apr 16 10:47	SZ
Sodium - Total	520	mg/l	1.0	6010	5 Apr 16 10:47	SZ
Potassium - Total	34.5	mg/l	1.0	6010	5 Apr 16 10:47	SZ
Lithium - Total	< 0.5 @	mg/l	0.10	6010	7 Apr 16 9:30	SZ
Boron - Total	7.10	mg/l	0.10	6010	5 Apr 16 15:37	KMD
Calcium - Dissolved	424	mg/l	1.0	6010	5 Apr 16 12:15	SZ
Magnesium - Dissolved	1060	mg/l	1.0	6010	5 Apr 16 12:15	SZ
Sodium - Dissolved	515	mg/l	1.0	6010	5 Apr 16 12:15	SZ
Potassium - Dissolved	33.6	mg/l	1.0	6010	5 Apr 16 12:15	SZ
Lithium - Dissolved	< 0.5 @	mg/l	0.10	6010	7 Apr 16 10:20	SZ
Boron - Dissolved	7.70	mg/l	0.10	6010	6 Apr 16 16:42	KMD
Antimony - Total	< 0.001	mg/l	0.0010	6020	6 Apr 16 14:30	KMD
Arsenic - Total	< 0.01 ^	mg/l	0.0020	6020	7 Apr 16 9:25	KMD
Barium - Total	0.0670	mg/l	0.0020	6020	6 Apr 16 14:30	KMD
Beryllium - Total	< 0.0005	mg/l	0.0005	6020	6 Apr 16 14:30	KMD
Cadmium - Total	< 0.0005	mg/l	0.0005	6020	6 Apr 16 14:30	KMD
Chromium - Total	0.0207	mg/l	0.0020	6020	6 Apr 16 14:30	KMD
Cobalt - Total	0.0020	mg/l	0.0020	6020	6 Apr 16 14:30	KMD
Lead - Total	0.0007	mg/l	0.0005	6020	6 Apr 16 14:30	KMD
Molybdenum - Total	0.0092	mg/l	0.0020	6020	6 Apr 16 14:30	KMD
Selenium - Total	0.0200	mg/l	0.0020	6020	6 Apr 16 9:50	KMD
Thallium - Total	< 0.001 ^	mg/l	0.0005	6020	7 Apr 16 9:25	KMD

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
 @ = Due to sample matrix # = Due to concentration of other analytes
 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 2 of 2

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 13 Apr 16
Lab Number: 16-W600
Work Order #: 82-0770
Account #: 002800
Date Sampled: 31 Mar 16 15:14
Date Received: 1 Apr 16 8:00
Sampled By: MVTL Field Services

Project Name: CCR Groundwater/March Event

PO #: 160249 OP

Sample Description: MW109
Sample Site: MDU Lewis and Clark

Temp at Receipt: 3.2C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Arsenic - Dissolved	< 0.005 ^ mg/l	0.0020	6020	9 Apr 16 13:00	KMD
Barium - Dissolved	0.0205 mg/l	0.0020	6020	9 Apr 16 13:00	KMD
Beryllium - Dissolved	< 0.001 ^ mg/l	0.0005	6020	10 Apr 16 10:22	CC
Cadmium - Dissolved	< 0.001 ^ mg/l	0.0005	6020	9 Apr 16 13:00	KMD
Chromium - Dissolved	< 0.005 ^ mg/l	0.0020	6020	9 Apr 16 13:00	KMD
Cobalt - Dissolved	< 0.002 mg/l	0.0020	6020	9 Apr 16 13:00	KMD
Lead - Dissolved	< 0.0005 mg/l	0.0005	6020	9 Apr 16 13:00	KMD
Molybdenum - Dissolved	0.0206 mg/l	0.0020	6020	9 Apr 16 13:00	KMD
Selenium - Dissolved	0.1004 mg/l	0.0020	6020	9 Apr 16 21:00	CC
Thallium - Dissolved	< 0.0005 mg/l	0.0005	6020	9 Apr 16 13:00	KMD

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll

CC
26 Apr 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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CASE NARRATIVE – AMENDED 16 JUN 2016

MVTL Lab Reference No/SDG: 201682-0771
IML Lab Reference No/SDG: S1604063
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – March 2016 Event
MVTL Laboratory Identifications: 16-W601 through 16-W611
Page 1 of 2

MDU Sample Identification	IML Sample Identification	MVTL Laboratory #
MW110	S1604063-001	16-W601
MW119	S1604063-002	16-W602
MW210	S1604063-003	16-W603
MW102	S1604063-004	16-W604
MW118	n/a	Sample analysis canceled due to sampling error
MW111	S1604063-005	16-W606
MW117	S1604063-006	16-W607
Dup 1	S1604063-007	16-W608
Field Blank (FB)	S1604063-008	16-W609
MW103	S1604063-009	16-W610
MW109	S1604063-010	16-W611

I. RECEIPT

- All samples were received at the laboratory on 1 April 2016 at 0800.
- Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
- Samples were received on ice and evidence of cooling had begun.
 - Temperature of samples upon receipt was 3.2°C.
- No other exceptions on sample receipt were encountered on this sample set unless noted here.
 - During sample collection, the non-dedicated pump being used at well MW118 was moved slightly by technician. This caused the water to become slightly turbid. Analysis was canceled and the well was resampled on 5 April 2016.
- All samples requiring radiochemistry analysis were sent via courier to Inter-Mountain Labs (IML) for analysis there. Samples were received at IML on 5 Apr 2016.
 - All samples were properly preserved unless noted on the individual analytical laboratory report or on the IML Case Narrative.

II. HOLDING TIMES

- All holding times were met for both preparation and analysis unless noted on the individual analytical laboratory report or on the IML Case Narrative.



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CASE NARRATIVE – AMENDED 16 JUN 2016

MVTL Lab Reference No/SDG: 201682-0771
IML Lab Reference No/SDG: S1604063
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – March 2016 Event
MVTL Laboratory Identifications: 16-W601 through 16-W611
Page 2 of 2

III. METHODS

- Approved methodology was followed for all sample analyses.
 - Please refer to the IML Case Narrative for more information regarding methodology.

IV. ANALYSIS

- All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted on the individual analytical laboratory report or on the IML Case Narrative.

V. REPORTING

- Per email from Barr Engineering upon review of the data package, on 16 Jun 2016, the sample reports for MW111 and MW117 were amended due to changes on the field data sheets.

All laboratory data has been approved by MVTL Laboratories.

SIGNED: Claudette Carroll DATE: 16 JUN 16
Claudette Carroll - MVTL Bismarck Laboratory Manager



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June 15, 2016

Montana Dakota Utilities
Attn: Samantha Marshall
400 N. 4th St.
Bismarck, ND 58501

RE: Groundwater Sampling Event - March 2016 at MDU Lewis & Clark Site

Dear Ms. Marshall:

It was brought to my attention by BARR Eng. that well MW117 (sampled on March 31, 2016) temp., cond, and pH on the chain of custody (COC) did not match the sampling readings on the field sheets, but were rather the final field readings before recharge. Also the sampled date of March 31, 2016 on the COC for well MW111 was incorrect, the field sheet notes sampling on March 30, 2016 which is the correct sample date. After my review of the chain of custody and field sheets I found that the above transcription errors to be true and made corrections to the chain of custody and field data report.

Please see the attached items with corrections and the MW117 and MW111 field sheets.

If you have any questions, please call me at (701) 391-4900.

Sincerely,

Jeremy Meyer
MVTL Field Services



MVTL Laboratories Inc.
FIELD DATA REPORT

MDU Lewis and Clark
Quarterly CCR Sampling

Attn: Samantha Marshall
400 North 4th St
Bismarck, ND 58501

WO# 82-0770
82-0771

WELL ID	PURGE DATE	START PURGE TIME	SAMPLE DATE	TIME OF SAMPLE	WATER LEVEL START (FT)	TOTAL DEPTH (FT)	WATER LEVEL END (FT)	VOLUME IN WELL (Liters)	VOLUME REMOVED (mL)	SAMPLE METHOD	FIELD READINGS			SAMPLE APPEARANCE
											TEMP (°C)	EC	pH	
MW110	30-Mar-16	10:41	30-Mar-16	12:06	10.11	16.95	10.22	4.2	8500.0	Bladder	7.62	971	7.43	clear
MW119	30-Mar-16	13:10	30-Mar-16	13:55	9.96	16.65	10.05	4.1	4500.0	Bladder	7.80	998	7.84	clear
MW210	30-Mar-16	15:57	30-Mar-16	17:17	10.18	35.43	11.59	15.6	8000.0	Bladder	9.26	1408	7.71	clear
MW102	30-Mar-16	18:22	30-Mar-16	19:12	19.92	24.74	20.23	3.0	5000.0	Bladder	9.03	6064	7.01	clear
MW118*	5-Apr-16	11:10	5-Apr-16	13:10	9.23	11.90	9.23	1.6	12000.0	Bladder	8.32	1634	8.01	clear
MW111 ⁺	30-Mar-16	8:52	30-Mar-16	8:57	8.47	17.80	8.50	5.7	6500.0	Bladder	6.53	3037	7.36	clear
MW117 [#]	31-Mar-16	7:28	31-Mar-16	18:09	6.29	11.52	10.98	3.2	6500.0	Bladder	7.39	7038	7.49	clear
MW103	31-Mar-16	16:17	31-Mar-16	17:07	11.46	21.15	11.49	6.0	5000.0	Bladder	8.12	1514	7.47	clear
MW109	31-Mar-16	13:34	31-Mar-16	15:14	11.30	17.05	11.34	3.5	10000.0	Bladder	7.42	1631	7.41	clear
MW101	NA	NA	30-Mar-16	10:22	10.04	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW103	NA	NA	30-Mar-16	10:20	11.15	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW105	NA	NA	30-Mar-16	10:12	9.55	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW106	NA	NA	30-Mar-16	10:08	10.13	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW107	NA	NA	30-Mar-16	10:25	4.96	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW108	NA	NA	30-Mar-16	10:04	17.38	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW109	NA	NA	30-Mar-16	10:15	11.33	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW116	NA	NA	30-Mar-16	10:00	11.24	NA	NA	NA	NA	WL	NA	NA	NA	Water Level

*Well MW118 was resampled on 5 Apr 16 due to the pump moving on 31 Mar 16 which caused the water to become unstable. See field sheets for further detail.

Well MW117 field readings were found to be incorrect and were updated on 15 June 2016.

Well MW111 had the incorrect date and was changed to the correct date of 30 March 2016

MVTL Calibration Worksheet

Site: MOU Lewis & Clark

Technician: Parren Nieswaag

Date: <u>30 March 16</u>		Time: <u>0557</u>						
Instrument (Circle One):	pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50	
	#1 650 MDS 08F100203	Buffer 7	<u>16.50</u>	<u>7.02</u>	<u>7.00</u>	6.95-7.05	<u>20.4</u>	0 +/- 50
	#2 650 MDS 04H14736	Buffer 10	<u>16.54</u>	<u>10.06</u>	<u>10.00</u>	9.95-10.05	<u>-167.6</u>	-180 +/- 50
	<u>#3 556 MPS 12E102056</u>	Conductivity	Temp °C	Pre Cal	Post Cal	Post Cal Range		
Other:	Buffer 1413		<u>16.56</u>	<u>1460</u>	<u>1414</u>	1387-1426		
Comments:	ORP	Temp °C	Pre Cal	Post Cal	Post Cal Range			
	231 mV @ 25C		<u>16.32</u>	<u>310.4</u>	<u>256.8</u>	±10 mV		
<u>Calibrated DO out in the field</u>	DO	Temp °C	Pre Cal	Post Cal	Post Cal Range	Barometric Pressure (mm Hg)		
			<u>16.47</u>	<u>9.28</u>	<u>8.94</u>	mg/L	<u>706.7</u>	

Date: <u>31 March 16</u>		Time: <u>0626</u>						
Instrument (Circle One):	pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50	
	#1 650 MDS 08F100203	Buffer 7	<u>19.48</u>	<u>6.98</u>	<u>7.00</u>	6.95-7.05	<u>19.4</u>	0 +/- 50
	#2 650 MDS 04H14736	Buffer 10	<u>19.55</u>	<u>9.99</u>	<u>10.00</u>	9.95-10.05	<u>-197.7</u>	-180 +/- 50
	<u>#3 556 MPS 12E102056</u>	Conductivity	Temp °C	Pre Cal	Post Cal	Post Cal Range		
Other:	Buffer 1413		<u>19.55</u>	<u>1383</u>	<u>1413</u>	1387-1426		
Comments:	ORP	Temp °C	Pre Cal	Post Cal	Post Cal Range			
	231 mV @ 25C		<u>19.62</u>	<u>249.0</u>	<u>257.0</u>	±10 mV		
	DO	Temp °C	Pre Cal	Post Cal	Post Cal Range	Barometric Pressure (mm Hg)		
			<u>19.93</u>	<u>6.42</u>	<u>8.42</u>	mg/L	<u>709.4</u>	



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: March

Sample ID: MW110

Sampling Personal: *Darren Redwing*

Weather Conditions: Temp: *48* °F Wind: *W 1-5* Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Visible
Repairs Necessary:	<i>—</i>		
Casing Diameter:	2"		
Water Level Before Purge:	<i>10.11</i>	ft	
Total Well Depth:	<i>16.95</i>	ft	
Well Volume:	<i>4.3</i>	liters	
Depth to Top of Pump:	<i>30m</i> 14.00 <i>14.00</i>	ft	
Water Level After Sample:	<i>10.22</i>	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder	Control Settings	
Sampling Method:	Bladder	Purge: <i>3</i>	sec.
Dedicated Equip?:	No	Recover: <i>57</i>	sec.
Duplicate Sample?:	<i>no</i>	PSI: <i>15</i>	
Duplicate Sample ID:	<i>—</i>		
Pumping Rate:	<i>100</i> ml/min		
Purge Date:	<i>30 March 16</i>	Time Purging Began:	<i>1041</i> am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/>	Time Purged Dry:	<i>—</i> am/pm
Sample Date:	<i>30 March 16</i>	Time of Sampling:	<i>1206</i> am/pm
Sample Appearance:	Visibility: <i>clear</i>	Color: <i>—</i>	Odor: <i>—</i> Phase: <i>—</i>

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
1	1046	7.33	972	7.42	2.99	217.4	61.0	10.19	500	clear
2	1051	7.21	970	7.40	2.60	214.5	46.9	10.19	500	clear
3	1056	7.02	969	7.41	2.38	211.6	35.3	10.20	500	clear
4	1101	7.11	969	7.41	2.30	210.2	38.4	10.21	500	clear
5	1106	7.31	968	7.42	2.24	208.6	34.2	10.22	500	clear
6	1111	7.34	970	7.42	2.20	206.9	24.6	10.22	500	clear
7	1116	7.39	970	7.42	2.17	205.9	22.9	10.22	500	clear
8	1121	7.39	970	7.40	2.17	205.2	21.4	10.22	500	clear
9	1126	7.43	970	7.43	2.12	201.2	15.8	10.22	500	clear
10	1131	7.52	973	7.41	2.13	199.2	15.9	10.22	500	clear

Stabilized: Yes No

Total Volume Removed: *—* mL

Comments:

Continued on next page

Bottle List:

- 500 mL Nitric
- 500 mL Nitric (filtered)
- 1 Liter Raw
- 4* - 1 Liter Nitric
- 30 March 16*
- DR*



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: March
Sample ID: MW110
Sampling Personal: Darren Wiesnang

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	1136	7.63	971	7.43	2.13	197.4	15.2	10.22	500	clear
12	1141	7.63	971	7.42	2.13	196.6	15.7	10.22	500	clear
13	1146	7.63	971	7.40	2.11	194.6	13.4	10.22	500	clear
14	1151	7.63	972	7.41	2.10	194.4	14.0	10.22	500	clear
15	1156	7.61	971	7.44	2.08	193.0	11.8	10.22	500	clear
16	1201	7.69	971	7.44	2.08	191.5	12.4	10.22	500	clear
17	1206	7.62	971	7.43	2.10	189.6	12.3	10.22	500	clear
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Stabilized: Yes No

Total Volume Removed: 8500 mL

Comments:

300 mV @ 16 sec



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: March
Sample ID: MW119
Sampling Personal: Parren Nieswag

Weather Conditions: Temp: 53 °F Wind: WS Precip: Sunny / Partly Cloudy (Cloudy)

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Not Visible
Repairs Necessary:		
Casing Diameter:	2"	
Water Level Before Purge:	9.96	ft
Total Well Depth:	16.65	ft
Well Volume:	4.2	liters
Depth to Top of Pump:	11.80	ft
Water Level After Sample:	10.05	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder	Control Settings		
Sampling Method:	Bladder	Purge:	3	sec.
Dedicated Equip?:	No	Recover:	55	sec.
Duplicate Sample?:	Yes	PSI:	20	
Duplicate Sample ID:	DUP-1			
Pumping Rate:	100 ml/min			
Purge Date:	30 March 16	Time Purging Began:	1310	am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Time Purged Dry:	—	am/pm
Sample Date:	30 March 16	Time of Sampling:	1355	am/pm
Sample Appearance:	Visibility	Color	Odor	Phase
	Clear	—	—	—

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
1	1315	8.27	978	7.84	1.84	158.4	16.0	10.05	500	Clear
2	1320	7.78	985	7.84	1.64	133.5	18.6	10.05	500	Clear
3	1325	7.63	992	7.84	1.57	104.8	12.2	10.05	500	Clear
4	1330	7.76	997	7.83	1.64	96.2	10.9	10.05	500	Clear
5	1335	7.67	998	7.84	1.70	95.8	6.96	10.05	500	Clear
6	1340	7.55	997	7.85	1.72	96.3	5.75	10.05	500	Clear
7	1345	7.52	997	7.84	1.75	97.2	4.05	10.05	500	Clear
8	1350	7.57	997	7.84	1.80	98.2	4.17	10.05	500	Clear
9	1355	7.80	998	7.84	1.80	99.1	4.11	10.05	500	Clear
10										

Bottle List:
500 mL Nitric
500 mL Nitric (filtered)
1 Liter Raw
4 - 1 Liter Nitric
30 March 16
PN

Stabilized: Yes No
Comments: (Signature)

Total Volume Removed: 4500 mL



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: March
Sample ID: MW210
Sampling Personal: Darren Nieswaag

30 March 16 on

Weather Conditions: Temp: 62 °F Wind: W 5-10 Precip: Sunny / Partly Cloudy (Cloudy)

Well Information

Well Locked?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Visible
Repairs Necessary:	<input type="checkbox"/>		
Casing Diameter:	2"		
Water Level Before Purge:	10.18	ft	
Total Well Depth:	35.43	ft	
Well Volume:	15.6	liters	
Depth to Top of Pump:	30.46	ft	
Water Level After Sample:	11.59	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder	Control Settings		
Sampling Method:	Bladder	Purge:	4	sec.
Dedicated Equip?:	No	Recover:	50/56	sec.
Duplicate Sample?:	no	PSI:	20	
Duplicate Sample ID:				
Pumping Rate:	100 ml/min			
Purge Date:	30 March 16	Time Purging Began:	1557	am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/>	Time Purged Dry:		am/pm
Sample Date:	30 March 16	Time of Sampling:	1717	am/pm
Sample Appearance:	Visibility	Color	Odor	Phase
	Clear	—	—	—

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
1	1602	9.22	1407	7.72	1.93	179.1	106	10.46	500	Clear
2	1607	9.36	1410	7.72	2.80	171.2	155	10.91	500	Clear
3	1612	9.34	1409	7.71	1.15	165.5	130	11.27	500	Clear
4	1617	9.38	1411	7.70	1.08	172.1	153	11.52	500	Clear
5	1622	9.30	1412	7.70	1.00	171.0	73.4	11.56	500	Clear
6	1627	9.36	1408	7.71	1.06	169.0	48.6	11.56	500	Clear
7	1632	9.34	1409	7.70	0.91	167.1	47.1	11.58	500	Clear
8	1637	9.36	1410	7.73	0.86	168.0	32.6	11.58	500	Clear
9	1642	9.35	1409	7.71	0.80	166.2	30.3	11.59	500	Clear
10	1647	9.30	1409	7.71	0.77	164.8	27.5	11.59	500	Clear

Bottle List:

- 500 mL Nitric
 - 500 mL Nitric (filtered)
 - 1 Liter Raw
 - 4 ¹ - 1 Liter Nitric
- 30 March 16 on*

Stabilized: Yes ~~No~~

Total Volume Removed: — mL

Comments:

Continued on next page

** 10.91 water level Line 2
30 March 16 on*



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: March
Sample ID: MW210
Sampling Personal: Darren Niswanger

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	1652	9.32	1409	7.72	0.71	162.5	23.0	11.59	500	clear
12	1657	9.36	1409	7.72	0.68	161.0	18.7	11.59	500	clear
13	1702 1702	9.35	1409	7.72	0.68	158.9 158.9	17.2	11.59	500	clear
14	1707	9.28	1408	7.71	0.69	155.9	14.2	11.59	500	clear
15	1712	9.26	1408	7.72	0.67	152.8	13.9	11.59	500	clear
16	1717	9.26	1408	7.71	0.65	150.8	13.1	11.59	500	clear
17	1717	9.26 9.26								
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Stabilized: Yes No
Comments:

Total Volume Removed: 9000 mL

*3/20/2016



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: March
Sample ID: MW102
Sampling Personal: Darren N. Esward

Weather Conditions: Temp: 48 °F Wind: W5-10 Precip: Sunny / Partly Cloudy / (Cloudy)

Well Information

Well Locked?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Casing Straight?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<i>30 March 16</i>
Grout Seal Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<u>Not Visible</u>
Repairs Necessary:		
Casing Diameter:	<u>2"</u>	
Water Level Before Purge:	<u>19.92</u>	ft
Total Well Depth:	<u>24.74</u>	ft
Well Volume:	<u>30</u>	liters
Depth to Top of Pump:	<i>30 March 16</i> <u>21.36</u>	ft
Water Level After Sample:	<u>20.23</u>	ft
Measurement Method:	<u>Electric Water Level Indicator</u>	

Sampling Information

Purging Method:	<u>Bladder</u>	Control Settings	
Sampling Method:	<u>Bladder</u>	Purge:	<u>4</u> sec.
Dedicated Equip?:	<u>No</u>	Recover:	<u>56</u> sec. <i>30 March 16</i>
Duplicate Sample?:	<u>No</u>	PSI:	<u>15-20</u>
Duplicate Sample ID:			
Pumping Rate:	<u>100</u> ml/min	Time Purging Began:	<u>1822</u> am/pm
Purge Date:	<u>30 March 16</u>	Time Purged Dry:	<u>—</u> am/pm
Well Purged Dry?	<u>Yes</u> <input checked="" type="checkbox"/> No <input type="checkbox"/>	Time of Sampling:	<u>1912</u> am/pm
Sample Date:	<u>30 March 16</u>		
Sample Appearance:	Visibility <u>Clear</u>	Color <u>—</u>	Odor <u>—</u>
			Phase <u>—</u>

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
1	1827	9.64	5994	6.95	0.52	152.0	6.4	20.18	500	Clear
2	1832	9.14	6010	6.97	0.80	116.9	36.9	20.18	500	Clear
3	1837	9.12	6023	6.99	0.65	80.2	24.8	20.21	500	Clear
4	1842	9.15	6028	6.99	0.51	71.2	24.7	20.22	500	Clear
5	1847	9.12	6049	7.00	0.42	61.6	12.9	20.23	500	Clear
6	1852	9.10	6066	7.00	0.35	54.2	8.4	20.23	500	Clear
7	1857	9.08	6074	7.01	0.30	49.8	6.5	20.23	500	Clear
8	1902	9.02	6077	7.01	0.25	46.2	5.40	20.23	500	Clear
9	1907	9.02	6073	7.01	0.23	43.4	4.99	20.23	500	Clear
10	1912	9.03	6064	7.01	0.23	41.1	5.3	20.23	500	Clear

Bottle List:
500 mL Nitric
500 mL Nitric (filtered)
1 Liter Raw
4 - 1 Liter Nitric
30 March 16

Stabilized: Yes No
Comments:

Total Volume Removed: 5000 mL

**30 March 16*



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: March

Sample ID: MW118

Sampling Personal: Darren Nieswady

Weather Conditions: Temp: 4.5 °F Wind: W 5-10 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	9.21 ft		
Total Well Depth:	11.90 ft		
Well Volume:	1.7 liters		
Depth to Top of Pump:	9.90 ft		
Water Level After Sample:	9.23 ft		
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder	Control Settings	
Sampling Method:	Bladder	Purge: 3	sec.
Dedicated Equip?:	No	Recover: 57	sec.
Duplicate Sample?:	No	PSI: 10-15	
Duplicate Sample ID:			
Pumping Rate:	100 ml/min		
Purge Date:	31 March 16	Time Purging Began:	1102 am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/>	Time Purged Dry:	
Sample Date:	31 March 16	Time of Sampling:	1227 am/pm
Sample Appearance:	Visibility	Color	Odor
	Clear		

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
1	1107	7.92	1638	8.06	3.28	162.9	869	9.21	500	Turbid
2	1112	7.16	1599	8.11	2.19	153.2	532	9.21	500	Turbid
3	1117	6.95	1573	8.16	1.77	141.9	361	9.22	500	Slightly Turbid
4	1122	6.86	1552	8.19	1.67	132.6	140	9.23	500	Slightly Turbid
5	1127	6.76	1540	8.21	1.43	119.4	81.3	9.23	500	Clear
6	1132	6.70	1533	8.20	1.31	105.9	44.6	9.23	500	Clear
7	1137	6.67	1530	8.22	1.34	91.2	28.6	9.23	500	Clear
8	1142	6.62	1530	8.21	1.20	77.3	22.0	9.23	500	Clear
9	1147	6.56	1532	8.22	1.13	47.4	17.7	9.23	500	Clear
10	1152	6.53	1537	8.20	1.14	31.7	13.9	9.23	500	Clear

Bottle List:
500 mL Nitric
500 mL Nitric (filtered)
1 Liter Raw
4 @ 1 Liter Nitric
31 March 16

Stabilized: Yes No

Total Volume Removed: mL

Comments:

Continued on next page

pump moved a little bit when changing bottles. There will be 2 bottles a little bit turbid.



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: March

Sample ID: mw 118

Sampling Personal: Darren Nieswang

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	1157	6.47	1540	8.19	1.10	16.5	10.1	9.23	500	Clear
12	1202	6.47	1544	8.18	1.09	2.2	6.61	9.23	500	Clear
13	1207	6.42	1547	8.17	1.08	-7.5	6.37	9.23	500	Clear
14	1212	6.58	1556	8.16	1.08	-7.0	5.18	9.23	500	Clear
15	1217	6.51	1558	8.16	1.09	-28.2	4.96	9.23	500	Clear
16	1222	6.53	1565	8.13	1.10	-25.5	4.81	9.23	500	Clear
17	1227	6.51	1568	8.13	1.10	-33.4	4.95	9.23	500	Clear
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Stabilized: Yes No

Total Volume Removed: 8500 mL

Comments:



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: March
Sample ID: MW111
Sampling Personal: Damen Nieswaag

Weather Conditions: Temp: 39 °F Wind: WS Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	<u>Not Visible</u>
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	8.47	ft	
Total Well Depth:	17.80	ft	
Well Volume:	5.8	liters	
Depth to Top of Pump:	12.56	ft	
Water Level After Sample:	8.50	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder	Control Settings		
Sampling Method:	Bladder	Purge:	4	sec.
Dedicated Equip?:	No	Recover:	56	sec.
Duplicate Sample?:	No	PSI:	10-15	
Duplicate Sample ID:				
Pumping Rate:	100	ml/min		
Purge Date:	30 March 16	Time Purging Began:	0852	am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Time Purged Dry:	
Sample Date:	30 March 16	Time of Sampling:	0957	am/pm
Sample Appearance:	Visibility	Color	Odor	Phase
	Clear	-	-	-

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
1	0857	7.47	3842	7.10	5.38	181.6	32.0	8.49	500	Clear
2	0902	7.18	3823	7.09	0.94	151.3	40.5	8.50	500	Clear
3	0907	7.04	3748	7.11	0.58	144.6	41.9	8.50	500	Clear
4	0912	6.77	3355	7.22	1.70	144.5	23.5	8.50	500	Clear
5	0917	6.73	3240	7.26	2.04	144.8	22.7	8.50	500	Clear
6	0922	6.70	3113	7.30	2.45	147.0	26.5	8.50	500	Clear
7	0927	6.58	3071	7.33	2.72	150.2	16.6	8.50	500	Clear
8	0932	6.54	3052	7.34	2.88	153.5	9.53	8.50	500	Clear
9	0937	6.56	3043	7.34	2.98	156.3	8.27	8.50	500	Clear
10	0942	6.40	3033	7.35	3.00	159.1	6.55	8.50	500	Clear

- Bottle List:
- 500 mL Nitric
 - 500 mL Nitric (filtered)
 - 1 Liter Raw
 - 4 - 1 Liter Nitric
- 30 March 16
DN

Stabilized: Yes ~~No~~
Comments:

Total Volume Removed: _____ mL

Continued on next page



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: March

Sample ID: MW11

Sampling Personal: Darren Nieswaag

Field Measurements

Bismarck

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	0847	6.71	3036	7.35	3.10	161.4	5.26	8.50	500	clear
12	0852	6.52	3030	7.36	3.13	162.8	4.99	8.50	500	clear
13	0857	6.53	3037	7.36	3.20	163.7	5.04	8.50	500	clear
14										
15										
16										
17										
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28										
29										
30										

Stabilized: Yes No

Comments: (handwritten mark)

Total Volume Removed: 6500 mL



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: March
Sample ID: MW117
Sampling Personal: Darren Nieswaag

Weather Conditions: Temp: 40 °F Wind: W 10-15 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/> No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Not Visible
Repairs Necessary:		
Casing Diameter:	2"	
Water Level Before Purge:	6.29	ft
Total Well Depth:	11.52	ft
Well Volume:	3.3	liters
Depth to Top of Pump:	-	ft
Water Level After Sample:	10.98	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder	Control Settings
Sampling Method:	Bladder	
Dedicated Equip?:	No	Purge: <u>3</u> sec.
Duplicate Sample?:	<u>NO</u>	Recover: <u>57</u> sec.
Duplicate Sample ID:		PSI: <u>10-15</u>
Pumping Rate:	<u>100</u> ml/min	
Purge Date:	<u>31 March 16</u>	Time Purging Began: <u>0728</u> am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Time Purged Dry: <u>0833</u> am/pm
Sample Date:	<u>31 March 16</u>	Time of Sampling: <u>1809</u> am/pm
Sample Appearance:	Visibility: <u>Clear</u>	Color: <u>-</u>
		Odor: <u>-</u>
		Phase: <u>-</u>

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
1	0733	4.55	7137	7.33	12.17	224.6	38.4	6.60	500	Clear
2	0738	4.50	7011	7.35	11.19	200.7	34.7	6.94	500	Clear
3	0743	4.46	6856	7.37	10.72	192.7	35.9	7.10	500	Clear
4	0748	4.45	6850	7.37	9.91	191.1	48.6	7.44	500	Clear
5	0753	4.42	6920	7.34	9.95	199.2	56.9	7.66	500	Clear
6	0758	4.46	6960	7.34	9.88	210.3	76.0	7.87	500	Clear
7	0803	4.55	7006	7.33	9.72	210.0	97.0	7.91	500	Clear
8	0808	4.64	7119	7.32	9.43	206.7	113.0	8.18	500	Clear
9	0813	5.13	7287	7.35	9.48	206.5	44.5	8.33	500	Clear
10	0818	5.06	7266	7.34	9.53	206.8	43.3	8.54	500	Clear

Bottle List:

- 500 mL Nitric
- 500 mL Nitric (filtered)
- 1 Liter Raw
- 3 # 2 - 1 Liter Nitric

31 March 16
DN

Total Volume Removed: - mL

Sized: Yes No

Notes:



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark
 Event: March
 Sample ID: MW117
 Sampling Personal: Darren Nieswaga

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	0823	5.03	7233	7.33	9.51	207.7	18.8	8.82	500	clear
12	0828	5.01	7147	7.34	9.46	205.9	8.13	9.10	500	clear
13	0833	5.09	7119	7.35	9.58	203.9	3.51	9.15	500	clear
14								top of pump		
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29	<i>aimed to</i>									
30	08 1809	7.39	7038	7.49	8.28	189.2	18.9	8.11	—	recharge

Stabilized: Yes No
 Comments:

Total Volume Removed: 6500 mL



Field Datasheet

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Water Level

Sampling Personnel:

Darren Niesowag

Company:

MDU Lewis and Clark

Well ID	Date	Time	Depth to Water	Comments
MW101	30 March 16	1022	10.04	
MW103	30 March 16	1020	11.45	
MW105	30 March 16	1012	9.55	
MW106	30 March 16	1008	10.13	
MW107	30 March 16	1025	4.96	
MW108	30 March 16	1004	17.38	
MW109	30 March 16	1015	11.33	
MW116	30 March 16	1000	16.24	



2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
 Event: March
 Sample ID: MW103
 Sampling Personal: Darren Nieswaag

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
116	1647	8.23	1521	7.46	0.67	93.3	6.69	11.49	500	clear
127	1652	8.06	1516	7.47	0.39	97.5	4.84	11.49	500	clear
138	1657	8.12	1515	7.47	0.37	98.1	3.99	11.49	500	clear
149	1702	8.11	1514	7.47	0.37	98.4	3.74	11.49	500	clear
150	1707	8.12	1514	7.47	0.36	100.1	3.65	11.49	500	clear
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Stabilized: Yes No
 Comments: (circled Yes)

Total Volume Removed: 5000 mL



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: March

Sample ID: mw 109

Sampling Personal: Darren Niswaga

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
116	1404	7.72	1652	7.40	0.28	92.1	54.8	11.34	500	clear
127	1409	7.47	1603	7.41	0.66	43.4	52.5	11.34	500	clear
138	1414	7.56	1632	7.40	0.41	40.5	56.3	11.34	500	clear
149	1419	8.11	1620	7.40	0.45	51.6	51.9	11.34	500	clear
1510	1424	7.45	1616	7.40	0.20	44.7	46.2	11.34	500	clear
1811	1429	7.47	1633	7.40	0.26	48.7	35.0	11.34	500	clear
1712	1434	7.54	1630	7.40	0.17	47.7	35.0	11.34	500	clear
1813	1439	7.67	1633	7.40	0.15	46.2	27.1	11.34	500	clear
1914	1444	7.71	1634	7.40	0.16	45.2	17.5	11.34	500	clear
2015	1449	7.45	1637	7.41	0.15	42.0	13.1	11.34	500	clear
2116	1454	7.42	1630	7.40	0.15	40.9	10.3	11.34	500	clear
2217	1459	7.36	1630	7.41	0.15	43.6	7.77	11.34	500	clear
2318	1504	7.38	1634	7.41	0.16	38.2	7.58	11.34	500	clear
2419	1509	7.41	1630	7.40	0.16	36.5	7.43	11.34	500	clear
2520	1514	7.42	1631	7.41	0.15	33.8	7.20	11.34	500	clear
26										
27										
28										
29										
30										

Stabilized: Yes No

Total Volume Removed: 10,000 mL

Comments:



Laboratories, Inc.

2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name: MDU Lewis and Clark CCR Radiochem March Event				Name of Sampler(s): <i>Darren Meswary</i>			
Report To: MDU Attn: Samantha Marshall Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-222-7829				Carbon Copy: Attn: Address:			
				Work Order Number: 82-0771			

Sample Information						Bottle Type				Field Parameters			Analysis	
Lab Number	Sample ID	Date	Time	Sample Type	Gradient	1000 ml HNO ₃					Field Temperature °C	Field Spec. Cond.	Field pH	Analysis Required
W601	MW110	30 March 16	1206	GW	Up	4					7.62	971	7.43	MDU CCR combined
W602	MW119	30 March 16	1355	GW	Up	4					7.80	998	7.84	RadChem
W603	MW210	30 March 16	1717	GW	Up	4					9.26	1408	7.71	
W604	MW102	30 March 16	1912	GW	Down	4					9.03	6064	7.01	
W605	MW118	31 March 16	0833	GW	Down	4					6.57	711	8.13	31 March 16 ON
W606	MW111	31 March 16	0857	GW	Down	4					6.53	3037	7.36	
W607	MW117	31 March 16	1809	GW	Down	4					5.09	7119	7.35	Temp 7.39 Spec Cond 7030 pH 7.49
W608	Dup 1	30 March 16	NA	W		4					NA	NA	NA	
W609	Field Blank (FB)	31 March 16	NA	W		4					NA	NA	NA	

Comments: * Correction made by Jerry Pless on 15 June 16
Jerry Pless

	Transferred by:	Sample Condition	Date/Time	Received by:	Sample Condition	Date/Time	°C
1	<i>Darren Meswary</i>	Log in	1 April 16 0758	C. Jackson		1 April 16 0800	3.2°C
2							7.588
3							



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 27 Apr 16
Lab Number: 16-W601
Work Order #: 82-0771
Account #: 002800
Date Sampled: 30 Mar 16 12:06
Date Received: 1 Apr 16 8:00
Sampled By: MVTL Field Services

Project Name: CCR Radiochem/March Event

PO #: 160249 OP

Sample Description: MW110
Sample Site: MDU Lewis and Clark

Temp at Receipt: 3.2C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.43 units	NA	SM 4500 H+ B	30 Mar 16 12:06	DJN
Temperature - Field	7.62 Degrees C	NA	SM 2550B	30 Mar 16 12:06	DJN
Conductivity - Field	971 umhos/cm	1	EPA 120.1	30 Mar 16 12:06	DJN
Radium 226	See Attached Report			12 Apr 16	OL
Radium 228	See Attached Report			13 Apr 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Cc
Claudette K. Carroll *27 Apr 16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 27 Apr 16
Lab Number: 16-W603
Work Order #: 82-0771
Account #: 002800
Date Sampled: 30 Mar 16 17:17
Date Received: 1 Apr 16 8:00
Sampled By: MVTL Field Services

Project Name: CCR Radiochem/March Event

PO #: 160249 OP

Sample Description: MW210
Sample Site: MDU Lewis and Clark

Temp at Receipt: 3.2C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.71 units	NA	SM 4500 H+ B	30 Mar 16 17:17	DJN
Temperature - Field	9.26 Degrees C	NA	SM 2550B	30 Mar 16 17:17	DJN
Conductivity - Field	1408 umhos/cm	1	EPA 120.1	30 Mar 16 17:17	DJN
Radium 226	See Attached Report			12 Apr 16	OL
Radium 228	See Attached Report			13 Apr 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Claudette K. Carroll ^{cc} 27 Apr 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 1 of 1

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 27 Apr 16
 Lab Number: 16-W605
 Work Order #: 82-0771
 Account #: 002800
 Date Sampled: 31 Mar 16 12:27
 Date Received: 1 Apr 16 8:00
 Sampled By: MVTL Field Services

Project Name: CCR Radiochem/March Event

Sample Description: MW118
 Sample Site: MDU Lewis and Clark

PO #: 160249 OP
 Temp at Receipt: 3.2C

As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
--------------------	-----------	------------------	---------------	---------

Cancel analysis due to pump issue. See 118 field sheet.
 JM 1 Apr 16

cc
27 Apr 16

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
 @ = Due to sample matrix # = Due to concentration of other analytes
 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Amended 16Jun16 (Sample date)

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 27 Apr 16
Lab Number: 16-W606
Work Order #: 82-0771
Account #: 002800
Date Sampled: 30 Mar 16 8:57
Date Received: 1 Apr 16 8:00
Sampled By: MVTL Field Services

Project Name: CCR Radiochem/March Event

PO #: 160249 OP

Sample Description: MW111
Sample Site: MDU Lewis and Clark

Temp at Receipt: 3.2C

	As Received Result		Method RL	Method Reference	Date Analyzed		Analyst
pH - Field	7.36	units	NA	SM 4500 H+ B	31 Mar 16	8:57	DJN
Temperature - Field	6.53	Degrees C	NA	SM 2550B	31 Mar 16	8:57	DJN
Conductivity - Field	3037	umhos/cm	1	EPA 120.1	31 Mar 16	8:57	DJN
Radium 226	See Attached Report				13 Apr 16		OL
Radium 228	See Attached Report				13 Apr 16		OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Claudette K. Carroll ^{CC} *16 JUN 16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



MINNESOTA VALLEY TESTING LABORATORIES, INC.

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Amended 16Jun16 (Field Data)

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 27 Apr 16
Lab Number: 16-W607
Work Order #: 82-0771
Account #: 002800
Date Sampled: 31 Mar 16 18:09
Date Received: 1 Apr 16 8:00
Sampled By: MVTL Field Services

Project Name: CCR Radiochem/March Event

PO #: 160249 OP

Sample Description: MW117
Sample Site: MDU Lewis and Clark

Temp at Receipt: 3.2C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.49 units	NA	SM 4500 H+ B	31 Mar 16 18:09	DJN
Temperature - Field	7.39 Degrees C	NA	SM 2550B	31 Mar 16 18:09	DJN
Conductivity - Field	7038 umhos/cm	1	EPA 120.1	31 Mar 16 18:09	DJN
Radium 226	See Attached Report			13 Apr 16	OL
Radium 228	See Attached Report			13 Apr 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Claudette K. Carroll

CC
16 JUN 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 27 Apr 16
Lab Number: 16-W608
Work Order #: 82-0771
Account #: 002800
Date Sampled: 31 Mar 16
Date Received: 1 Apr 16 8:00
Sampled By: MVTl Field Services

Project Name: CCR Radiochem/March Event

PO #: 160249 OP

Sample Description: Dup 1
Sample Site: MDU Lewis and Clark

Temp at Receipt: 3.2C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Radium 226	See Attached Report			13 Apr 16	OL
Radium 228	See Attached Report			14 Apr 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Claudette K. Carroll ^{CC} 27 Apr 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



MINNESOTA VALLEY TESTING LABORATORIES, INC.

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Page: 1 of 1

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 27 Apr 16
Lab Number: 16-W611
Work Order #: 82-0771
Account #: 002800
Date Sampled: 31 Mar 16 15:14
Date Received: 1 Apr 16 8:00
Sampled By: MVTl Field Services

Project Name: CCR Radiochem/March Event

PO #: 160249 OP

Sample Description: MW109
Sample Site: MDU Lewis and Clark

Temp at Receipt: 3.2C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.41 units	NA	SM 4500 H+ B	31 Mar 16 15:14	DJN
Temperature - Field	7.42 Degrees C	NA	SM 2550B	31 Mar 16 15:14	DJN
Conductivity - Field	1631 umhos/cm	1	EPA 120.1	31 Mar 16 15:14	DJN
Radium 226	See Attached Report			13 Apr 16	OL
Radium 228	See Attached Report			14 Apr 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by: Claudette K. Carroll ^{CC} 27 Apr 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



Date: 6/20/2016

CLIENT: MVTL Laboratories, Inc.
Project: 201682-0771
Lab Order: S1604063

CASE NARRATIVE
Report ID: S1604063002
(Replaces S1604063001)

Samples 16-W601 MW110, 16-W602 MW119, 16-W603 MW210, 16-W604 MW102, 16-W606 MW111, 16-W607 MW117, 16-W608 Dup 1, 16-W609 Field Blank, 16-W610 MW103, and 16-W611 MW109 were received on April 5, 2016.

All samples were received and analyzed within the EPA recommended holding times, except those noted below in this case narrative. Samples were analyzed using the methods outlined in the following references:

"Standard Methods For The Examination of Water and Wastewater", approved method versions
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition
40 CFR Parts 136 and 141
40 CFR Part 50, Appendices B, J, L, and O
Methods indicated in the Methods Update Rule published in the Federal Register Friday, May 18, 2012
ASTM approved and recognized standards

All Quality Control parameters met the acceptance criteria defined by EPA and Inter-Mountain Laboratories except as indicated in this case narrative.

Qualifiers by sample

MSD-335 - Radium 228 by Ga/Tech/Total Radium 228 - Spike Recovery outside accepted recovery limits

Sample S1604063-005 (MW111) was rereported see attached. The current version is S1604063002.

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Wade Nieuwsma

From: Claudette Carroll [ccarroll@mvtl.com]
Sent: Friday, June 17, 2016 10:29 AM
To: Wade Nieuwsma
Subject: Amended report

Hi Wade,

Upon review by the consultant, it was discovered that one of our samples had an incorrect sample date on the field sheet. It is your lab number S1604063-005. It should have a collection date of 3/30/2016 instead of 3/31/2016. Could you send me out an amended report with that correct sample date and also an amended EDD?

Thanks,
Claudette



**Minnesota Valley Testing
Laboratories, Inc.**

Providing Analytical Excellence Since 1951

ccarroll@mvtl.com

701-258-9720

2616 E. Broadway Ave/Bismarck, ND 58501



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/20/2016
Report ID S1604063002
(Replaces S1604063001)

ProjectName: 201682-0771
Lab ID: S1604063-001
ClientSample ID: 16-W601 MW110
COC: 201682-0771

WorkOrder: S1604063
CollectionDate: 3/30/2016 12:06:00 PM
DateReceived: 4/5/2016 9:55:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.1	pCi/L		0.2	SM 7500 Ra-B	04/12/2016 1528	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	04/12/2016 1528	MB
Radium 228	-5.0	pCi/L		1	Ga-Tech	04/13/2016 754	MB
Radium 228 Precision (±)	1.2	pCi/L			Ga-Tech	04/13/2016 754	MB

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - M Value exceeds Monthly Ave or MCL or is less than LCL
 - O Outside the Range of Dilutions
 - X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/20/2016
Report ID S1604063002
(Replaces S1604063001)

ProjectName: 201682-0771
Lab ID: S1604063-002
ClientSample ID: 16-WV602 MW119
COC: 201682-0771

WorkOrder: S1604063
CollectionDate: 3/30/2016 1:55:00 PM
DateReceived: 4/5/2016 9:55:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.2	pCi/L		0.2	SM 7500 Ra-B	04/12/2016 1528	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	04/12/2016 1528	MB
Radium 228	-3.3	pCi/L		1	Ga-Tech	04/13/2016 1055	MB
Radium 228 Precision (±)	1.0	pCi/L			Ga-Tech	04/13/2016 1055	MB

These results apply only to the samples tested.

RL - Reporting Limit

- | | | |
|--------------------|--|--|
| Qualifiers: | B Analyte detected in the associated Method Blank | C Calculated Value |
| | E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| | J Analyte detected below quantitation limits | L Analyzed by another laboratory |
| | M Value exceeds Monthly Ave or MCL or is less than LCL | ND Not Detected at the Reporting Limit |
| | O Outside the Range of Dilutions | S Spike Recovery outside accepted recovery limits |
| | X Matrix Effect | |

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/20/2016
Report ID S1604063002
(Replaces S1604063001)

ProjectName: 201682-0771
Lab ID: S1604063-003
ClientSample ID: 16-W603 MW210
COC: 201682-0771

WorkOrder: S1604063
CollectionDate: 3/30/2016 5:17:00 PM
DateReceived: 4/5/2016 9:55:00 AM
FieldSampler:
Matrix: Water

Comments

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Radionuclides - Total, Radium 226, Radium 226 Precision (±), Radium 228, and Radium 228 Precision (±).

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
M Value exceeds Monthly Ave or MCL or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

- C Calculated Value
H Holding times for preparation or analysis exceeded
L Analyzed by another laboratory
ND Not Detected at the Reporting Limit
S Spike Recovery outside accepted recovery limits

Reviewed by: [Signature]
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/20/2016
Report ID S1604063002
(Replaces S1604063001)

ProjectName: 201682-0771
Lab ID: S1604063-004
ClientSample ID: 16-W604 MW102
COC: 201682-0771

WorkOrder: S1604063
CollectionDate: 3/30/2016 7:12:00 PM
DateReceived: 4/5/2016 9:55:00 AM
FieldSampler:
Matrix: Water

Comments

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/init. Rows include Radionuclides - Total, Radium 226, Radium 226 Precision (±), Radium 228, and Radium 228 Precision (±).

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
M Value exceeds Monthly Ave or MCL or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

- C Calculated Value
H Holding times for preparation or analysis exceeded
L Analyzed by another laboratory
ND Not Detected at the Reporting Limit
S Spike Recovery outside accepted recovery limits

Reviewed by: [Signature]
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/20/2016
Report ID S1604063002
(Replaces S1604063001)

ProjectName: 201682-0771
Lab ID: S1604063-005
ClientSample ID: 16-W606 MW111
COC: 201682-0771

WorkOrder: S1604063
CollectionDate: 3/30/2016 8:57:00 AM
DateReceived: 4/5/2016 9:55:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Radionuclides - Total

Radium 226	0.3	pCi/L		0.2	SM 7500 Ra-B	04/13/2016 830 MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	04/13/2016 830 MB
Radium 228	-1.1	pCi/L		1	Ga-Tech	04/13/2016 1958 MB
Radium 228 Precision (±)	1.1	pCi/L			Ga-Tech	04/13/2016 1958 MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B Analyte detected in the associated Method Blank	C Calculated Value
	E Value above quantitation range	H Holding times for preparation or analysis exceeded
	J Analyte detected below quantitation limits	L Analyzed by another laboratory
	M Value exceeds Monthly Ave or MCL or is less than LCL	ND Not Detected at the Reporting Limit
	O Outside the Range of Dilutions	S Spike Recovery outside accepted recovery limits
	X Matrix Effect	

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/20/2016
Report ID S1604063002
(Replaces S1604063001)

ProjectName: 201682-0771
Lab ID: S1604063-006
ClientSample ID: 16-W607 MW117
COC: 201682-0771

WorkOrder: S1604063
CollectionDate: 3/31/2016 6:09:00 PM
DateReceived: 4/5/2016 9:55:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
----------	--------	-------	------	----	--------	--------------------

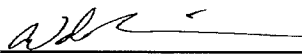
Radionuclides - Total

Radium 226	2.6	pCi/L		0.2	SM 7500 Ra-B	04/13/2016 830 MB
Radium 226 Precision (±)	0.2	pCi/L			SM 7500 Ra-B	04/13/2016 830 MB
Radium 228	2.6	pCi/L		1	Ga-Tech	04/13/2016 2259 MB
Radium 228 Precision (±)	1.1	pCi/L			Ga-Tech	04/13/2016 2259 MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by another laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by: 
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/20/2016
Report ID S1604063002
(Replaces S1604063001)

ProjectName: 201682-0771
Lab ID: S1604063-008
ClientSample ID: 16-W609 Field Blank
COC: 201682-0771

WorkOrder: S1604063
CollectionDate: 3/31/2016
DateReceived: 4/5/2016 9:55:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
----------	--------	-------	------	----	--------	--------------------

Radionuclides - Total

Radium 226	0.1	pCi/L		0.2	SM 7500 Ra-B	04/13/2016 830 MB
Radium 226 Precision (±)	0.05	pCi/L			SM 7500 Ra-B	04/13/2016 830 MB
Radium 228	-4.2	pCi/L		1	Ga-Tech	04/14/2016 501 MB
Radium 228 Precision (±)	1.1	pCi/L			Ga-Tech	04/14/2016 501 MB

These results apply only to the samples tested.

RL - Reporting Limit

- | | | |
|--------------------|--|--|
| Qualifiers: | B Analyte detected in the associated Method Blank | C Calculated Value |
| | E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| | J Analyte detected below quantitation limits | L Analyzed by another laboratory |
| | M Value exceeds Monthly Ave or MCL or is less than LCL | ND Not Detected at the Reporting Limit |
| | O Outside the Range of Dilutions | S Spike Recovery outside accepted recovery limits |
| | X Matrix Effect | |

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/20/2016
Report ID S1604063002
(Replaces S1604063001)

ProjectName: 201682-0771
Lab ID: S1604063-009
ClientSample ID: 16-W610 MW103
COC: 201682-0771

WorkOrder: S1604063
CollectionDate: 3/31/2016 5:07:00 PM
DateReceived: 4/5/2016 9:55:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
----------	--------	-------	------	----	--------	--------------------

Radionuclides - Total

Radium 226	0.3	pCi/L		0.2	SM 7500 Ra-B	04/13/2016 830 MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	04/13/2016 830 MB
Radium 228	-1.4	pCi/L		1	Ga-Tech	04/14/2016 802 MB
Radium 228 Precision (±)	1.1	pCi/L			Ga-Tech	04/14/2016 802 MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by another laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/20/2016
Report ID S1604063002
(Replaces S1604063001)

ProjectName: 201682-0771
Lab ID: S1604063-010
ClientSample ID: 16-W611 MW109
COC: 201682-0771

WorkOrder: S1604063
CollectionDate: 3/31/2016 3:14:00 PM
DateReceived: 4/5/2016 9:55:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.5	pCi/L		0.2	SM 7500 Ra-B	04/13/2016 830	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	04/13/2016 830	MB
Radium 228	-1.5	pCi/L		1	Ga-Tech	04/14/2016 1103	MB
Radium 228 Precision (±)	1.0	pCi/L			Ga-Tech	04/14/2016 1103	MB

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - M Value exceeds Monthly Ave or MCL or is less than LCL
 - O Outside the Range of Dilutions
 - X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



ANALYTICAL QC SUMMARY REPORT

CLIENT: MVTL Laboratories, Inc.
Work Order: S1604063
Project: 201682-0771

Date: 6/20/2016
Report ID: S1604063002
(Replaces S1604063001)

Radium 228 by Ga/Tech		Sample Type	MBLK		Units: pCi/L				
MB-335 (04/12/16 16:50)	Analyte	RunNo:	133003	PrepDate:	04/06/16 12:00	BatchID:	11625		
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Total Radium 228		ND	1						

Radium 228 by Ga/Tech		Sample Type	LCS		Units: pCi/L				
LCS-335 (04/12/16 19:51)	Analyte	RunNo:	133003	PrepDate:	04/06/16 12:00	BatchID:	11625		
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Total Radium 228		54	1	79		68.5	61.3 - 120		

Radium 228 by Ga/Tech		Sample Type	MS		Units: pCi/L				
MS-335 (04/13/16 01:52)	Analyte	RunNo:	133003	PrepDate:	04/06/16 12:00	BatchID:	11625		
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Total Radium 228		54	1	79	ND	67.8	64.3 - 120		

Radium 228 by Ga/Tech		Sample Type	MSD		Units: pCi/L				
MSD-335 (04/13/16 04:53)	Analyte	RunNo:	133003	PrepDate:	04/06/16 12:00	BatchID:	11625		
		Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
Total Radium 228		51	1	54	5.94	63.9	20	S	

Radium 226 in Water - Total		Sample Type	MBLK		Units: pCi/L				
MB-1595 (04/12/16 15:28)	Analyte	RunNo:	132925	PrepDate:	04/07/16 0:00	BatchID:	11615		
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Radium 226		ND	0.2						

Radium 226 in Water - Total		Sample Type	LCS		Units: pCi/L				
LCS-1595 (04/12/16 15:28)	Analyte	RunNo:	132925	PrepDate:	04/07/16 0:00	BatchID:	11615		
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Radium 226		5.3	0.2	5.54		96.4	67.1 - 122		

Radium 226 in Water - Total		Sample Type	LCSD		Units: pCi/L				
LCSD-1595 (04/12/16 15:28)	Analyte	RunNo:	132925	PrepDate:	04/07/16 0:00	BatchID:	11615		
		Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
Radium 226		5.7	0.2	5.3	6.59	103	20		

Qualifiers:	B Analyte detected in the associated Method Blank	E Value above quantitation range
	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	L Analyzed by another laboratory	ND Not Detected at the Reporting Limit
	O Outside the Range of Dilutions	R RPD outside accepted recovery limits
	S Spike Recovery outside accepted recovery limits	X Matrix Effect



LABORATORIES, Inc.
 2616 E Broadway Ave
 Bismarck, ND 58501

Chain of Custody Record

Phone: (701) 258-9720
 Toll Free: (800) 279-6885 Fax: (701) 258-9724

201682-0771

Company Name and Address: <u>MVTI</u> 2616 E Broadway Bismarck, ND 58501	Account #:	Phone #: 701-258-9720
	Contact: Claudette	Fax #: For faxed report check box <input type="checkbox"/>
Billing Address (indicate if different from above): PO Box 249 New Ulm, MN 56073	Name of Sampler:	E-mail: ccarroll@mvti.com For e-mail report check box <input type="checkbox"/>
	Quote Number	Date Submitted: 4/1/2016
	Project Name/Number:	Purchase Order #: BL5545

Sample Information						Bottle Type					Analysis
IML Lab Number	MVTI Lab Number	Client Sample ID	Sample Type	Date Sampled	Time Sampled	Untreated	1000 ml HNO3	VOC Vials Unpreserved	Glass Jar	Other	Analysis Required
51604063-001 ^{KB 4.5.16}	16-W601	MW110		3/30/2016	1206						Ra226 & Ra228 on all
002	16-W601	MW119		3/30/2016	1355						
003	16-W603	MW210		3/30/2016	1717						
004	16-W604	MW102		3/30/2016	1912						
005	16-W606	MW111	^{30 ml 16}	3/31/2016	857						
006	16-W607	MW117	^{23 ml 16}	3/31/2016	1809						
007	16-W608	Dup 1		3/30/2016	NA						
008	16-W609	Field Blank		3/31/2016	NA						
009	16-W610	MW103		3/31/2016	1707						
010	16-W611	MW109		3/31/2016	1514						

Comments: All results must be reported as a numerical value.

Transferred by:	Date:	Time:	Sample Condition:	Received by:	Date:	Temp:
C. Jackson	4/1/2016	1700		Kathy Boyd IML	5.4.5.16	13.4
2.					KB 4.5.16	14.2

2 coolers



CASE NARRATIVE

MVTL Lab Reference No/SDG: 201682-0812
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater - March 2016 Event
MVTL Laboratory Identifications: 16-W639
Page 1 of 1

Table with 2 columns: MDU Sample Identification, MVTL Laboratory #. Row 1: MW118, 16-W639

I. RECEIPT

- All samples were received at the laboratory on 6 April 2016 at 0814.
Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
Samples were received on ice and evidence of cooling had begun.
Temperature of samples upon receipt was 4.4°C.
All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
No other exceptions on sample receipt were encountered on this sample set unless noted here.

II. HOLDING TIMES

- With the exception of laboratory pH, all holding times were met for both preparation and analysis unless noted here.

III. METHODS

- Approved methodology was followed for all sample analyses.
Methods 6010D and Method 6020B were used to analyze the metals.

IV. ANALYSIS

- All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted here and/or flagged on the individual analytical laboratory report.
For some metals, the reported results were elevated due to instrument performance at the lower limit of quantitation (LLOQ).
Method blank for total suspended solids had a hit at the reporting limit.
One selenium spike recovery within the batch was outside of the acceptable limits. High spike recovery was determined to be due to matrix. Data was accepted based on the acceptable recovery of the LCS. No further action was taken.

All laboratory data has been approved by MVTL Laboratories.

SIGNED: Claudette Carroll DATE: 27 Apr 16
Claudette Carroll - MVTL Bismarck Laboratory Manager



MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
 2 North German St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
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 www.mvtl.com



Page: 1 of 2

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 15 Apr 16
 Lab Number: 16-W639
 Work Order #: 82-0812
 Account #: 002800
 Date Sampled: 5 Apr 16 13:10
 Date Received: 6 Apr 16 8:14
 Sampled By: MVTL Field Services

Project Name: CCR Groundwater/March Event

PO #: 160249 OP

Sample Description: MW118
 Sample Site: MDU Bismarck

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	6 Apr 16	ML
pH	* 7.7	units	N/A	SM4500 H+ B	6 Apr 16 17:00	ML
Total Suspended Solids	7	mg/l	1	I3765-85	6 Apr 16 16:23	ML
pH - Field	8.01	units	NA	SM 4500 H+ B	5 Apr 16 13:10	DJN
Temperature - Field	8.32	Degrees C	NA	SM 2550B	5 Apr 16 13:10	DJN
Total Alkalinity	259	mg/l CaCO3	20	SM2320-B	6 Apr 16 17:00	ML
Conductivity - Field	1634	umhos/cm	1	EPA 120.1	5 Apr 16 13:10	DJN
Fluoride	1.29	mg/l	0.10	SM4500-F-C	6 Apr 16 17:00	ML
Sulfate	592	mg/l	5.00	ASTM D516-07	7 Apr 16 9:23	EMS
Chloride	23.8	mg/l	1.0	SM4500-C1-E	7 Apr 16 11:08	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	12 Apr 16 11:28	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	12 Apr 16 13:10	EV
Total Dissolved Solids	1090	mg/l	5	I1750-85	6 Apr 16 14:00	ML
Calcium - Total	88.4	mg/l	1.0	6010	8 Apr 16 14:05	KMD
Magnesium - Total	133	mg/l	1.0	6010	8 Apr 16 14:05	KMD
Sodium - Total	84.4	mg/l	1.0	6010	8 Apr 16 14:05	KMD
Potassium - Total	8.2	mg/l	1.0	6010	8 Apr 16 14:05	KMD
Lithium - Total	< 0.1	mg/l	0.10	6010	15 Apr 16 10:00	KMD
Boron - Total	1.76	mg/l	0.10	6010	12 Apr 16 13:04	KMD
Calcium - Dissolved	83.8	mg/l	1.0	6010	8 Apr 16 14:05	KMD
Magnesium - Dissolved	134	mg/l	1.0	6010	8 Apr 16 14:05	KMD
Sodium - Dissolved	82.9	mg/l	1.0	6010	8 Apr 16 14:05	KMD
Potassium - Dissolved	8.2	mg/l	1.0	6010	8 Apr 16 14:05	KMD
Lithium - Dissolved	< 0.1	mg/l	0.10	6010	15 Apr 16 11:00	KMD
Boron - Dissolved	1.76	mg/l	0.10	6010	12 Apr 16 16:04	KMD
Antimony - Total	< 0.001	mg/l	0.0010	6020	9 Apr 16 11:15	KMD
Arsenic - Total	< 0.005 ^	mg/l	0.0020	6020	9 Apr 16 11:15	KMD
Barium - Total	0.0398	mg/l	0.0020	6020	9 Apr 16 11:15	KMD
Beryllium - Total	< 0.001 ^	mg/l	0.0005	6020	10 Apr 16 9:10	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020	9 Apr 16 11:15	KMD
Chromium - Total	< 0.005 ^	mg/l	0.0020	6020	9 Apr 16 11:15	KMD
Cobalt - Total	< 0.002	mg/l	0.0020	6020	9 Apr 16 11:15	KMD
Lead - Total	< 0.0005	mg/l	0.0005	6020	9 Apr 16 11:15	KMD
Molybdenum - Total	0.0610	mg/l	0.0020	6020	9 Apr 16 11:15	KMD
Selenium - Total	0.0976	mg/l	0.0020	6020	9 Apr 16 20:30	CC
Thallium - Total	0.0009	mg/l	0.0005	6020	9 Apr 16 11:15	KMD
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020	9 Apr 16 13:00	KMD

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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MEMBER
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Quality Control Report

Lab ID: 16-W639

Project: CCR Groundwater/March Event

Work Order: 201682-0812

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Antimony - Dissolved mg/l	0.1000	105	80-120	0.100 0.100	16-W599QC 16-W702QC	0.0043 < 0.001	0.1054 0.1043	101 104	75-125 75-125	0.1054 0.1043	0.1104 0.1096	106 110	4.6 5.0	20 20	- -	- -	< 0.001
Antimony - Total mg/l	0.1000	108	80-120	0.400 0.400 0.100	16-W634QC 16-W648QC 16-W659QC	< 0.001 < 0.001 < 0.001	0.4002 0.4194 0.1066	100 105 107	75-125 75-125 75-125	0.4002 0.4194 0.1066	0.4102 0.4202 0.1066	103 105 107	2.5 0.2 0.0	20 20 20	- - -	- - -	< 0.001
Arsenic - Dissolved mg/l	0.1000	107	80-120	0.100 0.100	16-W599QC 16-W702QC	0.0040 < 0.002	0.1087 0.1138	105 114	75-125 75-125	0.1087 0.1138	0.1108 0.1114	107 111	1.9 2.1	20 20	- -	- -	< 0.002
Arsenic - Total mg/l	0.1000	109	80-120	0.400 0.400 0.100	16-W634QC 16-W648QC 16-W659QC	< 0.002 < 0.002 < 0.002	0.4506 0.4412 0.1088	113 110 109	75-125 75-125 75-125	0.4506 0.4412 0.1088	0.4266 0.4262 0.1079	107 107 108	5.5 3.5 0.8	20 20 20	- - -	- - -	< 0.002
Barium - Dissolved mg/l	0.1000	110	80-120	0.100 0.100	16-W599QC 16-W702QC	0.0220 0.0315	0.1270 0.1322	105 101	75-125 75-125	0.1270 0.1322	0.1325 0.1338	110 102	4.2 1.2	20 20	- -	- -	< 0.002
Barium - Total mg/l	0.1000	107	80-120	0.400 0.400 0.100	16-W634QC 16-W648QC 16-W659QC	< 0.002 0.0084 0.0896	0.4194 0.4506 0.1922	105 111 103	75-125 75-125 75-125	0.4194 0.4506 0.1922	0.3958 0.4534 0.1938	99 111 104	5.8 0.6 0.8	20 20 20	- - -	- - -	< 0.002
Beryllium - Dissolved mg/l	0.1000	112	80-120	0.100 0.100	16-W599 16-W702QC	< 0.001 < 0.001	0.1041 0.1064	104 106	75-125 75-125	0.1041 0.1064	0.1084 0.1062	108 106	4.0 0.2	20 20	- -	- -	< 0.0005
Beryllium - Total mg/l	0.1000	103	80-120	0.400 0.400	16-W639 16-W648	< 0.001 < 0.001	0.4100 0.4228	102 106	75-125 75-125	0.4100 0.4228	0.3964 0.4230	99 106	3.4 0.0	20 20	- -	- -	< 0.0005
Boron - Dissolved mg/l	0.40	100	85-115	0.300	16-W639	1.76	1.99	77	75-125	1.99	2.00	80	0.5	20	- -	- -	< 0.1 < 0.1
Boron - Total mg/l	0.40	100	80-120	0.400 0.400 0.600	16-W592 16-W639 16-W648	0.18 1.76 0.44	0.58 2.19 1.03	100 108 98	75-125 75-125 75-125	0.58 2.19 1.03	0.58 2.14 1.02	100 95 97	0.0 2.3 1.0	20 20 20	- - -	- - -	< 0.1 < 0.1
Cadmium - Dissolved mg/l	0.1000	108	80-120	0.100 0.100	16-W599QC 16-W702QC	< 0.0005 < 0.0005	0.1036 0.1070	104 107	75-125 75-125	0.1036 0.1070	0.1099 0.1112	110 111	5.9 3.8	20 20	- -	- -	< 0.0005



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MEMBER
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Quality Control Report

Lab ID: 16-W639

Project: CCR Groundwater/March Event

Work Order: 201682-0812

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Cadmium - Total mg/l	0.1000	110	80-120	0.400	16-W634QC	< 0.0005	0.4022	101	75-125	0.4022	0.4244	106	5.4	20	-	-	< 0.0005
				0.400	16-W648QC	< 0.0005	0.4218	105	75-125	0.4218	0.4298	107	1.9	20	-	-	
				0.100	16-W659QC	0.0010	0.1092	108	75-125	0.1092	0.1106	110	1.3	20	-	-	
Calcium - Dissolved mg/l	20.0	94	85-115	100	16-W639	83.8	172	88	75-125	172	176	92	2.3	20	-	-	< 1 < 1
Calcium - Total mg/l	20.0	94	80-120	2000	16-M828	1730	3580	92	75-125	955	950	94	0.5	20	-	-	< 1 < 1
				500	16-W651	482	955	95	75-125	955	950	94	0.5	20	-	-	
Chloride mg/l	30.0	98	80-120	30.0	16-W649	< 1	28.5	95	80-120	28.5	27.7	92	2.8	20	-	-	< 1 < 1
	30.0	98	80-120	30.0	16-W621	6.3	34.7	95	80-120	34.7	35.2	96	1.4	20	-	-	
Chromium - Dissolved mg/l	0.1000	102	80-120	0.100	16-W599QC	< 0.002	0.1008	101	75-125	0.1008	0.1042	104	3.3	20	-	-	< 0.002
				0.100	16-W702QC	0.0087	0.1117	103	75-125	0.1117	0.1086	100	2.8	20	-	-	
Chromium - Total mg/l	0.1000	104	80-120	0.400	16-W634QC	< 0.002	0.4120	103	75-125	0.4120	0.3970	99	3.7	20	-	-	< 0.002
				0.400	16-W648QC	0.0024	0.4160	103	75-125	0.4160	0.4092	102	1.6	20	-	-	
				0.100	16-W659QC	0.0037	0.1010	97	75-125	0.1010	0.1054	102	4.3	20	-	-	
Cobalt - Dissolved mg/l	0.1000	101	80-120	0.100	16-W599QC	< 0.002	0.0988	99	75-125	0.0988	0.1023	102	3.5	20	-	-	< 0.002
				0.100	16-W702QC	< 0.002	0.1030	103	75-125	0.1030	0.1023	102	0.7	20	-	-	
Cobalt - Total mg/l	0.1000	108	80-120	0.400	16-W634QC	< 0.002	0.4192	105	75-125	0.4192	0.4062	102	3.1	20	-	-	< 0.002
				0.400	16-W648QC	< 0.002	0.4010	100	75-125	0.4010	0.4032	101	0.5	20	-	-	
				0.100	16-W659QC	< 0.002	0.1006	101	75-125	0.1006	0.1021	102	1.5	20	-	-	
Fluoride mg/l	0.50	98	90-110	0.500	16-M828	2.60	3.01	82	80-120	3.01	3.11	102	3.3	20	-	-	< 0.1 < 0.1
	0.50	96	90-110									102					
Lead - Dissolved mg/l	0.1000	103	80-120	0.100	16-W599QC	< 0.0005	0.0968	97	75-125	0.0968	0.0966	97	0.2	20	-	-	< 0.0005
				0.100	16-W702QC	0.0006	0.0934	93	75-125	0.0934	0.0936	93	0.2	20	-	-	
Lead - Total mg/l	0.1000	101	80-120	0.400	16-W634QC	< 0.0005	0.4100	102	75-125	0.4100	0.3938	98	4.0	20	-	-	< 0.0005
				0.400	16-W648QC	< 0.0005	0.3990	100	75-125	0.3990	0.4000	100	0.3	20	-	-	
				0.100	16-W659QC	0.0023	0.0984	96	75-125	0.0984	0.0999	98	1.5	20	-	-	



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Quality Control Report

Lab ID: 16-W639

Project: CCR Groundwater/March Event

Work Order: 201682-0812

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Lithium - Dissolved mg/l	0.40	110	85-115	0.400	16-W683	0.33	0.77	110	75-125	0.77	0.77	110	0.0	20	-	-	< 0.1 < 0.1
Lithium - Total mg/l	0.40	115	85-115	0.400 2.00 2.00	16-W639 16-W648 16-W680	0.10 1.44 1.02	0.56 3.58 3.34	115 107 116	75-125 75-125 75-125	0.56 3.58 3.34	0.54 3.56 3.25	110 106 112	3.6 0.6 2.7	20 20 20	- - -	- - -	< 0.1 < 0.1
Magnesium - Dissolved mg/l	20.0	104	80-120	100	16-W639	134	219	85	75-125	219	225	91	2.7	20	-	-	< 1 < 1
Magnesium - Total mg/l	20.0	104	80-120	2000 500	16-M828 16-W651	< 20 438	2040 935	102 99	75-125 75-125	935	930	98	0.5	20	- -	- -	< 1 < 1
Mercury - Dissolved mg/l	0.0020	90	85-115	0.002	16-W683	< 0.0002	0.0018	90	70-130	0.0018	0.0018	90	0.0	20	-	-	< 0.0002
Mercury - Total mg/l	0.0020	95	85-115	0.002 0.002 0.002	16-W621 16-D1386 16-W649	< 0.0002 < 0.0002 < 0.0002	0.0019 0.0017 0.0018	95 85 90	70-130 70-130 70-130	0.0019 0.0017 0.0018	0.0018 0.0017 0.0018	90 85 90	5.4 0.0 0.0	20 20 20	- - -	- - -	< 0.0002
Molybdenum - Dissolved mg/l	0.1000	89	80-120	0.100 0.100	16-W599QC 16-W702QC	0.0187 0.0036	0.1062 0.0922	88 89	75-125 75-125	0.1062 0.0922	0.1157 0.1003	97 97	8.6 8.4	20 20	- -	- -	< 0.002
Molybdenum - Total mg/l	0.1000	90	80-120	0.400 0.400 0.100	16-W634QC 16-W648QC 16-W659QC	0.0035 < 0.002 0.0025	0.3076 0.3324 0.0950	76 83 92	75-125 75-125 75-125	0.3076 0.3324 0.0950	0.3280 0.3560 0.1012	81 89 99	6.4 6.9 6.3	20 20 20	- - -	- - -	< 0.002
pH units	-	-	-	-	-	-	-	-	-	7.9	7.8	-	1.3	20	-	-	-
Potassium - Dissolved mg/l	10.0	92	85-115	20.0	16-W639	8.2	27.3	96	75-125	27.3	28.1	100	2.9	20	-	-	< 1 < 1
Potassium - Total mg/l	10.0	92	80-120	400 100	16-M828 16-W651	456 18.4	880 118	106 100	75-125 75-125	118	118	100	0.0	20	- -	- -	< 1 < 1
Selenium - Dissolved mg/l	0.1000	113	80-120	0.100 0.100	16-W599 16-W702	0.0717 < 0.002	0.1950 0.1186	123 119	75-125 75-125	0.1950 0.1186	0.2006 0.1204	129 120	2.8 1.5	20 20	- -	- -	< 0.002
Selenium - Total mg/l	0.1000	114	80-120	0.400 0.400 0.100	16-W639 16-W648 16-W659	0.0976 0.0802 < 0.002	0.5830 0.5804 0.1144	121 125 114	75-125 75-125 75-125	0.5830 0.5804 0.1144	0.5424 0.5738 0.1172	111 123 117	7.2 1.1 2.4	20 20 20	- - -	- - -	< 0.002



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Quality Control Report

Lab ID: 16-W639

Project: CCR Groundwater/March Event

Work Order: 201682-0812

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Sodium - Dissolved mg/l	20.0	102	85-115	100	16-W639	82.9	180	97	75-125	180	177	94	1.7	20	-	-	< 1 < 1
Sodium - Total mg/l	20.0	102	80-120	2000 500	16-M828 16-W651	5380 232	7220 715	92 97	75-125 75-125	715	720	98	0.7	20	-	-	< 1 < 1
Sulfate mg/l	100	101	90-110	100	16-W598	< 5	101	101	80-120	101	97.1	97	3.9	20	-	-	< 5
Thallium - Dissolved mg/l	0.1000	101	80-120	0.100 0.100	16-W599QC 16-W702QC	< 0.0005 < 0.0005	0.0986 0.0962	99 96	75-125 75-125	0.0986 0.0962	0.1000 0.0969	100 97	1.4 0.7	20 20	-	-	< 0.0005
Thallium - Total mg/l	0.1000	101	80-120	0.400 0.400 0.100	16-W634QC 16-W648QC 16-W659QC	0.0010 < 0.0005 < 0.0005	0.3772 0.3686 0.1012	94 92 101	75-125 75-125 75-125	0.3772 0.3686 0.1012	0.3740 0.3732 0.1006	93 93 101	0.9 1.2 0.6	20 20 20	-	-	< 0.0005
Total Alkalinity mg/l CaCO3	410 410	98 99	90-110 90-110	410	16-W639	259	650	95	80-120	650	652	96	0.3	20	98	80-120	< 20 < 20
Total Dissolved Solids mg/l	-	-	-	-	-	-	-	-	-	1090	1170	-	7.1	20	-	-	< 5
Total Suspended Solids mg/l	-	-	-	-	-	-	-	-	-	346 214	291 202	-	17.3 5.8	20 20	-	-	1

Approved by: C. Cantelano
27-Apr-16



Laboratories, Inc.

2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name:				Name of Sampler(s):			
MDU	Lewis and Clark	CCR Groundwater	March Event	<i>Parren Nieswaag</i>			
Report To: MDU			Carbon Copy:			Work Order Number:	
Attn: Samantha Marshall			Attn:			82-0812	
Address: 400 N. 4th St			Address:				
Bismarck, ND 58501							
Phone: 701-222-7829							

Sample Information				Bottle Type				Field Parameters			Analysis				
Lab Number	Sample ID	Date	Time	Sample Type	Gradient	500 ml HNO ₃	1 liter	500 ml HNO ₃ (filtered)			Field Temperature °C	Field Spec. Cond.	Field pH	Analysis Required	
W639	MW118	5 Apr 16	1310	GW	Up	X	X	X			8.32	1634	8.01	MDU CCR List with TSS and Dissolved CCR Metals. No RadChem.	

Comments:

	Transferred by:	Sample Condition	Date/Time	Received by:	Sample Condition	Date/Time	°C
1	<i>Don Nies</i>	Login	6 Apr 16 0814	C. JACKSON		6 Apr 16 0814	4.4°C
2							7M588 ROI
3							



CASE NARRATIVE

MVTL Lab Reference No/SDG: 201682-0813
IML Lab Reference No/SDG: S1604129
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – March 2016 Event

MVTL Laboratory Identifications: 16-W640
IML Laboratory Identifications: S1604129-001

Page 1 of 1

Table with 3 columns: MDU Sample Identification, MVTL Laboratory #, IML Laboratory #. Row 1: MW118, 16-W640, S1604129-001

I. RECEIPT

- All samples were received at the laboratory on 6 April 2016 at 0814.
Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
Samples were received on ice and evidence of cooling had begun.
Temperature of samples upon receipt was 4.4°C.
No other exceptions on sample receipt were encountered on this sample set unless noted here.
All samples requiring radiochemistry analysis were sent via courier to Inter-Mountain Labs (IML) for analysis there. Samples were received at IML on 8 April 2016.
All samples were properly preserved unless noted on the individual analytical laboratory report or on the IML Case Narrative.

II. HOLDING TIMES

- All holding times were met for both preparation and analysis unless noted on the individual analytical laboratory report or on the IML Case Narrative.

III. METHODS

- Approved methodology was followed for all sample analyses.
Please refer to the IML Case Narrative for more information regarding methodology.

IV. ANALYSIS

- All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted on the individual analytical laboratory report or on the IML Case Narrative.

All laboratory data has been approved by MVTL Laboratories.

SIGNED: Claudette Carroll DATE: 2 May 16
Claudette Carroll - MVTL Bismarck Laboratory Manager



Date: 4/29/2016

CLIENT: MVTL Laboratories, Inc.
Project:
Lab Order: S1604129

CASE NARRATIVE
Report ID: S1604129001

Sample 16-W640 MW118 was received on April 8, 2016.

All samples were received and analyzed within the EPA recommended holding times, except those noted below in this case narrative. Samples were analyzed using the methods outlined in the following references:

"Standard Methods For The Examination of Water and Wastewater", approved method versions
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition
40 CFR Parts 136 and 141
40 CFR Part 50, Appendices B, J, L, and O
Methods indicated in the Methods Update Rule published in the Federal Register Friday, May 18, 2012
ASTM approved and recognized standards

All Quality Control parameters met the acceptance criteria defined by EPA and Inter-Mountain Laboratories except as indicated in this case narrative.

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 4/29/2016
Report ID S1604129001

ProjectName:
Lab ID: S1604129-001
ClientSample ID: 16-W640 MW118
COC:

WorkOrder: S1604129
CollectionDate: 4/5/2016 1:10:00 PM
DateReceived: 4/8/2016 11:35:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
----------	--------	-------	------	----	--------	--------------------

Radionuclides - Total

Radium 226	0.1	pCi/L		0.2	SM 7500 Ra-B	04/19/2016 1504 MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	04/19/2016 1504 MB
Radium 228	-1.8	pCi/L		1	Ga-Tech	04/22/2016 120 MB
Radium 228 Precision (±)	1.1	pCi/L			Ga-Tech	04/22/2016 120 MB

These results apply only to the samples tested.

RL - Reporting Limit

- | | | |
|--------------------|--|--|
| Qualifiers: | B Analyte detected in the associated Method Blank | C Calculated Value |
| | E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| | J Analyte detected below quantitation limits | L Analyzed by another laboratory |
| | M Value exceeds Monthly Ave or MCL or is less than LCL | ND Not Detected at the Reporting Limit |
| | O Outside the Range of Dilutions | S Spike Recovery outside accepted recovery limits |
| | X Matrix Effect | |

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



ANALYTICAL QC SUMMARY REPORT

CLIENT: MVTL Laboratories, Inc.

Date: 4/29/2016

Work Order: S1604129

Report ID: S1604129001

Project:

Radium 228 by Ga/Tech		Sample Type	MBLK		Units: pCi/L				
MB-336 (04/21/16 10:15)	Analyte	RunNo:	133408	PrepDate:	04/14/16 14:00	BatchID:	11674		
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Total Radium 228		ND	1						

Radium 228 by Ga/Tech		Sample Type	LCS		Units: pCi/L				
LCS-336 (04/21/16 13:16)	Analyte	RunNo:	133408	PrepDate:	04/14/16 14:00	BatchID:	11674		
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Total Radium 228		34	1	39.5		86.0	61.3 - 120		

Radium 228 by Ga/Tech		Sample Type	MS		Units: pCi/L				
MS-336 (04/21/16 19:18)	Analyte	RunNo:	133408	PrepDate:	04/14/16 14:00	BatchID:	11674		
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Total Radium 228		29	1	39.5	ND	73.9	64.3 - 120		

Radium 228 by Ga/Tech		Sample Type	MSD		Units: pCi/L				
MSD-336 (04/21/16 22:19)	Analyte	RunNo:	133408	PrepDate:	04/14/16 14:00	BatchID:	11674		
		Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
Total Radium 228		32	1	29	10.1	81.7	20		

Radium 226 in Water - Total		Sample Type	MBLK		Units: pCi/L				
MB-1597 (04/19/16 15:04)	Analyte	RunNo:	133143	PrepDate:	04/14/16 0:00	BatchID:	11640		
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Radium 226		ND	0.2						

Radium 226 in Water - Total		Sample Type	LCS		Units: pCi/L				
LCS-1597 (04/19/16 15:04)	Analyte	RunNo:	133143	PrepDate:	04/14/16 0:00	BatchID:	11640		
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Radium 226		4.9	0.2	5.54		88.3	67.1 - 122		

Radium 226 in Water - Total		Sample Type	LCSD		Units: pCi/L				
LCSD-1597 (04/19/16 15:04)	Analyte	RunNo:	133143	PrepDate:	04/14/16 0:00	BatchID:	11640		
		Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
Radium 226		5.7	0.2	4.9	15.9	104	20		

Radium 226 in Water - Total		Sample Type	MS		Units: pCi/L				
S1604125-002B MS (04/19/16 15:04)	Analyte	RunNo:	133143	PrepDate:	04/14/16 0:00	BatchID:	11640		
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Radium 226		5.3	0.2	5.54	ND	95.4	65 - 131		

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - H Holding times for preparation or analysis exceeded
 - L Analyzed by another laboratory
 - O Outside the Range of Dilutions
 - S Spike Recovery outside accepted recovery limits
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - ND Not Detected at the Reporting Limit
 - R RPD outside accepted recovery limits
 - X Matrix Effect



LABORATORIES, Inc.
 2616 E Broadway Ave
 Bismarck, ND 58501

Chain of Custody Record

Phone: (701) 258-9720
 Toll Free: (800) 279-6885 Fax: (701) 258-9724

Company Name and Address: <u>MVTL</u> <u>2616 E Broadway</u> <u>Bismarck, ND 58501</u>	Account #:	Phone #: 701-258-9720
	Contact: Claudette	Fax #: For faxed report check box <input type="checkbox"/>
Billing Address (indicate if different from above): <u>PO Box 249</u> <u>New Ulm, MN 56073</u>	Name of Sampler:	E-mail: ccarroll@mvtl.com For e-mail report check box <input type="checkbox"/>
	Quote Number	Date Submitted: 4/6/2016
	Project Name/Number:	Purchase Order #: BL5548

Sample Information						Bottle Type					Analysis	
IML Lab Number	MVTL Lab Number	Client Sample ID	Sample Type	Date Sampled	Time Sampled	Untreated	1000 ml HNO3	VOC Vials	Unpreserved	Glass Jar	Other	Analysis Required
S1604129 -001	16-W640	MW118		4/5/2016	1310							Radium226 & Radium228

Comments: All results must be reported as a numerical value.

Transferred by:	Date:	Time:	Sample Condition:	Received by:	Date:	Temp:
C. Jackson	4/6/2016	1700		Kathy Boyd	4.8.16	11:35 14.4°C
2.						



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark (MDU L&C)

Sample ID: ^{5 Apr 16} MW102 MW118

Date: 5 Apr 16

Sampling Personal: Darren Nieswaag

Weather Conditions: Temp: 50 °F Wind: SW 20 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	No	
Well Labeled?	Yes	No	
Casing Straight?	Yes	No	
Grout Seal Intact?	Yes	No	Not Visible
Repairs Necessary:	_____		
Casing Diameter:	2"		
Water Level Before Purge:	9.23	Ft	
Well Depth:	11.90	Ft	
Well Volume:	1.7	Liters	
Water Level After Sample:	9.23	Ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Sampling Method:	SS Geosub	Bailer	Peristaltic	<u>Bladder</u>	Whale	Grab
Other:						
Dedicated Equipment?	Yes	No				
Duplicate Sample?	Yes	No	ID:	_____		
Pumping Rate:	100	ml/min				
Time Purging Began:	1110	am pm				
Time of Sampling:	1310	am pm				
Well Purged Dry?	Yes	No				
Time Purged Dry:	_____	am / pm				
Sample Appearance:	Clear Slightly Turbid / Turbid	Phase:	_____			
Color:	_____	Odor:	_____			

Field Measurements

SEQ #	Time	Temp	Cond.	pH	DO	ORP	Turbidity	water level	ML Liters Removed	Appearance
1	1115	9.15	1610	7.94	2.66	188.3	71000	9.23	500	Turbid
2	1120	8.72	1597	7.99	2.02	174.1	965	9.23	500	Turbid
3	1125	8.53	1580	8.07	1.58	168.6	316	9.23	500	Slightly turbid
4	1130	8.36	1574	8.06	1.34	165.9	162	9.23	500	Slightly turbid
5	1135	8.39	1574	8.05	1.23	166.5	97.4	9.23	500	Clear

Stabilized: ~~Yes~~ No

Total Liters Removed: _____

Comments:

Continued on next page

Bottles Collected

- ~~5 Apr 16 250 mL H₂SO₄~~
- 500 mL HNO₃
- 500 mL HNO₃ (Filtered)
- 1 Liter Raw
- 4 - 1 Liter Nitric



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: March

Sample ID: MW 118

Sampling Personal: Darren Nieswang

Field Measurements

* SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
116	1140	8.23	1572	8.09	1.14	164.9	59.0	9.23	500	clear
127	1145	8.28	1583	8.07	1.10	160.7	39.2	9.23	500	clear
138	1150	8.42	1593	8.09	1.10	160.2	29.4	9.23	500	clear
149	1155	8.40	1596	8.06	1.07	146.4	24.0	9.23	500	clear
1510	1200	8.33	1592	8.05	1.12	141.0	17.1	9.23	500	clear
1611	1205	8.46	1596	8.08	1.01	120.8	18.9	9.23	500	clear
1712	1210	8.36	1605	8.04	1.05	117.9	20.0	9.23	500	clear
1813	1215	8.93	1611	8.01	1.11	104.0	15.5	9.23	500	clear
1914	1220	9.00	1614	8.03	1.06	94.2	13.4	9.23	500	clear
2015	1225	8.65	1612	8.00	1.17	94.9	12.1	9.23	500	clear
2116	1230	9.59	1619	7.99	1.13	56.3	9.85	9.23	500	clear
2217	1235	9.64	1621	7.96	1.11	44.8	9.44	9.23	500	clear
2318	1240	8.96	1624	7.98	1.16	26.5	10.1	9.23	500	clear
2419	1245	8.90	1625	8.00	1.13	9.2	9.75	9.23	500	clear
2520	1250	9.78	1620	7.97	1.09	1.3	8.81	9.23	500	clear
2621	1255	9.81	1622	8.02	1.10	-8.4	9.03	9.23	500	clear
2722	1300	8.50	1626	8.00	1.11	-14.3	9.44	9.23	500	clear
2823	1305	8.50	1635	8.00	1.12	-12.8	9.58	9.23	500	clear
2924	1310	8.32	1634	8.01	1.12	-17.7	9.93	9.23	500	clear
3025	1315									

Stabilized: Yes No

Total Volume Removed: 12000 mL

Comments:

* - 5 Apr 16
DN

MVTL Calibration Worksheet

Site: MDU Lewis & Clark

Technician: Darren Nieswag

Instrument
(Circle One):

#1 650 MDS 08F100203

#2 650 MDS 04H14736

#3 556 MPS 12E102056

Pre Site Calibration						
Date:	Time:					
pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7	20.28	7.00	7.00	6.95-7.05	-20.0	0 +/- 50
Buffer 10	20.71	9.97	10.00	9.95-10.05	-197.5	-180 +/- 50
Conductivity						Check
Buffer 10000	20.35	1421	1415	±10%	1402	
ORP						
231 mV @ 25C	5.87	257.3	257.2	±10 mV		
DO				Barometric Pressure (mm Hg)		
	19.26	8.56	8.51	mg/L	703.3	

Post Site Check		
Time:	17:48	
pH	Temp °C	Reading
Buffer 7	21.59	7.04
Buffer 10	21.98	10.00
Conductivity		
Buffer 5000	22.06	10410
ORP		
231 mV @ 25C	22.26	254
DO		
	7.30	8.21

Date:	Time:					
pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7				6.95-7.05		0 +/- 50
Buffer 10				9.95-10.05		-180 +/- 50
Conductivity						Check
Buffer 10000				±10%	Buffer 5000	
ORP						
231 mV @ 25C				±10 mV		
DO				Barometric Pressure (mm Hg)		
				mg/L		

Time:		
pH	Temp °C	Reading
Buffer 7		
Buffer 10		
Conductivity		
Buffer 5000		
ORP		
231 mV @ 25C		
DO		



Laboratories, Inc.

2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name: MDU Lewis and Clark CCR Radiochem March Event				Name of Sampler(s): <i>Darren Nieswaag</i>			
Report To: MDU Attn: Samantha Marshall Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-222-7829				Carbon Copy: Attn: Address:			
				Work Order Number: <i>82-0813</i>			

Sample Information				Bottle Type				Field Parameters			Analysis		
Lab Number	Sample ID	Date	Time	Sample Type	Gradient	1000 ml HNO ₃				Field Temperature °C	Field Spec. Cond.	Field pH	Analysis Required
<i>W640</i>	MW118	<i>5 April 6</i>	<i>1310</i>	GW		4				<i>8.32</i>	<i>1634</i>	<i>8.01</i>	MDU CCR combined RadChem

Comments:

	Transferred by:	Sample Condition	Date/Time	Received by:	Sample Condition	Date/Time	° C
1	<i>Darren Nieswaag</i>	<i>Log in</i>	<i>6 April 0814</i>	<i>C. Jackson</i>		<i>6 April 0814</i>	<i>4.4°C</i>
2							<i>7M588 ROZ</i>
3							



June 28, 2016

Montana Dakota Utilities
Attn: Samantha Marshall
400 N. 4th St.
Bismarck, ND 58501

RE: Groundwater Sampling Event - May 2016 at MDU Lewis & Clark Site

Dear Ms. Marshall:

It was brought to my attention by BARR Eng. that well MW117 (sampled on May 26, 2016) pH on the chain of custody (COC) did not match the sampling readings on the field sheets. After my review of the chain of custody and field sheets I found that the above transcription errors to be true and made corrections to the chain of custody and field data report.

Please see the attached items with corrections and the MW117 field sheets.

If you have any questions, please call me at (701) 391-4900.

Sincerely,

Jeremy Meyer
MVTL Field Services



MVT L Laboratories Inc.
FIELD DATA REPORT

MDU Lewis and Clark
Quarterly CCR Sampling

Attn: Samantha Marshall
400 North 4th St
Bismarck, ND 58501

WO# 82-1420
82-1419

WELL ID	PURGE DATE	START PURGE TIME	SAMPLE DATE	TIME OF SAMPLE	WATER LEVEL START (FT)	TOTAL DEPTH (FT)	WATER LEVEL END (FT)	VOLUME IN WELL (Liters)	VOLUME REMOVED (mL)	SAMPLE METHOD	FIELD READINGS			SAMPLE APPEARANCE
											TEMP (°C)	EC	pH	
MW110	24-May-16	14:40	24-May-16	16:50	9.34	16.85	NA	4.6	13000.0	Bladder	9.31	1003	7.36	clear
MW119	24-May-16	17:54	24-May-16	18:44	9.18	16.65	9.29	4.6	5000.0	Bladder	10.80	1072	7.51	clear
MW210	25-May-16	7:10	25-May-16	8:25	9.43	35.45	10.94	16.0	7500.0	Bladder	10.09	1424	7.66	clear
MW102	26-May-16	8:20	26-May-16	9:50	19.44	24.70	19.77	3.2	9000.0	Bladder	10.15	6392	6.96	clear
MW118	25-May-16	13:48	25-May-16	15:43	8.80	11.90	8.88	1.9	11500.0	Bladder	11.36	1640	7.71	clear
MW111	25-May-16	11:39	25-May-16	12:44	8.16	17.80	8.38	5.9	6500.0	Bladder	9.46	2973	7.33	clear
MW117	25-May-16	10:27	26-May-16	7:13	6.32	11.51	9.85	3.2	5500.0	Bladder	10.14	7701	7.16	clear
MW103	25-May-16	16:50	25-May-16	18:05	10.67	21.15	10.68	6.5	7500.0	Bladder	10.87	1505	7.42	clear
MW109	25-May-16	19:087	25-May-16	19:58	10.62	17.05	10.69	4.0	5000.0	Bladder	10.94	1585	7.37	clear
MW101	NA	NA	24-May-16	14:13	9.27	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW105	NA	NA	24-May-16	14:29	9.07	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW106	NA	NA	24-May-16	14:26	9.79	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW107	NA	NA	24-May-16	14:16	4.68	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW108	NA	NA	24-May-16	14:23	17.03	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW116	NA	NA	24-May-16	14:20	10.61	NA	NA	NA	NA	WL	NA	NA	NA	Water Level

MVTL Calibration Worksheet

Site: MDU Lewis and Clark

Technician: Darren Nieswaag

Instrument
(Circle One):

#1 650 MDS 08F100203

#2 650 MDS 04H14736

#3 550 MPS 12E102056

Pre Site Calibration						
Date:	24 May 16		Time:	0646		
	pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv Range +/- 50
Buffer 7		21.35	7.01	7.00	6.95-7.05	-28.9 0 +/- 50
Buffer 10		21.25	10.03	10.00	9.95-10.05	-208.3 -180 +/- 50
Conductivity						Check
Buffer 1413		21.46	1334	1413	±10%	ICCA Buffer 5000 5010
ORP						
231 mV @ 25C		10.05	252.9	257.2	±10 mV	
DO						
14.34		20.67	8.45	8.37		Barometric Pressure (mm Hg)
						mg/L 707.3

Post Site Check			
Time:	1850		
	pH	Temp °C	Reading
Buffer 7		21.91	6.99
Conductivity			
Buffer 1413		21.24	1391

Pre Site Calibration						
Date:	24 May 16		Time:	0600		
	pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv Range +/- 50
Buffer 7		22.09	6.97	7.00	6.95-7.05	-27.4 0 +/- 50
Buffer 10		22.16	9.98	10.00	9.95-10.05	-205.3 -180 +/- 50
Conductivity						Check
Buffer 1413		21.97	1475	1413	±10%	ICCA Buffer 5000 5028
ORP						
231 mV @ 25C		10.21	256.8	257.6	±10 mV	
DO						
		21.27	8.65	8.17		Barometric Pressure (mm Hg)
						mg/L 704.4

Post Site Check			
Time:	20.04		
	pH	Temp °C	Reading
Buffer 7		20.12	7.01
Conductivity			
Buffer 1413		20.43	1415

MVTL Calibration Worksheet

Site: MDU Lewis and Clark

Technician: Darren Nieswaag

Instrument
(Circle One):

#1 650 MDS 08F100203

#2 650 MDS 04H14736

#3 556 MPS 12E102056

Pre Site Calibration						
Date:	Time:					
pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7				6.95-7.05		0 +/- 50
Buffer 10				9.95-10.05		-180 +/- 50
Conductivity						Check
Buffer 1413				±10%	Buffer 5000	
ORP						
231 mV @ 25C				±10 mV		
DO						
				Barometric Pressure (mm Hg)		
				mg/L		

Post Site Check		
Time:		
pH	Temp °C	Reading
Buffer 7		
Conductivity		
Buffer 1413		

Date:	Time:					
pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7	21.42	7.06	6.99	6.95-7.05	-29.5	0 +/- 50
Buffer 10	21.39	9.99	10.00	9.95-10.05	-207.4	-180 +/- 50
Conductivity						Check
Buffer 1413	21.30	1357	1415	±10%	Buffer 5000	4991
ORP						
231 mV @ 25C	7.51	256.8	259.2	±10 mV		
DO						
	21.02	7.60	8.25	Barometric Pressure (mm Hg)		
				mg/L		704.1

Time:		
pH	Temp °C	Reading
Buffer 7	15.95	6.97
Conductivity		
Buffer 1413	16.35	1402



Field Datasheet

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Water Level

Sampling Personnel:

Darran Nieswazy

Company:

MDU Lewis and Clark

Well ID	Date	Time	Depth to Water	Comments
MW101	24 May 16	1413	9.27	
MW105	24 May 16	1429	9.07	
MW106	24 May 16	1426	9.29	
MW107	24 May 16	1416	4.68	
MW108	24 May 16	1423	17.03	
MW116	24 May 16	1420	10.61	



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW110
Sampling Personal: DARRIN MITSUNAGA

Weather Conditions: Temp: 75 °F Wind: SW 5 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Well Labeled?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Casing Straight?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Grout Seal Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Not Visible
Repairs Necessary:		
Casing Diameter:	2"	
Water Level Before Purge:	9.34	ft
Total Well Depth:	16.85	ft
Well Volume:	4.7	liters
Depth to Top of Pump:	14.09	ft
Water Level After Sample:		ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	4 sec.
Dedicated Equip?:	Yes	<input checked="" type="checkbox"/> No	Recover:	56 sec.
Duplicate Sample?:	Yes	<input type="checkbox"/> No	PSI:	13
Duplicate Sample ID:			Pumping Rate:	100 mL/min
Purge Date:	24 May 16	Time Purging Began:	1440	am/pm
Well Purged Dry?	Yes	<input checked="" type="checkbox"/> No	Time Purged Dry:	— am/pm
Sample Date:	24 May 16	Time of Sampling:	1650	am/pm
Bottle	500 mL Nitric	1 Liter Raw		
List:	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

SEQ #	Stabilization (3 consecutive) Time	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.
2	1455	9.85	1005	7.36	2.96	78.3	101	9.52	500	clear
3	1505	9.93	1003	7.39	3.02	84.0	70.5	9.52	1000	clear
4	1515	9.84	1001	7.37	3.07	87.3	50.0	9.52	1000	clear
5	1525	9.66	999	7.37	3.09	89.2	45.8	9.52	1000	clear
6	1535	9.66	1000	7.36	3.00	94.0	31.8	9.52	1000	clear
7	1545	9.46	1000	7.36	3.11	95.4	17.2	9.52	1000	clear
8	1555	9.42	1002	7.37	3.13	95.8	13.6	9.52	1000	clear
9	1600	9.48	1001	7.37	3.14	96.5	11.4	9.52	1000	clear
10	1605	9.50	1000	7.38	3.14	97.9	11.7	9.52	500	clear

Stabilized: Yes No

Total Volume Removed: — mL

Comments:

Next page.



2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark

Event: 2016

Sample ID: MW110

Sampling Personal: Darren Medway

Date: 24 May 16

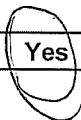
Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	1610	9.46	1002	7.37	3.36	98.4	9.12	9.52	500	clear
12	1615	9.57	1002	7.36	3.11	99.0	8.47	9.52	500	clear
13	1620	9.63	1003	7.36	3.14	98.6	7.49	9.52	500	clear
14	1625	9.64	1003	7.36	3.16	98.3	6.80	9.52	500	clear
15	1630	9.55	1001	7.37	3.17	97.6	5.43	9.52	500	clear
16	1635	9.56	1001	7.37	3.11	97.0	6.20	9.52	500	clear
17	1640	9.40	1001	7.37	3.00	97.1	5.57	9.52	500	clear
18	1645	9.43	1001	7.38	3.18	97.5	5.93	9.52	500	clear
19	1650	9.31	1003	7.36	3.18	98.4	5.61	9.52	500	clear
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Stabilized: Yes No

Total Volume Removed: 13,000 mL

Comments:





2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
 Event: 2016
 Sample ID: MW102
 Sampling Personal: Darren Misway

Weather Conditions: Temp: 55 °F Wind: E 5-10 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	<u>(Not Visible)</u>
Repairs Necessary:			
Casing Diameter:	<u>2"</u>		
Water Level Before Purge:	<u>19.44</u>	ft	
Total Well Depth:	<u>24.70</u>	ft	
Well Volume:	<u>3.3</u>	liters	
Depth to Top of Pump:	<u>21.22</u>	ft	
Water Level After Sample:	<u>19.77</u>	ft	
Measurement Method:	<u>Electric Water Level Indicator</u>		

Sampling Information

Purging Method:	<u>Bladder</u>	Control Settings	
Sampling Method:	<u>Bladder</u>	Purge: <u>564</u>	sec.
Dedicated Equip?:	Yes <input type="checkbox"/>	Recover: <u>56</u>	sec.
Duplicate Sample?:	Yes <input type="checkbox"/>	PSI: <u>10-15</u>	
Duplicate Sample ID:		Pumping Rate: <u>100</u>	mL/min
Purge Date:	<u>26 May 16</u>	Time Purging Began:	<u>0820</u> am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/>	Time Purged Dry:	am/pm
Sample Date:	<u>26 May 16</u>	Time of Sampling:	<u>0950</u> am/pm
Bottle List:	500 mL Nitric	1 Liter Raw	
	500 mL Nitric (filtered)	4 - 1 Liter Nitric	

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
										SEQ #
1	0825	10.06	6426	6.94	6.05	18.3	63.2	19.77	500	clear
2	0835	9.91	6466	6.95	0.90	1.2	34.4	19.77	1000	clear
3	0845	9.51	6447	6.95	0.42	-38.0	20.1	19.77	1000	clear
4	0855	9.92	6441	6.95	0.25	-49.2	25.1	19.77	1000	clear
5	0905	10.01	6428	6.96	0.22	-54.9	17.5	19.77	1000	clear
6	0915	9.95	6405	6.96	0.22	-54.0	11.8	19.77	1000	clear
7	0925	10.12	6402	6.96	0.25	-52.2	10.6	19.77	1000	clear
8	0935	10.12	6395	6.96	0.25	-51.4	5.50	19.77	1000	clear
9	0940	10.08	6392	6.96	0.25	-57.2	4.26	19.77	500	clear
10	0945	10.13	6389	6.96	0.22	-54.3	4.75	19.77	500	clear

Stabilized: Yes ~~No~~

Total Volume Removed: mL

Comments:

next page



2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark

Event: 2016

Sample ID: MW102

Sampling Personal: Darren Niezwaag

Date: 26 May 16

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	0950	10.15	6392	6.96	0.22	52.1	4.63	19.77	500	clear
12	0955									
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Stabilized: Yes No

Total Volume Removed: 9000 mL

Comments: C



2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
 Event: 2016
 Sample ID: MW118
 Sampling Personal: *Darren Niesman*

Weather Conditions: Temp: 74 °F Wind: NW 10 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	<input checked="" type="checkbox"/> No	
Well Labeled?	<input checked="" type="checkbox"/> Yes	No	
Casing Straight?	<input checked="" type="checkbox"/> Yes	No	
Grout Seal Intact?	<input checked="" type="checkbox"/> Yes	No	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	8.80	ft	
Total Well Depth:	11.90	ft	
Well Volume:	1.9	liters	
Depth to Top of Pump:	9.19	ft	
Water Level After Sample:	8.88	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder		Control Settings		
Sampling Method:	Bladder		Purge:	57 sec.	
Dedicated Equip?:	Yes	<input checked="" type="checkbox"/> No	Recover:	3 sec.	
Duplicate Sample?:	Yes	<input checked="" type="checkbox"/> No	PSI:	10-15	
Duplicate Sample ID:			Pumping Rate:	100 mL/min	
Purge Date:	25 May 16	Time Purging Began:	1348	am/pm	
Well Purged Dry?	Yes	<input checked="" type="checkbox"/> No	Time Purged Dry:		am/pm
Sample Date:	25 May 16	Time of Sampling:	1543	am/pm	
Bottle List:	500 mL Nitric	1 Liter Raw			
	500 mL Nitric (filtered)	4 - 1 Liter Nitric			

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
										SEQ #
1	1353	11.53	1633	7.66	3.93	-84.7	>1000	8.84	500	Turbid, Tan
2	1403	11.44	1623	7.70	3.11	-89.6	228	8.84	1000	Turbid
3	1413	11.49	1615	7.71	2.75	-88.6	87.7	8.88	1000	clear
4	1423	11.39	1613	7.71	2.78	-85.9	58.7	8.88	1000	clear
5	1433	11.81	1617	7.71	2.92	-79.8	238	8.88	1000	Turbid
6	1443	11.48	1615	7.71	2.68	-77.4	178	8.88	1000	Slightly Turbid
7	1453	11.43	1624	7.73	2.59	-78.8	77.0	8.88	1000	clear
8	1508	11.26	1629	7.72	2.45	-70.1	33.7	8.88	1500	clear
9	1523	11.28	1633	7.71	2.63	-66.7	13.9	8.88	1500	clear
10	1533	11.17	1636	7.71	2.66	-68.7	9.68	8.88	1000	clear

Stabilized: Yes No
 Comments: *(Signature)*

Total Volume Removed: 11,500 mL



2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark

Event: 2016

Sample ID: nw118

Sampling Personal: Darren Wisway

Date: 25 May 16

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	1538	11.14	1637	7.71	2.60	-66.4	9.52	8.88	500	clear
12	1543	11.36	1640	7.71	2.64	-68.3	9.27	8.88	500	clear
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
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26										
27										
28										
29										
30										

Stabilized: Yes No

Total Volume Removed: 11500 mL

Comments:



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW 117
Sampling Personal: Darren Nieswaag

Weather Conditions: Temp: 48 °F Wind: Light Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	6.32 ft		
Total Well Depth:	11.51 ft		
Well Volume:	n/a, 3.2 liters		
Depth to Top of Pump:	9.02 ft		
Water Level After Sample:	9.85 ft		
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	57 sec.
Dedicated Equip?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Recover:	3 sec.
Duplicate Sample?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	PSI:	10
Duplicate Sample ID:			Pumping Rate:	100 mL/min
Purge Date:	25 May 16	Time Purging Began:	10:27	am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Time Purged Dry:	11:22 am/pm
Sample Date:	26 May 16	Time of Sampling:	07:13	am/pm
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

SEQ #	Stabilization (3 consecutive) Time	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.
1	1032	9.01	7579	7.17	7.80	118.9	110	6.73	500	clear
2	1042	9.21	7411	7.20	7.56	118.6	30.9	7.24	1000	clear
3	1052	9.16	7349	7.19	7.31	115.1	21.2	7.78	1000	clear
4	1102	9.01	7395	7.17	7.37	113.5	27.4	8.09	1000	clear
5	1112	8.91	7463	7.17	7.35	113.4	18.9	8.59	1000	clear
6	1122	8.93	7455	7.18	7.25	111.8	14.6	9.02	1000	clear
7								Top of pump		
8	0713			start				6.81		
9										
10	0713	10.14	7701	7.16	11.29	189.9	27.0	-	Recharge	clear

Stabilized: Yes No
Comments:

Total Volume Removed: 3500 mL



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Quality Control Report

Lab IDs: 16-W1565 to 16-W1575

Project: MDU Lewis & Clark CCR May 2016

Work Order: 201682-1419

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Antimony - Dissolved mg/l	0.1000	104	80-120	0.100	16W1575q	< 0.001	0.1076	108	75-125	0.1076	0.1070	107	0.6	20	-	-	< 0.001
	0.1000	112	80-120	0.100	16W1572Dq	0.0046	0.1129	108	75-125	0.1129	0.1160	111	2.7	20	-	-	< 0.001
Antimony - Total mg/l	0.1000	104	80-120	0.400 0.100	16W1570q 16W1575q	< 0.001 < 0.001	0.4400 0.1076	110 108	75-125 75-125	0.4400 0.1076	0.4384 0.1070	110 107	0.4 0.6	20 20	- -	- -	< 0.001
Arsenic - Dissolved mg/l	0.1000	109	80-120	0.100	16W1575q	< 0.002	0.1086	109	75-125	0.1086	0.1082	108	0.4	20	-	-	< 0.002
	0.1000	116	80-120	0.100	16W1572Dq	0.0031	0.1120	109	75-125	0.1120	0.1152	112	2.8	20	-	-	< 0.002
Arsenic - Total mg/l	0.1000	109	80-120	0.400 0.100	16W1570q 16W1575q	< 0.002 < 0.002	0.4480 0.1086	112 109	75-125 75-125	0.4480 0.1086	0.4486 0.1082	112 108	0.1 0.4	20 20	- -	- -	< 0.002
Barium - Dissolved mg/l	0.1000	96	80-120	0.100	16W1575q	< 0.002	0.1018	102	75-125	0.1018	0.0988	99	3.0	20	-	-	< 0.002
	0.1000	110	80-120	0.100	16W1572Dq	0.0213	0.1222	101	75-125	0.1222	0.1235	102	1.1	20	-	-	< 0.002
Barium - Total mg/l	0.1000	96	80-120	0.400 0.100	16W1570q 16W1575q	0.0177 < 0.002	0.4330 0.1018	104 102	75-125 75-125	0.4330 0.1018	0.4142 0.0988	99 99	4.4 3.0	20 20	- -	- -	< 0.002
Beryllium - Dissolved mg/l	0.1000	94	80-120	0.100	16W1575q	< 0.0005	0.1045	104	75-125	0.1045	0.1012	101	3.2	20	-	-	< 0.0005
	0.1000	113	80-120	0.100	16W1572Dq	< 0.0005	0.1028	103	75-125	0.1028	0.1096	110	6.4	20	-	-	< 0.0005
Beryllium - Total mg/l	0.1000	94	80-120	0.400 0.100	16W1570q 16W1575q	< 0.0005 < 0.0005	0.4422 0.1045	111 104	75-125 75-125	0.4422 0.1045	0.4284 0.1012	107 101	3.2 3.2	20 20	- -	- -	< 0.0005
Boron - Dissolved mg/l	0.40	98	80-120	0.300	16-W1566	0.18	0.50	107	75-125	0.50	0.51	110	2.0	20	-	-	< 0.1
				0.600	16-W1589	0.55	1.19	107	75-125	1.19	1.17	103	1.7	20	-	-	< 0.1
Boron - Total mg/l	0.40	98	80-120	15.0	16-D2020	14.8	29.6	99	75-125	29.6	30.1	102	1.7	20	-	-	< 0.1
				0.400	16-D2073	0.39	0.77	95	75-125	0.77	0.80	102	3.8	20	-	-	< 0.1
				0.400	16-W1458	0.09	0.52	108	75-125	0.52	0.51	105	1.9	20	-	-	< 0.1
				0.400	16-W1463	0.11	0.51	100	75-125	0.51	0.52	102	1.9	20	-	-	< 0.1
				3.00	16-W1570	6.86	9.87	100	75-125	9.87	9.93	102	0.6	20	-	-	< 0.1
Cadmium - Dissolved mg/l	0.1000	104	80-120	0.100	16W1575q	< 0.0005	0.1081	108	75-125	0.1081	0.1052	105	2.7	20	-	-	< 0.0005
	0.1000	109	80-120	0.100	16W1572Dq	< 0.0005	0.1032	103	75-125	0.1032	0.1058	106	2.5	20	-	-	< 0.0005
Cadmium - Total mg/l	0.1000	104	80-120	0.400 0.100	16W1570q 16W1575q	< 0.0005 < 0.0005	0.4294 0.1081	107 108	75-125 75-125	0.4294 0.1081	0.4260 0.1052	106 105	0.8 2.7	20 20	- -	- -	< 0.0005



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Quality Control Report

Lab IDs: 16-W1565 to 16-W1575

Project: MDU Lewis & Clark CCR May 2016

Work Order: 201682-1419

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Calcium - Dissolved mg/l	20.0	106	80-120	100	16-W1567	43.2	147	104	75-125	147	148	105	0.7	20	-	-	< 1
				100	16-W1575	< 1	106	106	75-125	106	105	105	0.9	20	-	-	< 1
															-	-	< 1
															-	-	< 1
Calcium - Total mg/l	20.0	108	80-120	100	16-W1565	79.0	178	99	75-125	178	177	98	0.6	20	-	-	< 1
	20.0	107	80-120	500	16-W1568	280	800	104	75-125	800	775	99	3.2	20	-	-	< 1
				500	16-W1589	116	660	109	75-125	660	655	108	0.8	20	-	-	< 1
Chloride mg/l	30.0	88	80-120	30.0	16-D2097	39.0	69.0	100	80-120	69.0	66.3	91	4.0	20	-	-	< 1
	30.0	89	80-120	30.0	16-W1575	< 1	25.6	85	80-120	25.6	25.4	85	0.8	20	-	-	< 1
															-	-	< 1
Chromium - Dissolved mg/l	0.1000	92	80-120	0.100	16W1575q	< 0.002	0.0984	98	75-125	0.0984	0.0948	95	3.7	20	-	-	< 0.002
	0.1000	102	80-120	0.100	16W1572Dq	< 0.002	0.0962	96	75-125	0.0962	0.0978	98	1.6	20	-	-	< 0.002
Chromium - Total mg/l	0.1000	92	80-120	0.400	16W1570q	< 0.002	0.3910	98	75-125	0.3910	0.3888	97	0.6	20	-	-	< 0.002
				0.100	16W1575q	< 0.002	0.0984	98	75-125	0.0984	0.0948	95	3.7	20	-	-	< 0.002
Cobalt - Dissolved mg/l	0.1000	95	80-120	0.100	16W1575q	< 0.002	0.0979	98	75-125	0.0979	0.0967	97	1.2	20	-	-	< 0.002
	0.1000	104	80-120	0.100	16W1572Dq	< 0.002	0.0956	96	75-125	0.0956	0.0986	99	3.1	20	-	-	< 0.002
Cobalt - Total mg/l	0.1000	95	80-120	0.400	16W1570q	< 0.002	0.3930	98	75-125	0.3930	0.3906	98	0.6	20	-	-	< 0.002
				0.100	16W1575q	< 0.002	0.0979	98	75-125	0.0979	0.0967	97	1.2	20	-	-	< 0.002
Fluoride mg/l	0.50	106	90-110	0.500	16-W1550	0.18	0.71	106	80-120	0.71	0.72	108	1.4	20	-	-	< 0.1
	0.50	106	90-110	0.500	16-W1566	0.44	0.97	106	80-120	0.97	0.98	108	1.0	20	-	-	< 0.1
	0.50	106	90-110	0.500	16-W1589	0.24	0.77	106	80-120	0.77	0.77	106	0.0	20	-	-	< 0.1
Lead - Dissolved mg/l	0.1000	96	80-120	0.100	16W1575q	< 0.0005	0.1014	101	75-125	0.1014	0.0969	97	4.5	20	-	-	< 0.0005
	0.1000	109	80-120	0.100	16W1572Dq	< 0.0005	0.0976	98	75-125	0.0976	0.0970	97	0.6	20	-	-	< 0.0005



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Quality Control Report

Lab IDs: 16-W1565 to 16-W1575

Project: MDU Lewis & Clark CCR May 2016

Work Order: 201682-1419

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Lead - Total mg/l	0.1000	96	80-120	0.400 0.100	16W1570q 16W1575q	< 0.0005 < 0.0005	0.3908 0.1014	98 101	75-125 75-125	0.3908 0.1014	0.3790 0.0969	95 97	3.1 4.5	20 20	- -	- -	< 0.0005
Lithium - Dissolved mg/l	0.40	85	80-120	0.200 0.200	16-W1565 16-W1566	< 0.1 < 0.1	0.16 0.18	80 90	75-125 75-125	0.16 0.18	0.16 0.17	80 85	0.0 5.7	20 20	- -	- -	< 0.1 < 0.1 < 0.1
Lithium - Total mg/l	0.40 0.40 0.40	85 85 85	80-120 80-120 80-120	2.00 0.400 0.400	16-D2020 16-W1463 16-W1570	< 1 < 0.1 0.09	2.59 0.40 0.55	130 100 115	75-125 75-125 75-125	2.59 0.40 0.55	2.64 0.39 0.53	132 98 110	1.9 2.5 3.7	20 20 20	- - - - - -	- - - - - -	< 0.1 < 0.1 < 0.1 < 0.1 < 0.1 < 0.1
Magnesium - Dissolved mg/l	20.0	106	80-120	100 100	16-W1567 16-W1575	24.0 < 1	129 105	105 105	75-125 75-125	129 105	129 105	105 105	0.0 0.0	20 20	- - - - -	- - - - -	< 1 < 1 < 1 < 1 < 1
Magnesium - Total mg/l	20.0 20.0	108 106	80-120 80-120	100 500 500	16-W1565 16-W1568 16-W1589	47.6 1020 84.5	151 1530 635	103 102 110	75-125 75-125 75-125	151 1530 635	150 1480 630	102 92 109	0.7 3.3 0.8	20 20 20	- - - - -	- - - - -	< 1 < 1 < 1 < 1 < 1
Mercury - Dissolved mg/l	0.0020	100	85-115	0.002 0.002	16-W1571 16-W1589	< 0.0002 < 0.0002	0.0021 0.0020	105 100	70-130 70-130	0.0021 0.0020	0.0020 0.0020	100 100	4.9 0.0	20 20	- -	- -	< 0.0002
Mercury - Total mg/l	0.0020 0.0020	100 95	85-115 85-115	0.002 0.002 0.002	16-W1572 16-W1644 16-W1804	< 0.0002 < 0.0002 < 0.0002	0.0019 0.0017 0.0018	95 85 90	70-130 70-130 70-130	0.0019 0.0017 0.0018	0.0020 0.0018 0.0018	100 90 90	5.1 5.7 0.0	20 20 20	- - -	- - -	< 0.0002 < 0.0002
Molybdenum - Dissolved mg/l	0.1000 0.1000	88 103	80-120 80-120	0.100 0.100	16W1575q 16W1572Dq	< 0.002 0.0248	0.0984 0.1266	98 102	75-125 75-125	0.0984 0.1266	0.0969 0.1328	97 108	1.5 4.8	20 20	- -	- -	< 0.002 < 0.002



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MEMBER
ACIL

Quality Control Report

Lab IDs: 16-W1565 to 16-W1575

Project: MDU Lewis & Clark CCR May 2016

Work Order: 201682-1419

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Molybdenum - Total mg/l	0.1000	88	80-120	0.400 0.100	16W1570q 16W1575q	0.0747 < 0.002	0.5164 0.0984	110 98	75-125 75-125	0.5164 0.0984	0.5044 0.0969	107 97	2.4 1.5	20 20	- -	- -	< 0.002
pH units	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	8.2 7.6 7.3	8.2 7.6 7.4	- - -	0.0 0.0 1.4	20 20 20	- - -	- - -	- - -
Potassium - Dissolved mg/l	10.0	98	80-120	20.0 20.0	16-W1567 16-W1575	8.4 < 1	28.9 19.6	102 98	75-125 75-125	28.9 19.6	29.0 19.6	103 98	0.3 0.0	20 20	- - - - -	- - - - -	< 1 < 1 < 1 < 1 < 1
Potassium - Total mg/l	10.0 10.0	98 97	80-120 80-120	20.0 100 100	16-W1565 16-W1568 16-W1589	5.6 19.5 18.7	26.2 124 130	103 104 111	75-125 75-125 75-125	26.2 124 130	26.2 120 128	103 100 109	0.0 3.3 1.6	20 20 20	- - - - -	- - - - -	< 1 < 1 < 1 < 1 < 1
Selenium - Dissolved mg/l	0.1000 0.1000	100 116	80-120 80-120	0.100	16-W1572	0.0579	0.1708	113	75-125	0.1708	0.1773	119	3.7	20	- -	- -	< 0.002 < 0.002
Selenium - Total mg/l	0.1000	100	80-120	0.400 0.100	16-W1570 16-W1575	0.0954 < 0.01	0.5372 0.1056	110 106	75-125 75-125	0.5372 0.1056	0.5184 0.1042	106 104	3.6 1.3	20 20	- -	- -	< 0.002
Sodium - Dissolved mg/l	20.0	98	80-120	100 100	16-W1567 16-W1575	242 < 1	329 96.7	87 97	75-125 75-125	329 96.7	327 97.4	85 97	0.6 0.7	20 20	- - - - -	- - - - -	< 1 < 1 < 1 < 1 < 1



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MEMBER
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Quality Control Report

Lab IDs: 16-W1565 to 16-W1575

Project: MDU Lewis & Clark CCR May 2016

Work Order: 201682-1419

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Sodium - Total mg/l	20.0	98	80-120	100	16-W1565	73.4	171	98	75-125	171	171	98	0.0	20	-	-	< 1
	20.0	98	80-120	500	16-W1568	178	690	102	75-125	690	665	97	3.7	20	-	-	< 1
				500	16-W1589	1470	2000	106	75-125	2000	1980	102	1.0	20	-	-	< 1
															-	-	< 1
Sulfate mg/l	100	107	90-110	200	16-W1563	247	432	92	80-120	432	437	95	1.2	20	-	-	< 5
	100	108	90-110	4000	16-W1589	2440	6700	106	80-120	6700	6710	107	0.1	20	-	-	< 5
	100	94	90-110	1000	16-W1790	558	1490	93	80-120	1490	1510	95	1.3	20	-	-	< 5
				100	16-W1575	< 5	93.8	94	80-120	93.8	93.4	93	0.4	20	-	-	< 5
Thallium - Dissolved mg/l	0.1000	96	80-120	0.100	16W1575q	< 0.0005	0.1020	102	75-125	0.1020	0.0974	97	4.6	20	-	-	< 0.0005
	0.1000	108	80-120	0.100	16W1572Dq	0.0007	0.0987	98	75-125	0.0987	0.0981	97	0.6	20	-	-	< 0.0005
Thallium - Total mg/l	0.1000	96	80-120	0.400	16W1570q	< 0.0005	0.3848	96	75-125	0.3848	0.3726	93	3.2	20	-	-	< 0.0005
				0.100	16W1575q	< 0.0005	0.1020	102	75-125	0.1020	0.0974	97	4.6	20	-	-	< 0.0005
Total Alkalinity mg/l CaCO3	410	100	90-110	410	16-W1552	143	541	97	80-120	541	539	97	0.4	20	94	80-120	< 20
	410	99	90-110	410	16-W1562	532	926	96	80-120	926	922	95	0.4	20	93	80-120	< 20
	410	100	90-110	410	16-W1572	310	698	95	80-120	698	698	95	0.0	20			< 20
Total Dissolved Solids mg/l	-	-	-	-	-	-	-	-	-	6360	6390	-	0.5	20	-	-	< 5
	-	-	-	-	-	-	-	-	-	1150	1160	-	0.9	20	-	-	< 5
Total Suspended Solids mg/l	-	-	-	-	-	-	-	-	-	44	44	-	0.0	20	-	-	< 1
	-	-	-	-	-	-	-	-	-	5	5	-	0.0	*	-	-	< 1

* Due to result < 10 mg/L, data reported based on acceptance criteria of Relative % Difference of +/- 3 mg/L.

Approved by:

Claudia Canty
16JUN16



CASE NARRATIVE – AMENDED 28 JUN 2016 (FIELD DATA)

MVTL Lab Reference No/SDG: 201682-1419
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – May 2016 Event
MVTL Laboratory Identifications: 16-W1565 through 16-W1575
Page 1 of 2

Table with 2 columns: MDU Sample Identification and MVTL Laboratory #. Rows include MW110, MW119, MW210, MW102, MW118, MW111, MW117, MW103, MW109, Dup 1, and Field Blank (FB).

I. RECEIPT

- All samples were received at the laboratory on 26 May 2016 at 1515.
Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
Samples were received on ice and evidence of cooling had begun.
Temperature of samples upon receipt was 3.4°C.
All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
No other exceptions on sample receipt were encountered on this sample set unless noted here.

II. HOLDING TIMES

- With the exception of laboratory pH, all holding times were met for both preparation and analysis unless noted here.

III. METHODS

- Approved methodology was followed for all sample analyses.
Methods 6010D and Method 6020B were used to analyze the metals.

IV. ANALYSIS

- All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted here and/or flagged on the individual analytical laboratory report.
For some metals, the reported results were elevated due to instrument performance at the lower limit of quantitation (LLOQ).



CASE NARRATIVE – AMENDED 28 JUN 2016 (FIELD DATA)

MVTL Lab Reference No/SDG: 201682-1419
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – May 2016 Event
MVTL Laboratory Identifications: 16-W1565 through 16-W1575
Page 2 of 2

- For some metals, the reported results were elevated due to additional dilutions required to minimize the effects of sample matrix.
- Recoveries for one lithium matrix spike/matrix spike duplicate within the batch were outside the acceptable limits. RPD for the matrix spike/matrix spike duplicate was acceptable. High spike recoveries were determined to be due sample matrix. Data was accepted based on the acceptable recovery of the LCS. No further action was taken.

• REPORTING

- Per email from Barr Engineering upon review of the data package, on 28 Jun 2016, the sample report for MW117 was amended due to a change on the field data sheet.

All laboratory data has been approved by MVTL Laboratories.

SIGNED: Claudette Carroll DATE: 28 JUN 16
Claudette Carroll - MVTL Bismarck Laboratory Manager



Laboratories, Inc.

2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name: MDU Lewis and Clark CCR Groundwater May Event 2016				Name of Sampler(s): <i>Darren Nieswaag</i>				
Report To: MDU Attn: Samantha Marshall Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-222-7829			Carbon Copy: Attn: Address:			Work Order Number: <i>82-1419</i>		

Sample Information						Bottle Type			Field Parameters			Analysis
Lab Number	Sample ID	Date	Time	Sample Type	Gradient	500 ml HNO ₃	1 liter	500 ml HNO ₃ (filtered)	Field Temperature °C	Field Spec. Cond.	Field pH	Analysis Required
W1565	MW110	24 May 16	1650	GW	Up	X	X	X	9.31	1003	7.36	MDU CCR List with TSS and Dissolved CCR Metals. No RadChem.
W1566	MW119	24 May 16	1844	GW	Up	X	X	X	10.80	1072	7.51	
W1567	MW210	25 May 16	0825	GW	Up	X	X	X	10.09	1424	7.66	
W1568	MW102	26 May 16	0950	GW	Down	X	X	X	10.15	6392	6.96	
W1569	MW118	25 May 16	1543	GW	Down	X	X	X	11.36	2640	7.71	
W1570	MW111	25 May 16	1244	GW	Down	X	X	X	9.46	2973	7.33	
W1571	MW117	26 May 16	0713	GW	Down	X	X	X	10.14	7701	7.18	
W1572	MW103	25 May 16	1805	GW		X	X	X	10.87	1505	7.42	
W1573	MW109	25 May 16	1958	GW		X	X	X	10.94	1585	7.37	
W1574	Dup 1	25 May 16	NA	W		X	X	X	NA	NA	NA	
W1575	Field Blank (FB)	25 May 16 on 26 May 16	NA	W		X	X	X	NA	NA	NA	

Comments: * 20 Jun 16 Corrected by Jeremy Meyer

	Transferred by:	Sample Condition	Date/Time	Received by:	Sample Condition	Date/Time	°C
1	<i>Darren Nieswaag</i>	<i>Lozin</i>	<i>26 May 16 1515</i>	<i>[Signature]</i>		<i>26 May 2016 1515</i>	<i>3.4°C TMS88</i>
2							
3							



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Page: 1 of 2

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 8 Jun 16
 Lab Number: 16-W1565
 Work Order #:82-1419
 Account #: 002800
 Date Sampled: 24 May 16 16:50
 Date Received: 26 May 16 16:50
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
 Sample Description: MW110

Temp at Receipt: 3.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion						
pH	* 7.4	units	N/A	EPA 200.2	26 May 16	ML
Total Suspended Solids	6	mg/l	1	SM4500 H+ B	26 May 16 18:00	ML
pH - Field	7.36	units	NA	I3765-85	27 May 16 12:32	ML
Temperature - Field	9.31	Degrees C	NA	SM 4500 H+ B	24 May 16 16:50	DJN
Total Alkalinity	313	mg/l CaCO3	20	SM 2550B	24 May 16 16:50	DJN
Conductivity - Field	1003	umhos/cm	1	SM2320-B	26 May 16 18:00	ML
Fluoride	0.48	mg/l	0.10	EPA 120.1	24 May 16 16:50	DJN
Sulfate	182	mg/l	5.00	SM4500-F-C	26 May 16 18:00	ML
Chloride	18.2	mg/l	1.0	ASTM D516-07	3 Jun 16 12:00	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	SM4500-Cl-E	2 Jun 16 15:06	EMS
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	1 Jun 16 12:39	EV
Total Dissolved Solids	610	mg/l	5	EPA 245.1	1 Jun 16 14:12	EV
Calcium - Total	79.0	mg/l	1.0	I1750-85	27 May 16 11:32	ML
Magnesium - Total	47.6	mg/l	1.0	6010	2 Jun 16 13:23	KMD
Sodium - Total	73.4	mg/l	1.0	6010	2 Jun 16 13:23	KMD
Potassium - Total	5.6	mg/l	1.0	6010	2 Jun 16 13:23	KMD
Lithium - Total	< 0.1	mg/l	0.10	6010	31 May 16 13:31	KMD
Boron - Total	0.18	mg/l	0.10	6010	31 May 16 16:45	KMD
Calcium - Dissolved	77.1	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Magnesium - Dissolved	46.6	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Sodium - Dissolved	72.5	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Potassium - Dissolved	5.7	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Lithium - Dissolved	< 0.1	mg/l	0.10	6010	1 Jun 16 14:37	KMD
Boron - Dissolved	0.17	mg/l	0.10	6010	31 May 16 19:45	KMD
Antimony - Total	< 0.001	mg/l	0.0010	6020	3 Jun 16 11:15	CC
Arsenic - Total	< 0.005 ^	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Barium - Total	0.0270	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Beryllium - Total	< 0.001 ^	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Chromium - Total	< 0.002	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Cobalt - Total	< 0.002	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Lead - Total	< 0.001 ^	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Molybdenum - Total	0.0032	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Selenium - Total	< 0.01 ^	mg/l	0.0020	6020	6 Jun 16 15:30	CC
Thallium - Total	< 0.0005	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020	3 Jun 16 11:15	CC
Arsenic - Dissolved	< 0.005 ^	mg/l	0.0020	6020	3 Jun 16 11:15	CC

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 8 Jun 16
 Lab Number: 16-W1565
 Work Order #: 82-1419
 Account #: 002800
 Date Sampled: 24 May 16 16:50
 Date Received: 26 May 16 16:50
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
 Sample Description: MW110

Temp at Receipt: 3.4C

	As Received Result	Method	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0259 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Beryllium - Dissolved	< 0.001 ^ mg/l	0.0005	6020	3 Jun 16 11:15	CC
Cadmium - Dissolved	< 0.0005 mg/l	0.0005	6020	3 Jun 16 11:15	CC
Chromium - Dissolved	< 0.002 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Cobalt - Dissolved	< 0.002 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Lead - Dissolved	< 0.001 ^ mg/l	0.0005	6020	3 Jun 16 11:15	CC
Molybdenum - Dissolved	0.0039 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Selenium - Dissolved	< 0.01 ^ mg/l	0.0020	6020	6 Jun 16 15:30	CC
Thallium - Dissolved	< 0.0005 mg/l	0.0005	6020	3 Jun 16 11:15	CC

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll

CC
16 JUN 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
 @ = Due to sample matrix # = Due to concentration of other analytes
 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 8 Jun 16
 Lab Number: 16-W1566
 Work Order #: 82-1419
 Account #: 002800
 Date Sampled: 24 May 16 18:44
 Date Received: 26 May 16 16:50
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
 Sample Description: MW119

Temp at Receipt: 3.4C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion			EPA 200.2	26 May 16	ML
pH	* 7.5 units	N/A	SM4500 H+ B	26 May 16 18:00	ML
Total Suspended Solids	< 1 mg/l	1	I3765-85	27 May 16 12:32	ML
pH - Field	7.51 units	NA	SM 4500 H+ B	24 May 16 18:44	DJN
Temperature - Field	10.8 Degrees C	NA	SM 2550B	24 May 16 18:44	DJN
Total Alkalinity	331 mg/l CaCO3	20	SM2320-B	26 May 16 18:00	ML
Conductivity - Field	1072 umhos/cm	1	EPA 120.1	24 May 16 18:44	DJN
Fluoride	0.44 mg/l	0.10	SM4500-F-C	26 May 16 18:00	ML
Sulfate	214 mg/l	5.00	ASTM D516-07	3 Jun 16 12:00	EMS
Chloride	22.2 mg/l	1.0	SM4500-Cl-E	2 Jun 16 15:06	EMS
Mercury - Total	< 0.0002 mg/l	0.0002	EPA 245.1	1 Jun 16 12:39	EV
Mercury - Dissolved	< 0.0002 mg/l	0.0002	EPA 245.1	1 Jun 16 14:12	EV
Total Dissolved Solids	663 mg/l	5	I1750-85	27 May 16 11:32	ML
Calcium - Total	81.2 mg/l	1.0	6010	2 Jun 16 14:23	KMD
Magnesium - Total	50.6 mg/l	1.0	6010	2 Jun 16 14:23	KMD
Sodium - Total	77.1 mg/l	1.0	6010	2 Jun 16 14:23	KMD
Potassium - Total	6.9 mg/l	1.0	6010	2 Jun 16 14:23	KMD
Lithium - Total	< 0.1 mg/l	0.10	6010	31 May 16 13:31	KMD
Boron - Total	0.20 mg/l	0.10	6010	31 May 16 17:45	KMD
Calcium - Dissolved	81.4 mg/l	1.0	6010	1 Jun 16 14:37	KMD
Magnesium - Dissolved	51.0 mg/l	1.0	6010	1 Jun 16 14:37	KMD
Sodium - Dissolved	78.1 mg/l	1.0	6010	1 Jun 16 14:37	KMD
Potassium - Dissolved	7.1 mg/l	1.0	6010	1 Jun 16 14:37	KMD
Lithium - Dissolved	< 0.1 mg/l	0.10	6010	31 May 16 14:31	KMD
Boron - Dissolved	0.18 mg/l	0.10	6010	31 May 16 19:45	KMD
Antimony - Total	< 0.001 mg/l	0.0010	6020	3 Jun 16 11:15	CC
Arsenic - Total	< 0.005 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Barium - Total	0.0310 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Beryllium - Total	< 0.001 mg/l	0.0005	6020	3 Jun 16 11:15	CC
Cadmium - Total	0.0006 mg/l	0.0005	6020	3 Jun 16 11:15	CC
Chromium - Total	< 0.002 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Cobalt - Total	< 0.002 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Lead - Total	< 0.001 mg/l	0.0005	6020	3 Jun 16 11:15	CC
Molybdenum - Total	0.0051 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Selenium - Total	< 0.01 mg/l	0.0020	6020	6 Jun 16 15:30	CC
Thallium - Total	< 0.0005 mg/l	0.0005	6020	3 Jun 16 11:15	CC
Antimony - Dissolved	< 0.001 mg/l	0.0010	6020	3 Jun 16 11:15	CC
Arsenic - Dissolved	< 0.005 mg/l	0.0020	6020	3 Jun 16 11:15	CC

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
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 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 2 of 2

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 8 Jun 16
Lab Number: 16-W1566
Work Order #: 82-1419
Account #: 002800
Date Sampled: 24 May 16 18:44
Date Received: 26 May 16 16:50
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
Sample Description: MW119

Temp at Receipt: 3.4C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0317 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Beryllium - Dissolved	< 0.001 ^ mg/l	0.0005	6020	3 Jun 16 11:15	CC
Cadmium - Dissolved	0.0005 mg/l	0.0005	6020	3 Jun 16 11:15	CC
Chromium - Dissolved	< 0.002 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Cobalt - Dissolved	< 0.002 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Lead - Dissolved	< 0.001 ^ mg/l	0.0005	6020	3 Jun 16 11:15	CC
Molybdenum - Dissolved	0.0056 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Selenium - Dissolved	< 0.01 ^ mg/l	0.0020	6020	6 Jun 16 15:30	CC
Thallium - Dissolved	< 0.0005 mg/l	0.0005	6020	3 Jun 16 11:15	CC

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll

CC
16 JUN 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 1 of 2

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 8 Jun 16
 Lab Number: 16-W1567
 Work Order #: 82-1419
 Account #: 002800
 Date Sampled: 25 May 16 8:25
 Date Received: 26 May 16 16:50
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
 Sample Description: MW210

Temp at Receipt: 3.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	26 May 16	ML
pH	* 7.6	units	N/A	SM4500 H+ B	26 May 16 18:00	ML
Total Suspended Solids	5	mg/l	1	I3765-85	27 May 16 12:32	ML
pH - Field	7.66	units	NA	SM 4500 H+ B	25 May 16 8:25	DJN
Temperature - Field	10.1	Degrees C	NA	SM 2550B	25 May 16 8:25	DJN
Total Alkalinity	390	mg/l CaCO3	20	SM2320-B	26 May 16 18:00	ML
Conductivity - Field	1424	umhos/cm	1	EPA 120.1	25 May 16 8:25	DJN
Fluoride	0.95	mg/l	0.10	SM4500-F-C	26 May 16 18:00	ML
Sulfate	377	mg/l	5.00	ASTM D516-07	3 Jun 16 12:00	EMS
Chloride	4.7	mg/l	1.0	SM4500-Cl-E	2 Jun 16 15:06	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	1 Jun 16 12:39	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	1 Jun 16 14:12	EV
Total Dissolved Solids	902	mg/l	5	I1750-85	27 May 16 11:32	ML
Calcium - Total	41.8	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Magnesium - Total	23.7	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Sodium - Total	239	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Potassium - Total	9.0	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Lithium - Total	< 0.1	mg/l	0.10	6010	31 May 16 13:31	KMD
Boron - Total	0.17	mg/l	0.10	6010	31 May 16 17:45	KMD
Calcium - Dissolved	43.2	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Magnesium - Dissolved	24.0	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Sodium - Dissolved	242	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Potassium - Dissolved	8.4	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Lithium - Dissolved	< 0.1	mg/l	0.10	6010	31 May 16 14:31	KMD
Boron - Dissolved	0.16	mg/l	0.10	6010	31 May 16 19:45	KMD
Antimony - Total	< 0.001	mg/l	0.0010	6020	3 Jun 16 11:15	CC
Arsenic - Total	< 0.005 ^	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Barium - Total	0.0275	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Beryllium - Total	< 0.001 ^	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Chromium - Total	< 0.002	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Cobalt - Total	< 0.002	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Lead - Total	< 0.001 ^	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Molybdenum - Total	0.0034	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Selenium - Total	< 0.01 ^	mg/l	0.0020	6020	6 Jun 16 15:30	CC
Thallium - Total	< 0.0005	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020	3 Jun 16 11:15	CC
Arsenic - Dissolved	< 0.005 ^	mg/l	0.0020	6020	3 Jun 16 11:15	CC

RL = Method Reporting Limit

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 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 8 Jun 16
 Lab Number: 16-W1567
 Work Order #: 82-1419
 Account #: 002800
 Date Sampled: 25 May 16 8:25
 Date Received: 26 May 16 16:50
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
 Sample Description: MW210

Temp at Receipt: 3.4C

	As Received Result	Method	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0251 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Beryllium - Dissolved	< 0.001 ^ mg/l	0.0005	6020	3 Jun 16 11:15	CC
Cadmium - Dissolved	< 0.0005 mg/l	0.0005	6020	3 Jun 16 11:15	CC
Chromium - Dissolved	< 0.002 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Cobalt - Dissolved	< 0.002 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Lead - Dissolved	< 0.001 ^ mg/l	0.0005	6020	3 Jun 16 11:15	CC
Molybdenum - Dissolved	0.0034 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Selenium - Dissolved	< 0.01 ^ mg/l	0.0020	6020	6 Jun 16 15:30	CC
Thallium - Dissolved	< 0.0005 mg/l	0.0005	6020	3 Jun 16 11:15	CC

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll

lc
16 JUN 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
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CERTIFICATION: ND # ND-00016



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Page: 1 of 2

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 8 Jun 16
 Lab Number: 16-W1568
 Work Order #: 82-1419
 Account #: 002800
 Date Sampled: 26 May 16 9:50
 Date Received: 26 May 16 16:50
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
 Sample Description: MW102

Temp at Receipt: 3.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	26 May 16	ML
pH	* 7.3	units	N/A	SM4500 H+ B	26 May 16 18:00	ML
Total Suspended Solids	< 1	mg/l	1	I3765-85	27 May 16 12:32	ML
pH - Field	6.96	units	NA	SM 4500 H+ B	26 May 16 9:50	DJN
Temperature - Field	10.2	Degrees C	NA	SM 2550B	26 May 16 9:50	DJN
Total Alkalinity	378	mg/l CaCO3	20	SM2320-B	26 May 16 18:00	ML
Conductivity - Field	6392	umhos/cm	1	EPA 120.1	26 May 16 9:50	DJN
Fluoride	1.62	mg/l	0.10	SM4500-F-C	26 May 16 18:00	ML
Sulfate	5180	mg/l	5.00	ASTM D516-07	3 Jun 16 12:00	EMS
Chloride	48.0	mg/l	1.0	SM4500-Cl-E	2 Jun 16 15:06	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	1 Jun 16 12:39	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	1 Jun 16 14:12	EV
Total Dissolved Solids	6360	mg/l	5	I1750-85	27 May 16 11:32	ML
Calcium - Total	280	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Magnesium - Total	1020	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Sodium - Total	178	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Potassium - Total	19.5	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Lithium - Total	< 0.5 @	mg/l	0.10	6010	31 May 16 13:31	KMD
Boron - Total	21.2	mg/l	0.10	6010	31 May 16 17:45	KMD
Calcium - Dissolved	286	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Magnesium - Dissolved	1040	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Sodium - Dissolved	180	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Potassium - Dissolved	21.6	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Lithium - Dissolved	< 0.5 @	mg/l	0.10	6010	31 May 16 14:31	KMD
Boron - Dissolved	22.7	mg/l	0.10	6010	31 May 16 19:45	KMD
Antimony - Total	< 0.001	mg/l	0.0010	6020	3 Jun 16 11:15	CC
Arsenic - Total	< 0.005 ^	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Barium - Total	0.0153	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Beryllium - Total	< 0.001 ^	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Chromium - Total	< 0.002	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Cobalt - Total	0.0058	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Lead - Total	< 0.001 ^	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Molybdenum - Total	0.0910	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Selenium - Total	< 0.01 ^	mg/l	0.0020	6020	6 Jun 16 15:30	CC
Thallium - Total	< 0.0005	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020	3 Jun 16 11:15	CC
Arsenic - Dissolved	< 0.005 ^	mg/l	0.0020	6020	3 Jun 16 11:15	CC

RL = Method Reporting Limit

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 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 2 of 2

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 8 Jun 16
 Lab Number: 16-W1568
 Work Order #: 82-1419
 Account #: 002800
 Date Sampled: 26 May 16 9:50
 Date Received: 26 May 16 16:50
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
 Sample Description: MW102

Temp at Receipt: 3.4C

	As Received Result	Method	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0152 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Beryllium - Dissolved	< 0.001 ^ mg/l	0.0005	6020	3 Jun 16 11:15	CC
Cadmium - Dissolved	< 0.0005 mg/l	0.0005	6020	3 Jun 16 11:15	CC
Chromium - Dissolved	< 0.002 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Cobalt - Dissolved	0.0060 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Lead - Dissolved	< 0.001 ^ mg/l	0.0005	6020	3 Jun 16 11:15	CC
Molybdenum - Dissolved	0.1000 mg/l	0.0020	6020	3 Jun 16 11:15	CC
Selenium - Dissolved	< 0.01 ^ mg/l	0.0020	6020	6 Jun 16 15:30	CC
Thallium - Dissolved	< 0.0005 mg/l	0.0005	6020	3 Jun 16 11:15	CC

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Cc
Claudette K Carroll *16 JUN 16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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CERTIFICATION: ND # ND-00016



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Page: 2 of 2

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 8 Jun 16
Lab Number: 16-W1569
Work Order #: 82-1419
Account #: 002800
Date Sampled: 25 May 16 15:43
Date Received: 26 May 16 16:50
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
Sample Description: MW118

Temp at Receipt: 3.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0309	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Beryllium - Dissolved	< 0.001 ^	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Lead - Dissolved	< 0.001 ^	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Molybdenum - Dissolved	0.0720	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Selenium - Dissolved	0.1000	mg/l	0.0020	6020	6 Jun 16 15:30	CC
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020	3 Jun 16 11:15	CC

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll ^{CC} 16 JUN 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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CERTIFICATION: ND # ND-00016



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Page: 1 of 2

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 8 Jun 16
 Lab Number: 16-W1570
 Work Order #: 82-1419
 Account #: 002800
 Date Sampled: 25 May 16 12:44
 Date Received: 26 May 16 16:50
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
 Sample Description: MW111

Temp at Receipt: 3.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	26 May 16	ML
pH	* 7.6	units	N/A	SM4500 H+ B	26 May 16 18:00	ML
Total Suspended Solids	4	mg/l	1	I3765-85	27 May 16 12:32	ML
pH - Field	7.33	units	NA	SM 4500 H+ B	25 May 16 12:44	DJN
Temperature - Field	9.46	Degrees C	NA	SM 2550B	25 May 16 12:44	DJN
Total Alkalinity	356	mg/l CaCO3	20	SM2320-B	26 May 16 18:00	ML
Conductivity - Field	2973	umhos/cm	1	EPA 120.1	25 May 16 12:44	DJN
Fluoride	2.29	mg/l	0.10	SM4500-F-C	26 May 16 18:00	ML
Sulfate	1720	mg/l	5.00	ASTM D516-07	3 Jun 16 12:00	EMS
Chloride	25.8	mg/l	1.0	SM4500-Cl-E	2 Jun 16 15:06	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	1 Jun 16 12:39	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	1 Jun 16 14:12	EV
Total Dissolved Solids	2540	mg/l	5	I1750-85	27 May 16 11:32	ML
Calcium - Total	126	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Magnesium - Total	352	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Sodium - Total	102	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Potassium - Total	8.0	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Lithium - Total	< 0.1	mg/l	0.10	6010	31 May 16 14:31	KMD
Boron - Total	6.86	mg/l	0.10	6010	31 May 16 17:45	KMD
Calcium - Dissolved	130	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Magnesium - Dissolved	361	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Sodium - Dissolved	106	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Potassium - Dissolved	8.4	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Lithium - Dissolved	< 0.1	mg/l	0.10	6010	31 May 16 14:31	KMD
Boron - Dissolved	7.15	mg/l	0.10	6010	31 May 16 19:45	KMD
Antimony - Total	< 0.001	mg/l	0.0010	6020	3 Jun 16 11:15	CC
Arsenic - Total	< 0.005 ^	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Barium - Total	0.0177	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Beryllium - Total	< 0.001 ^	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Chromium - Total	< 0.002	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Cobalt - Total	< 0.002	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Lead - Total	< 0.001 ^	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Molybdenum - Total	0.0747	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Selenium - Total	0.0954	mg/l	0.0020	6020	6 Jun 16 15:30	CC
Thallium - Total	< 0.0005	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020	3 Jun 16 11:15	CC
Arsenic - Dissolved	< 0.005 ^	mg/l	0.0020	6020	3 Jun 16 11:15	CC

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 2 of 2

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 8 Jun 16
 Lab Number: 16-W1570
 Work Order #: 82-1419
 Account #: 002800
 Date Sampled: 25 May 16 12:44
 Date Received: 26 May 16 16:50
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
 Sample Description: MW111

Temp at Receipt: 3.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0179 mg/l		0.0020	6020	3 Jun 16 11:15	CC
Beryllium - Dissolved	< 0.001 ^ mg/l		0.0005	6020	3 Jun 16 11:15	CC
Cadmium - Dissolved	< 0.0005 mg/l		0.0005	6020	3 Jun 16 11:15	CC
Chromium - Dissolved	< 0.002 mg/l		0.0020	6020	3 Jun 16 11:15	CC
Cobalt - Dissolved	< 0.002 mg/l		0.0020	6020	3 Jun 16 11:15	CC
Lead - Dissolved	< 0.001 ^ mg/l		0.0005	6020	3 Jun 16 11:15	CC
Molybdenum - Dissolved	0.0803 mg/l		0.0020	6020	3 Jun 16 11:15	CC
Selenium - Dissolved	0.1125 mg/l		0.0020	6020	6 Jun 16 15:30	CC
Thallium - Dissolved	< 0.0005 mg/l		0.0005	6020	3 Jun 16 11:15	CC

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll *CE* *16 JUN 16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
 @ = Due to sample matrix # = Due to concentration of other analytes
 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 2 of 2

Amended 28Jun16 (Field Data)

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 8 Jun 16
Lab Number: 16-W1571
Work Order #: 82-1419
Account #: 002800
Date Sampled: 26 May 16 7:13
Date Received: 26 May 16 16:50
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
Sample Description: MW117

Temp at Receipt: 3.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Arsenic - Dissolved	< 0.005 ^	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Barium - Dissolved	0.0250	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Beryllium - Dissolved	< 0.001 ^	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Lead - Dissolved	< 0.001 ^	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Molybdenum - Dissolved	0.0061	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Selenium - Dissolved	0.0211	mg/l	0.0020	6020	6 Jun 16 15:30	CC
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020	3 Jun 16 11:15	CC

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll ^{CC} 28 JUN 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 1 of 2

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 8 Jun 16
 Lab Number: 16-W1572
 Work Order #: 82-1419
 Account #: 002800
 Date Sampled: 25 May 16 18:05
 Date Received: 26 May 16 16:50
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
 Sample Description: MW103

Temp at Receipt: 3.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	26 May 16	ML
pH	* 7.3	units	N/A	SM4500 H+ B	27 May 16 17:00	ML
Total Suspended Solids	5	mg/l	1	I3765-85	27 May 16 12:32	ML
pH - Field	7.42	units	NA	SM 4500 H+ B	25 May 16 18:05	DJN
Temperature - Field	10.9	Degrees C	NA	SM 2550B	25 May 16 18:05	DJN
Total Alkalinity	310	mg/l CaCO3	20	SM2320-B	27 May 16 17:00	ML
Conductivity - Field	1505	umhos/cm	1	EPA 120.1	25 May 16 18:05	DJN
Fluoride	0.76	mg/l	0.10	SM4500-F-C	27 May 16 17:00	ML
Sulfate	473	mg/l	5.00	ASTM D516-07	3 Jun 16 13:28	EMS
Chloride	19.9	mg/l	1.0	SM4500-Cl-E	2 Jun 16 15:06	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	1 Jun 16 12:39	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	1 Jun 16 14:12	EV
Total Dissolved Solids	1020	mg/l	5	I1750-85	27 May 16 11:32	ML
Calcium - Total	84.2	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Magnesium - Total	125	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Sodium - Total	77.9	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Potassium - Total	7.0	mg/l	1.0	6010	2 Jun 16 14:23	KMD
Lithium - Total	< 0.1	mg/l	0.10	6010	31 May 16 14:31	KMD
Boron - Total	1.53	mg/l	0.10	6010	31 May 16 17:45	KMD
Calcium - Dissolved	84.2	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Magnesium - Dissolved	125	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Sodium - Dissolved	77.9	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Potassium - Dissolved	7.1	mg/l	1.0	6010	1 Jun 16 14:37	KMD
Lithium - Dissolved	< 0.1	mg/l	0.10	6010	31 May 16 14:31	KMD
Boron - Dissolved	1.46	mg/l	0.10	6010	31 May 16 19:45	KMD
Antimony - Total	0.0049	mg/l	0.0010	6020	3 Jun 16 11:15	CC
Arsenic - Total	< 0.005 ^	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Barium - Total	0.0260	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Beryllium - Total	< 0.001 ^	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Chromium - Total	< 0.002	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Cobalt - Total	< 0.002	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Lead - Total	< 0.001 ^	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Molybdenum - Total	0.0282	mg/l	0.0020	6020	3 Jun 16 11:15	CC
Selenium - Total	0.0579	mg/l	0.0020	6020	6 Jun 16 15:30	CC
Thallium - Total	< 0.0005	mg/l	0.0005	6020	3 Jun 16 11:15	CC
Antimony - Dissolved	0.0046	mg/l	0.0010	6020	3 Jun 16 16:18	CC
Arsenic - Dissolved	< 0.005 ^	mg/l	0.0020	6020	3 Jun 16 16:18	CC

RL = Method Reporting Limit

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 @ = Due to sample matrix # = Due to concentration of other analytes
 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 8 Jun 16
Lab Number: 16-W1572
Work Order #: 82-1419
Account #: 002800
Date Sampled: 25 May 16 18:05
Date Received: 26 May 16 16:50
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
Sample Description: MW103

Temp at Receipt: 3.4C

	As Received Result	Method	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0213 mg/l	0.0020	6020	3 Jun 16 16:18	CC
Beryllium - Dissolved	< 0.001 ^ mg/l	0.0005	6020	3 Jun 16 16:18	CC
Cadmium - Dissolved	< 0.0005 mg/l	0.0005	6020	3 Jun 16 16:18	CC
Chromium - Dissolved	< 0.002 mg/l	0.0020	6020	3 Jun 16 16:18	CC
Cobalt - Dissolved	< 0.002 mg/l	0.0020	6020	3 Jun 16 16:18	CC
Lead - Dissolved	< 0.001 ^ mg/l	0.0005	6020	3 Jun 16 16:18	CC
Molybdenum - Dissolved	0.0248 mg/l	0.0020	6020	3 Jun 16 16:18	CC
Selenium - Dissolved	0.0579 mg/l	0.0020	6020	6 Jun 16 18:00	CC
Thallium - Dissolved	0.0007 mg/l	0.0005	6020	3 Jun 16 16:18	CC

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll

cc
16 JUN 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

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CERTIFICATION: ND # ND-00016



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Page: 2 of 2

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 8 Jun 16
Lab Number: 16-W1574
Work Order #: 82-1419
Account #: 002800
Date Sampled: 25 May 16
Date Received: 26 May 16 16:50
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
Sample Description: Dup 1

Temp at Receipt: 3.4C

	As Received Result	Method	Method Reference	Date Analyzed	Analyst
Chromium - Dissolved	< 0.002 mg/l	0.0020	6020	3 Jun 16 16:18	CC
Cobalt - Dissolved	< 0.002 mg/l	0.0020	6020	3 Jun 16 16:18	CC
Lead - Dissolved	< 0.001 ^ mg/l	0.0005	6020	3 Jun 16 16:18	CC
Molybdenum - Dissolved	0.0040 mg/l	0.0020	6020	3 Jun 16 16:18	CC
Selenium - Dissolved	< 0.01 ^ mg/l	0.0020	6020	6 Jun 16 18:00	CC
Thallium - Dissolved	< 0.0005 mg/l	0.0005	6020	3 Jun 16 16:18	CC

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll

CC
16 JUN 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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www.mvtl.com



Page: 1 of 2

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 8 Jun 16
Lab Number: 16-W1575
Work Order #:82-1419
Account #: 002800
Date Sampled: 26 May 16
Date Received: 26 May 16 16:50
Sampled By: MVTl Field Services

Project Name: MDU Lewis & Clark CCR May 2016
Sample Description: Field Blank

Temp at Receipt: 3.4C

Table with columns: As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Lists various chemical tests and their results.

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 2 of 2

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 8 Jun 16
Lab Number: 16-W1575
Work Order #: 82-1419
Account #: 002800
Date Sampled: 26 May 16
Date Received: 26 May 16 16:50
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
Sample Description: Field Blank

Temp at Receipt: 3.4C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Chromium - Dissolved	< 0.002 mg/l	0.0020	6020	3 Jun 16 16:18	CC
Cobalt - Dissolved	< 0.002 mg/l	0.0020	6020	3 Jun 16 16:18	CC
Lead - Dissolved	< 0.001 ^ mg/l	0.0005	6020	3 Jun 16 16:18	CC
Molybdenum - Dissolved	< 0.002 mg/l	0.0020	6020	3 Jun 16 16:18	CC
Selenium - Dissolved	< 0.01 ^ mg/l	0.0020	6020	6 Jun 16 18:00	CC
Thallium - Dissolved	< 0.0005 mg/l	0.0005	6020	3 Jun 16 16:18	CC

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll

*CC
16 JUN 16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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CERTIFICATION: ND # ND-00016



CASE NARRATIVE

MVTL Lab Reference No/SDG: 201682-1420
IML Lab Reference No/SDG: S1606019
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – May 2016 Event
MVTL Laboratory Identifications: 16-W1576 through 16-W1586
Page 1 of 2

Table with 3 columns: MDU Sample Identification, IML Sample Identification, and MVTL Laboratory #. Rows include MW110 through MW109, Dup 1, and Field Blank (FB).

I. RECEIPT

- All samples were received at the laboratory on 26 May 2016 at 1515.
Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
Samples were received on ice and evidence of cooling had begun.
Temperature of samples upon receipt was 3.4°C.
No other exceptions on sample receipt were encountered on this sample set unless noted here.
All samples requiring radiochemistry analysis were sent via courier to Inter-Mountain Labs (IML) for analysis there. Samples were received at IML on 1 Jun 2016.
All samples were properly preserved unless noted on the individual analytical laboratory report or on the IML Case Narrative.

II. HOLDING TIMES

- All holding times were met for both preparation and analysis unless noted on the individual analytical laboratory report or on the IML Case Narrative.



CASE NARRATIVE

MVTL Lab Reference No/SDG: 201682-1420
IML Lab Reference No/SDG: S1606019
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – May 2016 Event
MVTL Laboratory Identifications: 16-W1576 through 16-W1586
Page 2 of 2

III. METHODS

- Approved methodology was followed for all sample analyses.
 - Please refer to the IML Case Narrative for more information regarding methodology.

IV. ANALYSIS

- All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted on the individual analytical laboratory report or on the IML Case Narrative.

All laboratory data has been approved by MVTL Laboratories.

SIGNED: Claudette Carroll DATE: 28 JW 16
Claudette Carroll - MVTL Bismarck Laboratory Manager



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Page: 1 of 1

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 28 Jun 16
Lab Number: 16-W1577
Work Order #: 82-1420
Account #: 002800
Date Sampled: 24 May 16 18:44
Date Received: 26 May 16 16:50
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
Sample Description: MW119

Temp at Receipt: 3.4C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.51 units	NA	SM 4500 H+ B	24 May 16 18:44	DJN
Temperature - Field	10.8 Degrees C	NA	SM 2550B	24 May 16 18:44	DJN
Conductivity - Field	1072 umhos/cm	1	EPA 120.1	24 May 16 18:44	DJN
Radium 226	See Attached Report			20 Jun 16	OL
Radium 228	See Attached Report			11 Jun 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Claudette K. Carroll

CC
28 JUN 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

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CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 28 Jun 16
Lab Number: 16-W1582
Work Order #: 82-1420
Account #: 002800
Date Sampled: 26 May 16 7:13
Date Received: 26 May 16 16:50
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
Sample Description: MW117

Temp at Receipt: 3.4C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.16 units	NA	SM 4500 H+ B	26 May 16 7:13	DJN
Temperature - Field	10.1 Degrees C	NA	SM 2550B	26 May 16 7:13	DJN
Conductivity - Field	7701 umhos/cm	1	EPA 120.1	26 May 16 7:13	DJN
Radium 226	See Attached Report			20 Jun 16	OL
Radium 228	See Attached Report			12 Jun 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Claudette K. Carroll ^{CC} *28 JUN 16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 1 of 1

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 28 Jun 16
Lab Number: 16-W1584
Work Order #: 82-1420
Account #: 002800
Date Sampled: 25 May 16 19:58
Date Received: 26 May 16 16:50
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
Sample Description: MW109

Temp at Receipt: 3.4C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.37 units	NA	SM 4500 H+ B	25 May 16 19:58	DJN
Temperature - Field	10.9 Degrees C	NA	SM 2550B	25 May 16 19:58	DJN
Conductivity - Field	1585 umhos/cm	1	EPA 120.1	25 May 16 19:58	DJN
Radium 226	See Attached Report			20 Jun 16	OL
Radium 228	See Attached Report			12 Jun 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Claudette K. Carroll *28 JUN 16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 1 of 1

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 28 Jun 16
 Lab Number: 16-W1585
 Work Order #: 82-1420
 Account #: 002800
 Date Sampled: 25 May 16
 Date Received: 26 May 16 16:50
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
 Sample Description: Dup 1

Temp at Receipt: 3.4C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Radium 226	See Attached Report			20 Jun 16	OL
Radium 228	See Attached Report			12 Jun 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Cc
Claudette K. Carroll *28 JUN 16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2 North German St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.mvtl.com



Page: 1 of 1

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 28 Jun 16
Lab Number: 16-W1586
Work Order #: 82-1420
Account #: 002800
Date Sampled: 26 May 16
Date Received: 26 May 16 16:50
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR May 2016
Sample Description: Field Blank

Temp at Receipt: 3.4C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Radium 226	See Attached Report			20 Jun 16	OL
Radium 228	See Attached Report			12 Jun 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by: Claudette K. Carroll ^{LC} 28 JUN 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



Laboratories, Inc.

2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name: MDU Lewis and Clark CCR Radiochem May Event 2016				Name of Sampler(s): <i>Darren Niesway</i>				
Report To: MDU Attn: Samantha Marshall Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-222-7829			Carbon Copy: Attn: Address:			Work Order Number: <i>82-1420</i>		

Sample Information						Bottle Type				Field Parameters			Analysis	
Lab Number	Sample ID	Date	Time	Sample Type	Gradient	1000 ml HNO ₃					Field Temperature °C	Field Spec. Cond.	Field pH	Analysis Required
<i>W1576</i>	MW110	<i>24 May 16</i>	<i>1650</i>	GW	Up	4					<i>9.31</i>	<i>1003</i>	<i>7.36</i>	MDU CCR combined
<i>W1577</i>	MW119	<i>24 May 16</i>	<i>1844</i>	GW	Up	4					<i>10.80</i>	<i>1072</i>	<i>7.51</i>	RadChem
<i>W1578</i>	MW210	<i>25 May 16</i>	<i>0825</i>	GW	Up	4					<i>10.09</i>	<i>1424</i>	<i>7.66</i>	
<i>W1579</i>	MW102	<i>25 May 16</i>	<i>0950</i>	GW	Down	4					<i>10.15</i>	<i>6392</i>	<i>6.96</i>	
<i>W1580</i>	MW118	<i>25 May 16</i>	<i>1543</i>	GW	Down	4					<i>11.36</i>	<i>1640</i>	<i>7.71</i>	
<i>W1581</i>	MW111	<i>25 May 16</i>	<i>1244</i>	GW	Down	4					<i>9.46</i>	<i>2973</i>	<i>7.33</i>	
<i>W1582</i>	MW117	<i>26 May 16</i>	<i>0713</i>	GW	Down	4					<i>10.14</i>	<i>7701</i>	<i>7.18</i>	<i>7.16 @ 28 Jun 16</i>
<i>W1583</i>	MW103	<i>25 May 16</i>	<i>1805</i>	GW		4					<i>10.87</i>	<i>1505</i>	<i>7.42</i>	
<i>W1584</i>	MW109	<i>25 May 16</i>	<i>1958</i>	GW		4					<i>10.94</i>	<i>1585</i>	<i>7.37</i>	
<i>W1585</i>	Dup 1	<i>25 May 16</i>	NA	W		4					NA	NA	NA	
<i>W1586</i>	Field Blank (FB)		NA	W		4					NA	NA	NA	

Comments:

	Transferred by:	Sample Condition	Date/Time	Received by:	Sample Condition	Date/Time	° C
1	<i>Jan 16</i>	<i>Log in</i>	<i>26 May 16 1515</i>	<i>[Signature]</i>		<i>26 May 2016 1515</i>	<i>3.4°C TMS88</i>
2							
3							



Date: 6/23/2016

CLIENT: MVTL Laboratories, Inc.
Project: 201682-1420
Lab Order: S1606019

CASE NARRATIVE
Report ID: S1606019001

Samples 16-W1576 MW110, 16-W1577 MW119, 16-W1578 MW210, 16-W1579 MW102, 16-W1580 MW118, 16-W1581 MW111, 16-W1582 MW117, 16-W1583 MW103, 16-W1584 MW109, 16-W1585 Dup 1, and 16-W1586 Field Blank were received on June 1, 2016.

All samples were received and analyzed within the EPA recommended holding times, except those noted below in this case narrative. Samples were analyzed using the methods outlined in the following references:

"Standard Methods For The Examination of Water and Wastewater", approved method versions
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition
40 CFR Parts 136 and 141
40 CFR Part 50, Appendices B, J, L, and O
Methods indicated in the Methods Update Rule published in the Federal Register Friday, May 18, 2012
ASTM approved and recognized standards

All Quality Control parameters met the acceptance criteria defined by EPA and Inter-Mountain Laboratories except as indicated in this case narrative.

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/23/2016
Report ID S1606019001

ProjectName: 201682-1420
Lab ID: S1606019-001
ClientSample ID: 16-W1576 MW110
COC: 201682-1420

WorkOrder: S1606019
CollectionDate: 5/24/2016 4:50:00 PM
DateReceived: 6/1/2016 10:57:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.03	pCi/L		0.2	SM 7500 Ra-B	06/20/2016 1049	MB
Radium 226 Precision (±)	0.03	pCi/L			SM 7500 Ra-B	06/20/2016 1049	MB
Radium 228	-1.6	pCi/L		1	Ga-Tech	06/11/2016 1008	MB
Radium 228 Precision (±)	1.1	pCi/L			Ga-Tech	06/11/2016 1008	MB

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - M Value exceeds Monthly Ave or MCL or is less than LCL
 - O Outside the Range of Dilutions
 - X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/23/2016
Report ID S1606019001

ProjectName: 201682-1420
Lab ID: S1606019-002
ClientSample ID: 16-W1577 MW119
COC: 201682-1420

WorkOrder: S1606019
CollectionDate: 5/24/2016 6:44:00 PM
DateReceived: 6/1/2016 10:57:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Radionuclides - Total

Radium 226	0.1	pCi/L		0.2	SM 7500 Ra-B	06/20/2016 1049 MB
Radium 226 Precision (±)	0.04	pCi/L			SM 7500 Ra-B	06/20/2016 1049 MB
Radium 228	0.8	pCi/L		1	Ga-Tech	06/11/2016 1308 MB
Radium 228 Precision (±)	0.9	pCi/L			Ga-Tech	06/11/2016 1308 MB

These results apply only to the samples tested.

RL - Reporting Limit

- | | | | | |
|--------------------|---|--|----|--|
| Qualifiers: | B | Analyte detected in the associated Method Blank | C | Calculated Value |
| | E | Value above quantitation range | H | Holding times for preparation or analysis exceeded |
| | J | Analyte detected below quantitation limits | L | Analyzed by another laboratory |
| | M | Value exceeds Monthly Ave or MCL or is less than LCL | ND | Not Detected at the Reporting Limit |
| | O | Outside the Range of Dilutions | S | Spike Recovery outside accepted recovery limits |
| | X | Matrix Effect | | |

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/23/2016
Report ID S1606019001

ProjectName: 201682-1420
Lab ID: S1606019-003
ClientSample ID: 16-W1578 MW210
COC: 201682-1420

WorkOrder: S1606019
CollectionDate: 5/25/2016 8:25:00 AM
DateReceived: 6/1/2016 10:57:00 AM
FieldSampler:
Matrix: Water

Comments

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Radionuclides - Total, Radium 226, Radium 226 Precision (±), Radium 228, and Radium 228 Precision (±).

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
M Value exceeds Monthly Ave or MCL or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

- C Calculated Value
H Holding times for preparation or analysis exceeded
L Analyzed by another laboratory
ND Not Detected at the Reporting Limit
S Spike Recovery outside accepted recovery limits

Reviewed by: [Signature]
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/23/2016
Report ID S1606019001

ProjectName: 201682-1420
Lab ID: S1606019-004
ClientSample ID: 16-W1579 MW102
COC: 201682-1420

WorkOrder: S1606019
CollectionDate: 5/24/2016 9:50:00 AM
DateReceived: 6/1/2016 10:57:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.4	pCi/L		0.2	SM 7500 Ra-B	06/20/2016 1049	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	06/20/2016 1049	MB
Radium 228	-1.9	pCi/L		1	Ga-Tech	06/11/2016 1910	MB
Radium 228 Precision (±)	1.2	pCi/L			Ga-Tech	06/11/2016 1910	MB

These results apply only to the samples tested.

RL - Reporting Limit

- | | | |
|--------------------|--|--|
| Qualifiers: | B Analyte detected in the associated Method Blank | C Calculated Value |
| | E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| | J Analyte detected below quantitation limits | L Analyzed by another laboratory |
| | M Value exceeds Monthly Ave or MCL or is less than LCL | ND Not Detected at the Reporting Limit |
| | O Outside the Range of Dilutions | S Spike Recovery outside accepted recovery limits |
| | X Matrix Effect | |

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/23/2016
Report ID S1606019001

ProjectName: 201682-1420
Lab ID: S1606019-005
ClientSample ID: 16-W1580 MW118
COC: 201682-1420

WorkOrder: S1606019
CollectionDate: 5/25/2016 3:43:00 PM
DateReceived: 6/1/2016 10:57:00 AM
FieldSampler:
Matrix: Water

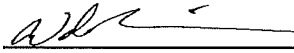
Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.1	pCi/L		0.2	SM 7500 Ra-B	06/20/2016 1049	MB
Radium 226 Precision (±)	0.04	pCi/L			SM 7500 Ra-B	06/20/2016 1049	MB
Radium 228	-2.7	pCi/L		1	Ga-Tech	06/11/2016 2211	MB
Radium 228 Precision (±)	1.1	pCi/L			Ga-Tech	06/11/2016 2211	MB

These results apply only to the samples tested.

RL - Reporting Limit

- | | | |
|--------------------|--|--|
| Qualifiers: | B Analyte detected in the associated Method Blank | C Calculated Value |
| | E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| | J Analyte detected below quantitation limits | L Analyzed by another laboratory |
| | M Value exceeds Monthly Ave or MCL or is less than LCL | ND Not Detected at the Reporting Limit |
| | O Outside the Range of Dilutions | S Spike Recovery outside accepted recovery limits |
| | X Matrix Effect | |

Reviewed by: 
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/23/2016
Report ID S1606019001

ProjectName: 201682-1420
Lab ID: S1606019-006
ClientSample ID: 16-W1581 MW111
COC: 201682-1420

WorkOrder: S1606019
CollectionDate: 5/25/2016 12:44:00 PM
DateReceived: 6/1/2016 10:57:00 AM
FieldSampler:
Matrix: Water

Comments

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Radionuclides - Total, Radium 226, Radium 226 Precision (±), Radium 228, and Radium 228 Precision (±).

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
M Value exceeds Monthly Ave or MCL or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

- C Calculated Value
H Holding times for preparation or analysis exceeded
L Analyzed by another laboratory
ND Not Detected at the Reporting Limit
S Spike Recovery outside accepted recovery limits

Reviewed by: [Signature]
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/23/2016
Report ID S1606019001

ProjectName: 201682-1420
Lab ID: S1606019-007
ClientSample ID: 16-W1582 MW117
COC: 201682-1420

WorkOrder: S1606019
CollectionDate: 5/26/2016 7:13:00 AM
DateReceived: 6/1/2016 10:57:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Radionuclides - Total

Radium 226	0.5	pCi/L		0.2	SM 7500 Ra-B	06/20/2016 1049 MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	06/20/2016 1049 MB
Radium 228	-0.2	pCi/L		1	Ga-Tech	06/12/2016 413 MB
Radium 228 Precision (±)	1.2	pCi/L			Ga-Tech	06/12/2016 413 MB

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by another laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/23/2016
Report ID S1606019001

ProjectName: 201682-1420
Lab ID: S1606019-008
ClientSample ID: 16-W1583 MW103
COC: 201682-1420

WorkOrder: S1606019
CollectionDate: 5/25/2016 6:05:00 PM
DateReceived: 6/1/2016 10:57:00 AM
FieldSampler:
Matrix: Water

Comments

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Radionuclides - Total, Radium 226, Radium 226 Precision (±), Radium 228, and Radium 228 Precision (±).

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
M Value exceeds Monthly Ave or MCL or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

- C Calculated Value
H Holding times for preparation or analysis exceeded
L Analyzed by another laboratory
ND Not Detected at the Reporting Limit
S Spike Recovery outside accepted recovery limits

Reviewed by: [Signature]
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/23/2016
Report ID S1606019001

ProjectName: 201682-1420
Lab ID: S1606019-009
ClientSample ID: 16-W1584 MW109
COC: 201682-1420

WorkOrder: S1606019
CollectionDate: 5/25/2016 7:58:00 PM
DateReceived: 6/1/2016 10:57:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.05	pCi/L		0.2	SM 7500 Ra-B	06/20/2016 1311	MB
Radium 226 Precision (±)	0.03	pCi/L			SM 7500 Ra-B	06/20/2016 1311	MB
Radium 228	0.9	pCi/L		1	Ga-Tech	06/12/2016 1617	MB
Radium 228 Precision (±)	1.1	pCi/L			Ga-Tech	06/12/2016 1617	MB

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - M Value exceeds Monthly Ave or MCL or is less than LCL
 - O Outside the Range of Dilutions
 - X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/23/2016
Report ID S1606019001

ProjectName: 201682-1420
Lab ID: S1606019-010
ClientSample ID: 16-W1585 Dup 1
COC: 201682-1420

WorkOrder: S1606019
CollectionDate: 5/25/2016
DateReceived: 6/1/2016 10:57:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.1	pCi/L		0.2	SM 7500 Ra-B	06/20/2016 1311	MB
Radium 226 Precision (±)	0.04	pCi/L			SM 7500 Ra-B	06/20/2016 1311	MB
Radium 228	0.4	pCi/L		1	Ga-Tech	06/12/2016 1316	MB
Radium 228 Precision (±)	1.1	pCi/L			Ga-Tech	06/12/2016 1316	MB

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - M Value exceeds Monthly Ave or MCL or is less than LCL
 - O Outside the Range of Dilutions
 - X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 6/23/2016
Report ID S1606019001

ProjectName: 201682-1420
Lab ID: S1606019-011
ClientSample ID: 16-W1586 Field Blank
COC: 201682-1420

WorkOrder: S1606019
CollectionDate:
DateReceived: 6/1/2016 10:57:00 AM
FieldSampler:
Matrix: Water

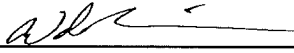
Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.03	pCi/L		0.2	SM 7500 Ra-B	06/20/2016 1311	MB
Radium 226 Precision (±)	0.03	pCi/L			SM 7500 Ra-B	06/20/2016 1311	MB
Radium 228	-3.4	pCi/L		1	Ga-Tech	06/12/2016 1617	MB
Radium 228 Precision (±)	1.1	pCi/L			Ga-Tech	06/12/2016 1617	MB

These results apply only to the samples tested.

RL - Reporting Limit

- | | | |
|--------------------|--|--|
| Qualifiers: | B Analyte detected in the associated Method Blank | C Calculated Value |
| | E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| | J Analyte detected below quantitation limits | L Analyzed by another laboratory |
| | M Value exceeds Monthly Ave or MCL or is less than LCL | ND Not Detected at the Reporting Limit |
| | O Outside the Range of Dilutions | S Spike Recovery outside accepted recovery limits |
| | X Matrix Effect | |

Reviewed by: 
Wade Nieuwsma, Assistant Laboratory Manager



ANALYTICAL QC SUMMARY REPORT

CLIENT: MVTL Laboratories, Inc.
Work Order: S1606019
Project: 201682-1420

Date: 6/23/2016
Report ID: S1606019001

Radium 228 by Ga/Tech		Sample Type MBLK		Units: pCi/L			
MB-344 (06/10/16 16:02)	RunNo: 135174	PrepDate: 06/06/16 11:30	BatchID: 11867				
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Total Radium 228		ND	1				

Radium 228 by Ga/Tech		Sample Type LCS		Units: pCi/L			
LCS-344 (06/10/16 19:03)	RunNo: 135174	PrepDate: 06/06/16 11:30	BatchID: 11867				
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Total Radium 228		38	1	39.5	96.0	61.3 - 120	

Radium 228 by Ga/Tech		Sample Type MS		Units: pCi/L			
MS-344 (06/11/16 01:05)	RunNo: 135174	PrepDate: 06/06/16 11:30	BatchID: 11867				
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Total Radium 228		34	1	39.5	ND	85.3	64.3 - 120

Radium 228 by Ga/Tech		Sample Type MSD		Units: pCi/L			
MSD-344 (06/11/16 04:06)	RunNo: 135174	PrepDate: 06/06/16 11:30	BatchID: 11867				
Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Total Radium 228		37	1	34	8.03	92.4	20

Radium 226 in Water - Total		Sample Type MBLK		Units: pCi/L			
MB-1612 (06/20/16 10:49)	RunNo: 135482	PrepDate: 06/06/16 0:00	BatchID: 11892				
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Radium 226		ND	0.2				

Radium 226 in Water - Total		Sample Type LCS		Units: pCi/L			
LCS-1612 (06/20/16 10:49)	RunNo: 135482	PrepDate: 06/06/16 0:00	BatchID: 11892				
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Radium 226		5.4	0.2	5.54	97.6	67.1 - 122	

Radium 226 in Water - Total		Sample Type LCSD		Units: pCi/L			
LCSD-1612 (06/20/16 10:49)	RunNo: 135482	PrepDate: 06/06/16 0:00	BatchID: 11892				
Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Radium 226		5.0	0.2	5.4	7.54	90.5	20

Radium 226 in Water - Total		Sample Type MS		Units: pCi/L			
S1606019-001A MS (06/20/16 10:49)	RunNo: 135482	PrepDate: 06/06/16 0:00	BatchID: 11892				
Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Radium 226		5.6	0.2	5.54	ND	101	65 - 131

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - H Holding times for preparation or analysis exceeded
 - L Analyzed by another laboratory
 - O Outside the Range of Dilutions
 - S Spike Recovery outside accepted recovery limits
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - ND Not Detected at the Reporting Limit
 - R RPD outside accepted recovery limits
 - X Matrix Effect



LABORATORIES, Inc.
 2616 E Broadway Ave
 Bismarck, ND 58501

Chain of Custody Record

Phone: (701) 258-9720

Toll Free: (800) 279-6885

Fax: (701) 258-9724

201682-1420

Company Name and Address: MVTL 2616 E Broadway Bismarck, ND 58501	Account #:	Phone #: 701-258-9720
	Contact: Claudette	Fax #: For faxed report check box <input type="checkbox"/>
Billing Address (indicate if different from above): PO Box 249 New Ulm, MN 56073	Name of Sampler:	E-mail: ccarroll@mvtl.com For e-mail report check box <input type="checkbox"/>
	Quote Number	Date Submitted: 5/27/2016
	Project Name/Number:	Purchase Order #: BL5580

Sample Information						Bottle Type					Analysis
IML Lab Number	MVTL Lab Number	Client Sample ID	Sample Type	Date Sampled	Time Sampled	Untreated	1000 ml HNO3	VOC Vials Impreserved	Glass Jar	Other	Analysis Required
51606019 001	16-W1576	MW110		05/24/16	1650						Radium226 & Radium228 on all
002	16-W1577	MW119		05/24/16	1844						
003	16-W1578	MW210		05/25/16	825						
004	16-W1579	MW102		05/24/16	950						
005	16-W1580	MW118		05/25/16	1543						
006	16-W1581	MW111		05/25/16	1244						
007	16-W1582	MW117		05/26/16	713						
008	16-W1583	MW103		05/25/16	1805						
009	16-W1584	MW109		05/25/16	1958						
010	16-W1585	Dup 1		05/25/16							

Comments: All results must be reported as a numerical value.

Transferred by:	Date:	Time:	Sample Condition:	Received by:	Date:	Temp:
C. Jackson	05/27/16	1700		Kathy Boye	6.1.16	10:57 16.1°C
2.						



LABORATORIES, Inc.
 2616 E Broadway Ave
 Bismarck, ND 58501

Chain of Custody Record

Phone: (701) 258-9720
 Toll Free: (800) 279-6885 Fax: (701) 258-9724

201682-1420

Company Name and Address: MVTl 2616 E Broadway Bismarck, ND 58501	Account #:	Phone #: 701-258-9720
	Contact: Claudette	Fax #: For faxed report check box <input type="checkbox"/>
Billing Address (indicate if different from above): PO Box 249 New Ulm, MN 56073	Name of Sampler:	E-mail: ccarroll@mvtl.com For e-mail report check box <input type="checkbox"/>
	Quote Number	Date Submitted: 5/27/2016
	Project Name/Number:	Purchase Order #: BL5580

Sample Information						Bottle Type					Analysis	
IML Lab Number	MVTl Lab Number	Client Sample ID	Sample Type	Date Sampled	Time Sampled	Untreated	1000 ml HNO3	VOC Vials	Unpreserved	Glass Jar	Other	Analysis Required
51606019	16-W1586	Field Blank										Radium226 & Radium228 on all

Comments: All results must be reported as a numerical value.

Transferred by:	Date:	Time:	Sample Condition:	Received by:	Date:	Temp:
C. Jackson	05/27/16	1700		Kathy Barm	6.1.16	10:57 16.1 C
2.						



MVTL Laboratories Inc.
FIELD DATA REPORT

MDU Lewis and Clark
Quarterly CCR Sampling

Attn: Samantha Marshall
400 North 4th St
Bismarck, ND 58501

WO# 82-1420
82-1419

WELL ID	PURGE DATE	START PURGE TIME	SAMPLE DATE	TIME OF SAMPLE	WATER LEVEL START (FT)	TOTAL DEPTH (FT)	WATER LEVEL END (FT)	VOLUME IN WELL (Liters)	VOLUME REMOVED (mL)	SAMPLE METHOD	FIELD READINGS			SAMPLE APPEARANCE
											TEMP (°C)	EC	pH	
MW110	24-May-16	14:40	24-May-16	16:50	9.34	16.85	NA	4.6	13000.0	Bladder	9.31	1003	7.36	clear
MW119	24-May-16	17:54	24-May-16	18:44	9.18	16.65	9.29	4.6	5000.0	Bladder	10.80	1072	7.51	clear
MW210	25-May-16	7:10	25-May-16	8:25	9.43	35.45	10.94	16.0	7500.0	Bladder	10.09	1424	7.66	clear
MW102	26-May-16	8:20	26-May-16	9:50	19.44	24.70	19.77	3.2	9000.0	Bladder	10.15	6392	6.96	clear
MW118	25-May-16	13:48	25-May-16	15:43	8.80	11.90	8.88	1.9	11500.0	Bladder	11.36	1640	7.71	clear
MW111	25-May-16	11:39	25-May-16	12:44	8.16	17.80	8.38	5.9	6500.0	Bladder	9.46	2973	7.33	clear
MW117	25-May-16	10:27	26-May-16	7:13	6.32	11.51	9.85	3.2	5500.0	Bladder	10.14	7701	7.16	clear
MW103	25-May-16	16:50	25-May-16	18:05	10.67	21.15	10.68	6.5	7500.0	Bladder	10.87	1505	7.42	clear
MW109	25-May-16	19:087	25-May-16	19:58	10.62	17.05	10.69	4.0	5000.0	Bladder	10.94	1585	7.37	clear
MW101	NA	NA	24-May-16	14:13	9.27	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW105	NA	NA	24-May-16	14:29	9.07	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW106	NA	NA	24-May-16	14:26	9.79	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW107	NA	NA	24-May-16	14:16	4.68	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW108	NA	NA	24-May-16	14:23	17.03	NA	NA	NA	NA	WL	NA	NA	NA	Water Level
MW116	NA	NA	24-May-16	14:20	10.61	NA	NA	NA	NA	WL	NA	NA	NA	Water Level

MVTL Calibration Worksheet

Site: MDU Lewis and Clark

Technician: Darren Nieswaag

Instrument
(Circle One):

#1 650 MDS 08F100203

#2 650 MDS 04H14736

#3 556 MPS 12E102056

Pre Site Calibration

Date: 24 May 16 Time: 0646

	pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/-
Buffer 7		<u>21.35</u>	<u>7.01</u>	<u>7.00</u>	6.95-7.05	<u>-28.9</u>	0 +/- 50
Buffer 10		<u>21.25</u>	<u>10.03</u>	<u>10.00</u>	9.95-10.05	<u>-208.3</u>	-180 +/- 50
Conductivity							
Buffer 1413		<u>21.46</u>	<u>1334</u>	<u>1413</u>	±10%	<u>ICCA</u> Buffer 5000	Check <u>5010</u>
ORP							
231 mV @ 25C		<u>10.05</u>	<u>252.9</u>	<u>257.2</u>	±10 mV		
DO							
<u>Time 1434</u>		<u>20.67</u>	<u>8.45</u>	<u>8.37</u>			
					Barometric Pressure (mm Hg)	<u>707.3</u>	
					mg/L		

Post Site Check

Time: 1850

	pH	Temp °C	Reading
Buffer 7		<u>21.91</u>	<u>6.99</u>
Conductivity			
Buffer 1413		<u>21.24</u>	<u>1391</u>

Date: 24 May 16 Time: 0600

	pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/-
Buffer 7		<u>22.09</u>	<u>6.97</u>	<u>7.00</u>	6.95-7.05	<u>-27.4</u>	0 +/- 50
Buffer 10		<u>22.16</u>	<u>9.98</u>	<u>10.00</u>	9.95-10.05	<u>-205.3</u>	-180 +/- 50
Conductivity							
Buffer 1413		<u>21.97</u>	<u>1475</u>	<u>1413</u>	±10%	<u>ICCA</u> Buffer <u>5000</u> <u>1443</u> <u>m</u>	Check <u>5028</u>
ORP							
231 mV @ 25C		<u>10.21</u>	<u>256.8</u>	<u>257.6</u>	±10 mV		
DO							
		<u>21.27</u>	<u>8.65</u>	<u>8.17</u>			
					Barometric Pressure (mm Hg)	<u>704.4</u>	
					mg/L		

Time: 20.04

	pH	Temp °C	Reading
Buffer 7		<u>20.12</u>	<u>7.01</u>
Conductivity			
Buffer 1413		<u>20.43</u>	<u>1415</u>

MVTL Calibration Worksheet

Site: MDU Lewis and Clark

Technician: Darren Nieswaag

Instrument
(Circle One):

#1 650 MDS 08F100203

#2 650 MDS 04H14736

#3 556 MPS 12E102056

Pre Site Calibration							
Date:	Time:						
pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50	
Buffer 7				6.95-7.05		0 +/- 50	
Buffer 10				9.95-10.05		-180 +/- 50	
Conductivity		Pre Cal	Post Cal	Post Cal Range	Buffer	Check	
Buffer 1413				±10%	5000		
ORP		Pre Cal	Post Cal	Post Cal Range			
231 mV @ 25C				±10 mV			
DO		Pre Cal	Post Cal	Barometric Pressure (mm Hg)			
				mg/L			

Post Site Check		
Time:		
pH	Temp °C	Reading
Buffer 7		
Conductivity		
Buffer 1413		

Pre Site Calibration							
Date:	Time:						
pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50	
Buffer 7	21.42	7.06	6.99	6.95-7.05	-29.5	0 +/- 50	
Buffer 10	21.39	9.99	10.00	9.95-10.05	-207.4	-180 +/- 50	
Conductivity		Pre Cal	Post Cal	Post Cal Range	Buffer	Check	
Buffer 1413	21.30	1357	1415	±10%	5000	4991	
ORP		Pre Cal	Post Cal	Post Cal Range			
231 mV @ 25C	7.51	256.8	258.2	±10 mV			
DO		Pre Cal	Post Cal	Barometric Pressure (mm Hg)			
	21.02	7.60	8.25	mg/L	704.1		

Post Site Check		
Time:		
pH	Temp °C	Reading
Buffer 7	15.95	6.97
Conductivity		
Buffer 1413	16.35	1402



Field Datasheet

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Water Level

Sampling Personnel:

Darran Nieswazy

Company:

MDU Lewis and Clark

Well ID	Date	Time	Depth to Water	Comments
MW101	24 May 16	1413	9.27	
MW105	24 May 16	1429	9.07	
MW106	24 May 16	1426	9.79	
MW107	24 May 16	1416	4.68	
MW108	24 May 16	1423	17.03	
MW116	24 May 16	1420	10.61	



2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW110
Sampling Personal: *Darren Mesmay*

Weather Conditions: Temp: 75 °F Wind: SW5 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes No	
Well Labeled?	Yes No	
Casing Straight?	Yes No	
Grout Seal Intact?	Yes No	Not Visible
Repairs Necessary:		
Casing Diameter:	2"	
Water Level Before Purge:	9.34	ft
Total Well Depth:	16.85	ft
Well Volume:	4.7	liters
Depth to Top of Pump:	14.09	ft
Water Level After Sample:		ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	4 sec.
Dedicated Equip?:	Yes	No	Recover:	56 sec.
Duplicate Sample?:	Yes	No	PSI:	13
Duplicate Sample ID:			Pumping Rate:	100 mL/min
Purge Date:	24 May 16	Time Purging Began:	1440	am/pm
Well Purged Dry?	Yes	No	Time Purged Dry:	— am/pm
Sample Date:	24 May 16	Time of Sampling:	1650	am/pm
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

SEQ #	Stabilization (3 consecutive) Time	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.
2	1455	9.85	1005	7.36	2.96	78.3	101	9.52	500/1000	clear
3	1505	9.93	1003	7.39	3.02	84.0	70.5	9.52	1000	clear
4	1515	9.84	1001	7.37	3.07	87.3	50.0	9.52	1000	clear
5	1525	9.66	999	7.37	3.09	89.2	45.8	9.52	1000	clear
6	1535	9.66	1000	7.36	3.06	94.0	31.8	9.52	1000	clear
7	1545	9.46	1000	7.36	3.11	95.4	17.2	9.52	1000	clear
8	1555	9.42	1002	7.37	3.13	95.8	13.6	9.52	1000	clear
9	1600	9.48	1001	7.37	3.14	96.5	11.4	9.52	1000/500	clear
10	1605	9.50	1000	7.38	3.14	97.9	11.7	9.52	500	clear

Stabilized: ~~Yes~~ No

Total Volume Removed: — mL

Comments:

Next page.



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
 Event: 2016
 Sample ID: MW110
 Sampling Personal: Parren Medway
 Date: 24 May 16

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	1610	9.46	1002	7.37	3.36	98.4	9.12	9.52	500	clear
12	1615	9.57	1002	7.36	3.11	99.0	8.47	9.52	500	clear
13	1620	9.63	1003	7.36	3.14	98.6	7.49	9.52	500	clear
14	1625	9.64	1003	7.36	3.16	98.3	6.80	9.52	500	clear
15	1630	9.55	1001	7.37	3.17	97.6	5.43	9.52	500	clear
16	1635	9.56	1001	7.37	3.11	97.0	6.20	9.52	500	clear
17	1640	9.40	1001	7.37	3.00	97.1	5.57	9.52	500	clear
18	1645	9.43	1001	7.38	3.18	97.5	5.93	9.52	500	clear
19	1650	9.31	1003	7.36	3.18	98.4	5.61	9.52	500	clear
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Stabilized: Yes No

Total Volume Removed: 13,000 mL

Comments:



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW119
Sampling Personal: Darren Wisniewski

Weather Conditions: Temp: 76 °F Wind: SW 5 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	<input checked="" type="checkbox"/> No	
Well Labeled?	<input checked="" type="checkbox"/> Yes	No	
Casing Straight?	<input checked="" type="checkbox"/> Yes	No	
Grout Seal Intact?	<input checked="" type="checkbox"/> Yes	No	Not Visible
Repairs Necessary:	-		
Casing Diameter:	2"		
Water Level Before Purge:	9.18	ft	
Total Well Depth:	16.65	ft	
Well Volume:	4.6	liters	
Depth to Top of Pump:	11.94	ft	
Water Level After Sample:	9.29	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	3 sec.
Dedicated Equip?:	Yes	<input checked="" type="checkbox"/> No	Recover:	57 sec.
Duplicate Sample?:	Yes	<input checked="" type="checkbox"/> No	PSI:	
Duplicate Sample ID:			Pumping Rate:	100 mL/min
Purge Date:	24 May 16	Time Purging Began:	1754	am/pm
Well Purged Dry?	Yes	<input checked="" type="checkbox"/> No	Time Purged Dry:	0254 am/pm
Sample Date:	24 May 16	Time of Sampling:	1844	am/pm
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
1	17.59	11.99	1054	7.52	1.26	-6.8	34.6	9.29	500	clear
2	18.09	11.17	1062	7.54	1.48	-41.8	18.5	9.29	500/1000	clear
3	18.19	11.14	1068	7.54	1.35	-37.2	5.49	9.29	1000	clear
4	18.29	11.09	1067	7.53	1.38	-30.3	2.69	9.29	1000	clear
5	18.34	10.92	1068	7.52	1.41	-27.4	2.26	9.29	500	clear
6	18.39	11.00	1070	7.52	1.40	-25.2	2.22	9.29	500	clear
7	18.44	10.80	1072	7.51	1.46	-20.2	2.08	9.29	500	clear
8										
9										
10										

Stabilized: Yes No

Total Volume Removed: 5000 mL

Comments:



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW 710
Sampling Personal: Darrien Nieswagg

Weather Conditions: SS Temp: 55 °F Wind: Light W/S Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Visible
Repairs Necessary:	—		
Casing Diameter:	2"		
Water Level Before Purge:	9.43	ft	
Total Well Depth:	35.45	ft	
Well Volume:	16.1	liters	
Depth to Top of Pump:	29.08	ft	
Water Level After Sample:	10.94	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	1564 sec.
Dedicated Equip?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Recover:	56 sec.
Duplicate Sample?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	PSI:	20-
Duplicate Sample ID:	Dup 1		Pumping Rate:	100 mL/min
Purge Date:	25 May 16	Time Purging Began:	0710	am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Time Purged Dry:	— am/pm
Sample Date:	25 May 16	Time of Sampling:	0825	am/pm
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.
1	0715 10.14	1426	7.64	0.26	25.5	15.5	10.09	500	clear
2	0725 10.09	1428	7.66	0.35	-20.2	16.5	10.64	1000	clear
3	0735 10.02	1429	7.67	0.29	-36.0	10.7	10.62	1000	clear
4	0745 10.04	1426	7.67	0.27	-44.5	7.88	10.74	1000	clear
5	0755 10.02	1426	7.67	0.26	-52.5	5.45	10.80	1000	clear
6	0805 10.00	1426	7.67	0.22	-57.5	4.48	10.80	1000	clear
7	0810 9.97	1426	7.67	0.24	-59.6	4.04	10.80	500	clear
8	0815 10.03	1425	7.67	0.25	-61.2	3.30	10.80	500	clear
9	0820 10.11	1425	7.67	0.20	-63.2	3.12	10.80	500	clear
10	0825 10.09	1424	7.66	0.21	-65.1	3.11	10.80	500	clear

Stabilized: Yes No
Comments:

Total Volume Removed: 7500 mL



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW102
Sampling Personal: Darren Neswary

Weather Conditions: Temp: 55 °F Wind: E 5-10 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	<input checked="" type="radio"/> No	
Well Labeled?	Yes	<input checked="" type="radio"/> No	
Casing Straight?	<input checked="" type="radio"/> Yes	No	
Grout Seal Intact?	Yes	No	<u>(Not Visible)</u>
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	19.44	ft	
Total Well Depth:	24.70	ft	
Well Volume:	3.3	liters	
Depth to Top of Pump:	21.22	ft	
Water Level After Sample:	19.77	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	564 sec.
Dedicated Equip?:	Yes	<input checked="" type="radio"/> No	Recover:	56 sec.
Duplicate Sample?:	Yes	<input checked="" type="radio"/> No	PSI:	10-15
Duplicate Sample ID:			Pumping Rate:	100 mL/min
Purge Date:	26 May 16	Time Purging Began:	0820	am/pm
Well Purged Dry?	Yes	<input checked="" type="radio"/> No	Time Purged Dry:	
Sample Date:	26 May 16	Time of Sampling:	0950	am/pm
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
										SEQ #
1	0825	10.01	6426	6.94	6.05	18.3	63.2	19.77	500	clear
2	0835	9.91	6466	6.95	0.90	1.2	34.4	19.77	1000	clear
3	0845	9.51	6447	6.95	0.42	-38.0	20.1	19.77	1000	clear
4	0855	9.92	6441	6.95	0.25	-49.2	25.1	19.77	1000	clear
5	0905	10.01	6428	6.96	0.22	-54.9	17.5	19.77	1000	clear
6	0915	9.95	6405	6.96	0.22	-54.0	11.8	19.77	1000	clear
7	0925	10.12	6402	6.96	0.25	-52.2	10.6	19.77	1000	clear
8	0935	10.12	6395	6.96	0.25	-51.4	5.50	19.77	1000	clear
9	0940	10.08	6392	6.96	0.25	-51.2	4.76	19.77	500	clear
10	0945	10.13	6389	6.96	0.22	-54.3	4.75	19.77	500	clear

Stabilized: Yes No

Total Volume Removed: _____ mL

Comments:

next page



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark
 Event: 2016
 Sample ID: MW102
 Sampling Personal: Darren Nierway
 Date: 26 May 16

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	0950	10.15	6392	6.96	0.22	52.1	4.63	19.77	500	clear
12	0955									
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Stabilized: Yes No

Comments: C

Total Volume Removed: 9000 mL



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: nw118
Sampling Personal: Parron Nieswaj

Weather Conditions: Temp: 74 °F Wind: NW 10 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	8.80	ft	
Total Well Depth:	11.90	ft	
Well Volume:	1.9	liters	
Depth to Top of Pump:	9.19	ft	
Water Level After Sample:	8.88	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	57 sec.
Dedicated Equip?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Recover:	3 sec.
Duplicate Sample?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	PSI:	10-15
Duplicate Sample ID:			Pumping Rate:	100 mL/min
Purge Date:	25 May 16	Time Purging Began:	1348	am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Time Purged Dry:	
Sample Date:	25 May 16	Time of Sampling:	1543	am/pm
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.
	11.53	1633	7.66	3.93	-84.7	21000	8.84	500	Turbid, Tan
	11.44	1623	7.70	3.11	-89.6	228	8.84	1000	turbid
	11.49	1615	7.71	2.75	-88.6	87.7	8.88	1000	clear
	11.39	1613	7.71	2.78	-85.9	58.7	8.88	1000	clear
	11.81	1617	7.71	2.92	-79.8	238	8.88	1000	turbid
	11.48	1615	7.71	2.68	-77.4	178	8.88	1000	Slightly Turbid
	11.43	1624	7.73	2.59	-78.8	77.0	8.88	1000	clear
	11.26	1629	7.72	2.45	-70.1	33.7	8.88	1500	clear
	11.28	1633	7.71	2.63	-66.7	13.9	8.88	1500	clear
	11.17	1636	7.71	2.66	-68.7	9.68	8.88	1000	clear

Stabilized: Yes No
Comments: (Signature)

Total Volume Removed: 16,500 mL



2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
 Event: 2016
 Sample ID: NW118
 Sampling Personal: Parson Nickschway
 Date: 25 May 16

Field Measurements

SEQ #	Time	Temp (°C)	Spec. Cond.	pH	DO (mg/L)	OPR (mV)	Turbidity (NTU)	Water Level (ft)	mL Removed	Appearance
11	15:38	11.14	1637	7.71	2.60	-66.4	9.52	8.88	500	clear
12	15:43	11.36	1640	7.71	2.64	-68.3	9.27	8.88	500	clear
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

Stabilized: Yes No
 Comments:

Total Volume Removed: 1000 mL



2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark

Event: 2016

Sample ID: MW111

Sampling Personal: Darren Nieswag

Weather Conditions: Temp: 66 °F Wind: NW 10-15 Precip: Sunny / Partly Cloudy (Cloudy)

Well Information

Well Locked?	Yes	No	
Well Labeled?	Yes	No	
Casing Straight?	Yes	No	
Grout Seal Intact?	Yes	No	Not Visible
Repairs Necessary:	✓		
Casing Diameter:	2"		
Water Level Before Purge:	8.66	ft	
Total Well Depth:	17.80	ft	
Well Volume:	6.0	liters	
Depth to Top of Pump:	17.40	13.50	ft
Water Level After Sample:	8.38	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder	Control Settings	
Sampling Method:	Bladder	Purge:	569 sec.
Dedicated Equip?:	Yes (No)	Recover:	84 sec.
Duplicate Sample?:	Yes (No)	PSI:	10-15
Duplicate Sample ID:	Pumping Rate: 100 mL/min		
Purge Date:	25 May 16	Time Purging Began:	1139 am/pm
Well Purged Dry?	Yes (No)	Time Purged Dry:	am/pm
Sample Date:	25 May 16	Time of Sampling:	1244 am/pm
Bottle List:	500 mL Nitric	1 Liter Raw	
	500 mL Nitric (filtered)	4 - 1 Liter Nitric	

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
										SEQ #
1	1144	9.67	3879	7.05	1.98	2.5	119	8.38	500	Clear
2	1154	9.51	3817	7.10	0.80	5.4	57.8	8.38	1000	Clear
3	1204	9.47	3166	7.24	2.37	4.8	28.1	8.38	1000	Clear
4	1214	9.45	2991	7.30	3.58	7.0	13.2	8.38	1000	Clear
5	1224	9.42	2977	7.32	3.89	6.3	6.71	8.38	1000	Clear
6	1229	9.43	2976	7.32	3.27	6.4	4.84	8.38	1000	Clear
7	1234	9.43	2977	7.32	4.08	6.7	3.36	8.38	500	Clear
8	1239	9.41	2971	7.33	4.15	6.6	3.08	8.38	500	Clear
9	1244	9.46	2973	7.33	4.15	6.4	3.18	8.38	500	Clear
10										

Stabilized: Yes No

Total Volume Removed: 6500 mL

Comments:



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW 117
Sampling Personal: Darren Nieswazy

Weather Conditions: Temp: 48 °F Wind: Light Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Visible
Repairs Necessary:	_____		
Casing Diameter:	2"		
Water Level Before Purge:	6.32 ft		
Total Well Depth:	11.51 ft		
Well Volume:	net 3.2 liters		
Depth to Top of Pump:	9.02 ft		
Water Level After Sample:	9.85 ft		
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	57 sec.
Dedicated Equip?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Recover:	3 sec.
Duplicate Sample?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	PSI:	10
Duplicate Sample ID:	_____		Pumping Rate:	100 mL/min
Purge Date:	25 May 16	Time Purging Began:	10:27	am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Time Purged Dry:	11:22 am/pm
Sample Date:	26 May 16	Time of Sampling:	07:13	am/pm
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
										SEQ #
1	1032	9.01	7579	7.17	7.80	118.9	110	6.73	500	clear
2	1042	9.21	7411	7.20	7.56	118.6	30.9	7.24	1000	clear
3	1052	9.16	7349	7.19	7.31	115.1	21.2	7.78	1000	clear
4	1102	9.01	7395	7.17	7.37	113.5	27.4	8.09	1000	clear
5	1112	8.91	7463	7.17	7.35	113.4	18.9	8.59	1000	clear
6	1122	8.93	7455	7.18	7.25	111.8	14.6	9.02	1000	clear
7								Top of pump		
8	0713							6.81		
9										
10	0713	10.14	7701	7.16	11.29	189.9	27.0	-	Recharge	clear

Stabilized: Yes No
Comments:

Total Volume Removed: 3500 mL



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September 9, 2016

Montana Dakota Utilities
Attn: Samantha Marshall
400 N. 4th St.
Bismarck, ND 58501

RE: Groundwater Sampling Event - 2016 at MDU Lewis & Clark Site

Dear Ms. Marshall:

It was brought to MVTL's attention that some of the summary data in the Field Data Report did not match the Raw Data collected in the field. Attached to this letter is the correct Field Data Report and a list of the corrections that BARR brought to our attention.

Thank you for your trust and support of our services. If you have any questions, please call me at (701) 391-4900.

Sincerely,

Jeremy Meyer
MVTL Field Services



List of corrections for the August 2016 sampling event at Lewis and Clark.

1. The following items are specific to the field data summary report vs. the raw data. Some of these are very minor changes but am assume they should match exactly???
 - a. MW110, total well depth: raw data = 16.95, summary data = 16.85
 - b. MW110, volume in well: raw data = 4.9, summary data = 4.8
 - c. MW119, volume removed: please check the volume listed on the raw data.
Based on the individual volumes listed for each sequence number, shouldn't this be 5,500 instead of 4,500?
 - d. MW210, total well depth: raw data = 35.43, summary data = 35.45
 - e. MW102, volume in well: raw data = 3.3, summary data = 3.2
 - f. MW111, time purging began: raw data = 1111, summary data = 1139
 - g. MW111, total well depth: raw data = 17.81, summary data = 17.80
 - h. MW111, volume in well: raw data = 6.0, summary data = 5.9
 - i. MW117, volume in well: raw data = 2.8, summary data = 2.7
 - j. MW109, total well depth: raw data = 17.04, summary data = 17.05



MVTL Laboratories Inc.
FIELD DATA REPORT

WO# 82-2485
82-2483

MDU Lewis and Clark
Quarterly CCR Sampling

Attn: Samantha Marshall
400 North 4th St
Bismarck, ND 58501

WELL ID	PURGE DATE	START PURGE TIME	SAMPLE DATE	TIME OF SAMPLE	WATER LEVEL START (FT)	TOTAL DEPTH (FT)	WATER LEVEL END (FT)	VOLUME IN WELL (Liters)	VOLUME REMOVED (mL)	SAMPLE METHOD	FIELD READINGS				SAMPLE APPEARANCE
											TEMP (°C)	EC	pH	Turb. NTU	
MW110	8-Aug-16	11:52	8-Aug-16	13:07	9.13	16.95	9.25	4.9	7500.0	Bladder	14.44	1034	7.29	3.28	clear
MW119	8-Aug-16	14:08	8-Aug-16	15:03	9.03	16.65	9.04	4.7	5500.0	Bladder	17.43	1116	7.36	2.46	clear
MW210	8-Aug-16	16:00	8-Aug-16	17:15	9.21	35.43	10.99	16.2	7500.0	Bladder	15.60	1437	7.59	3.23	clear
MW102	9-Aug-16	7:55	9-Aug-16	9:25	19.47	24.70	19.91	3.3	9000.0	Bladder	11.96	6350	6.90	4.67	clear
MW118	9-Aug-16	13:25	9-Aug-16	14:40	8.68	11.90	8.83	2.0	7500.0	Bladder	18.36	1665	7.39	4.48	clear
MW111	9-Aug-16	11:11	9-Aug-16	12:26	8.15	17.81	8.21	5.9	7500.0	Bladder	18.47	3225	7.14	3.94	clear
MW117	9-Aug-16	10:20	10-Aug-16	7:35	7.10	11.51	11.48	2.8	2000.0	Bladder	14.00	7458	7.02	3.71	clear
MW103	10-Aug-16	8:31	10-Aug-16	9:51	10.59	21.15	10.60	6.5	8000.0	Bladder	16.30	1453	7.30	3.18	clear
MW109	9-Aug-16	16:43	9-Aug-16	17:38	10.56	17.04	10.58	4.0	5500.0	Bladder	15.84	1595	7.25	2.70	clear
MW101	NA	NA	8-Aug-16	11:23	9.13	NA	NA	NA	NA	WL	NA	NA	NA	NA	Water Level
MW105	NA	NA	8-Aug-16	11:37	8.90	NA	NA	NA	NA	WL	NA	NA	NA	NA	Water Level
MW106	NA	NA	8-Aug-16	11:35	9.73	NA	NA	NA	NA	WL	NA	NA	NA	NA	Water Level
MW107	NA	NA	8-Aug-16	11:26	4.67	NA	NA	NA	NA	WL	NA	NA	NA	NA	Water Level
MW108	NA	NA	8-Aug-16	11:33	16.43	NA	NA	NA	NA	WL	NA	NA	NA	NA	Water Level
MW116	NA	NA	8-Aug-16	11:30	10.49	NA	NA	NA	NA	WL	NA	NA	NA	NA	Water Level



CASE NARRATIVE – AMENDED 6 SEP 2016 (MVTL Lab Reference No/SDG.)

MVTL Lab Reference No/SDG: 201682-2483
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – August 2016 Event
MVTL Laboratory Identifications: 16-W3346 through 16-W3356
Page 1 of 2

MDU Sample Identification	MVTL Laboratory #
MW110	16-W3346
MW119	16-W3347
MW210	16-W3348
MW102	16-W3349
MW118	16-W3350
MW111	16-W3351
MW117	16-W3352
MW103	16-W3353
MW109	16-W3354
Dup 1	16-W3355
Field Blank (FB)	16-W3356

I. RECEIPT

- All samples were received at the laboratory on 10 August 2016 at 1538.
- Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
- Samples were received on ice and evidence of cooling had begun.
 - Temperature of samples upon receipt was 4.1°C.
- All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
- No other exceptions on sample receipt were encountered on this sample set unless noted here.

II. HOLDING TIMES

- With the exception of laboratory pH, all holding times were met for both preparation and analysis unless noted here.

III. METHODS

- Approved methodology was followed for all sample analyses.
 - Methods 6010D and Method 6020B were used to analyze the metals.



CASE NARRATIVE – AMENDED 6 SEP 2016 (MVTL Lab Reference No/SDG.)

MVTL Lab Reference No/SDG: 201682-2483
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – August 2016 Event
MVTL Laboratory Identifications: 16-W3346 through 16-W3356
Page 2 of 2

IV. ANALYSIS

- All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted here and/or flagged on the individual analytical laboratory report.
 - For some metals, the reported results were elevated due to instrument performance at the lower limit of quantitation (LLOQ).
 - For some metals, the reported results were elevated due to additional dilutions required to minimize the effects of sample matrix.

All laboratory data has been approved by MVTL Laboratories.

SIGNED: Claudette Carroll DATE: 6 Sep 16
Claudette Carroll - MVTL Bismarck Laboratory Manager



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3346
Work Order #: 82-2483
Account #: 002800
Date Sampled: 8 Aug 16 13:07
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: MW110

Temp at Receipt: 4.1C

Event and Year: August 2016

Table with columns: As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include various chemical tests like pH, Total Suspended Solids, Temperature, etc.

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 2 of 2

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3346
Work Order #: 82-2483
Account #: 002800
Date Sampled: 8 Aug 16 13:07
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: MW110

Temp at Receipt: 4.1C

Event and Year: August 2016

Table with 6 columns: Analyte, As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Lead, Molybdenum, Selenium, and Thallium.

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll 26 Aug 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

- @ = Due to sample matrix
! = Due to sample quantity
= Due to concentration of other analytes
+ = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3347
Work Order #:82-2483
Account #: 002800
Date Sampled: 8 Aug 16 15:03
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: MW119

Temp at Receipt: 4.1C

Event and Year: August 2016

Table with columns: As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include various chemical tests like pH, Total Suspended Solids, Conductivity, etc.

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3347
Work Order #:82-2483
Account #: 002800
Date Sampled: 8 Aug 16 15:03
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: MW119

Temp at Receipt: 4.1C

Event and Year: August 2016

Table with columns: As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Lead, Molybdenum, Selenium, and Thallium.

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by: Claudette K. Carroll 26 Aug 16
Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3348
Work Order #:82-2483
Account #: 002800
Date Sampled: 8 Aug 16 17:15
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: MW210

Temp at Receipt: 4.1C

Event and Year: August 2016

Table with columns: As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include various chemical tests like pH, Total Suspended Solids, etc.

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 2 of 2

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3348
Work Order #: 82-2483
Account #: 002800
Date Sampled: 8 Aug 16 17:15
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: MW210

Temp at Receipt: 4.1C

Event and Year: August 2016

Table with 6 columns: Analyte, As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Lead, Molybdenum, Selenium, and Thallium.

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll 26 Aug 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

- @ = Due to sample matrix
! = Due to sample quantity
= Due to concentration of other analytes
+ = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3349
Work Order #: 82-2483
Account #: 002800
Date Sampled: 9 Aug 16 9:25
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: MW102

Temp at Receipt: 4.1C

Event and Year: August 2016

Table with columns: As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Lists various chemical tests and their results.

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3350
Work Order #: 82-2483
Account #: 002800
Date Sampled: 9 Aug 16 14:40
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: MW118

Temp at Receipt: 4.1C

Event and Year: August 2016

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst	
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020	24 Aug 16	9:30	KMD
Barium - Dissolved	0.0343	mg/l	0.0020	6020	24 Aug 16	9:30	KMD
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020	24 Aug 16	16:00	KMD
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020	24 Aug 16	9:30	KMD
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020	24 Aug 16	9:30	KMD
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020	24 Aug 16	9:30	KMD
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020	24 Aug 16	9:30	KMD
Molybdenum - Dissolved	0.0604	mg/l	0.0020	6020	24 Aug 16	9:30	KMD
Selenium - Dissolved	0.0870	mg/l	0.0020	6020	23 Aug 16	15:30	CC
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020	24 Aug 16	9:30	KMD

* Holding time exceeded

Approved by:

Claudette K. Carroll

26 Aug 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3351
Work Order #: 82-2483
Account #: 002800
Date Sampled: 9 Aug 16 12:26
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: MW111

Temp at Receipt: 4.1C

Event and Year: August 2016

Table with columns: As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include various chemical tests like pH, Total Suspended Solids, Conductivity, etc.

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3352
Work Order #: 82-2483
Account #: 002800
Date Sampled: 10 Aug 16 7:35
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: MW117

Temp at Receipt: 4.1C

Event and Year: August 2016

Table with columns: As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include various chemical tests like pH, Total Suspended Solids, Mercury, etc.

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3353
Work Order #: 82-2483
Account #: 002800
Date Sampled: 10 Aug 16 9:51
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: MW103

Temp at Receipt: 4.1C

Event and Year: August 2016

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Arsenic - Dissolved	0.0032 mg/l		0.0020	6020	24 Aug 16 9:30	KMD
Barium - Dissolved	0.0242 mg/l		0.0020	6020	24 Aug 16 9:30	KMD
Beryllium - Dissolved	< 0.0005 mg/l		0.0005	6020	24 Aug 16 16:00	KMD
Cadmium - Dissolved	< 0.0005 mg/l		0.0005	6020	24 Aug 16 9:30	KMD
Chromium - Dissolved	< 0.002 mg/l		0.0020	6020	24 Aug 16 9:30	KMD
Cobalt - Dissolved	< 0.002 mg/l		0.0020	6020	24 Aug 16 9:30	KMD
Lead - Dissolved	< 0.0005 mg/l		0.0005	6020	24 Aug 16 18:20	KMD
Molybdenum - Dissolved	0.0274 mg/l		0.0020	6020	24 Aug 16 9:30	KMD
Selenium - Dissolved	0.0586 mg/l		0.0020	6020	23 Aug 16 15:30	CC
Thallium - Dissolved	< 0.0005 mg/l		0.0005	6020	24 Aug 16 9:30	KMD

* Holding time exceeded

Approved by:

CC
Claudette K. Carroll 26 Aug 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
: = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3354
Work Order #: 82-2483
Account #: 002800
Date Sampled: 9 Aug 16 17:38
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: MW109

Temp at Receipt: 4.1C

Event and Year: August 2016

Table with 6 columns: Analyte, As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Lead, Molybdenum, Selenium, and Thallium.

* Holding time exceeded

Approved by:

Claudette K. Carroll 26 Aug 15

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3355
Work Order #: 82-2483
Account #: 002800
Date Sampled: 8 Aug 16
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: Dup 1

Temp at Receipt: 4.1C

Event and Year: August 2016

Table with columns: As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include various chemical tests like pH, Total Suspended Solids, Fluoride, Sulfate, Chloride, Mercury, etc.

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3355
Work Order #: 82-2483
Account #: 002800
Date Sampled: 8 Aug 16
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: Dup 1

Temp at Receipt: 4.1C

Event and Year: August 2016

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Cadmium - Dissolved	< 0.0005 mg/l	0.0005	6020	24 Aug 16 10:35	KMD
Chromium - Dissolved	< 0.002 mg/l	0.0020	6020	24 Aug 16 10:35	KMD
Cobalt - Dissolved	< 0.002 mg/l	0.0020	6020	24 Aug 16 10:35	KMD
Lead - Dissolved	< 0.0005 mg/l	0.0005	6020	24 Aug 16 18:20	KMD
Molybdenum - Dissolved	0.0037 mg/l	0.0020	6020	24 Aug 16 10:35	KMD
Selenium - Dissolved	< 0.01 ^ mg/l	0.0020	6020	23 Aug 16 16:18	CC
Thallium - Dissolved	< 0.0005 mg/l	0.0005	6020	24 Aug 16 10:35	KMD

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

CC
Claudette K. Carroll *26 Aug 16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 25 Aug 16
Lab Number: 16-W3356
Work Order #: 82-2483
Account #: 002800
Date Sampled: 10 Aug 16
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR
Sample Description: Field Blank (FB)

Temp at Receipt: 4.1C

Event and Year: August 2016

Table with 6 columns: Analyte, As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include Cadmium, Chromium, Cobalt, Lead, Molybdenum, Selenium, and Thallium.

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll, Laboratory Manager, Bismarck, ND (with handwritten signature and date 26 Aug 16)

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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MEMBER
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Quality Control Report

Lab IDs: 16-W3346 to 16-W3356

Project: MDU Lewis & Clark CCR

Work Order: 201682-2483

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Antimony - Dissolved mg/l	0.1000	110	80-120	0.100	16W3346q	< 0.001	0.1098	110	75-125	0.1098	0.1116	112	1.6	20	-	-	< 0.001
	0.1000	108	80-120	0.100	16-W3355	< 0.001	0.1124	112	75-125	0.1124	0.1122	112	0.2	20	-	-	< 0.001
Antimony - Total mg/l	0.1000	110	80-120	0.400	16W3354q	0.0054	0.4514	112	75-125	0.4514	0.4532	112	0.4	20	-	-	< 0.001
				0.100	16W3346Dq	< 0.001	0.1098	110	75-125	0.1098	0.1116	112	1.6	20	-	-	< 0.001
Arsenic - Dissolved mg/l	0.1000	113	80-120	0.100	16W3346q	< 0.002	0.1116	112	75-125	0.1116	0.1137	114	1.9	20	-	-	< 0.002
	0.1000	108	80-120	0.100	16-W3355	< 0.002	0.1138	114	75-125	0.1138	0.1128	113	0.9	20	-	-	< 0.002
Arsenic - Total mg/l	0.1000	113	80-120	0.400	16W3354q	0.0027	0.4536	113	75-125	0.4536	0.4622	115	1.9	20	-	-	< 0.002
				0.100	16W3346Dq	< 0.002	0.1116	112	75-125	0.1116	0.1137	114	1.9	20	-	-	< 0.002
Barium - Dissolved mg/l	0.1000	106	80-120	0.100	16W3346q	0.0316	0.1337	102	75-125	0.1337	0.1405	109	5.0	20	-	-	< 0.002
	0.1000	104	80-120	0.100	16-W3355	0.0257	0.1308	105	75-125	0.1308	0.1330	107	1.7	20	-	-	< 0.002
Barium - Total mg/l	0.1000	106	80-120	0.400	16W3354q	0.0230	0.4480	106	75-125	0.4480	0.4482	106	0.0	20	-	-	< 0.002
				0.100	16W3346Dq	0.0316	0.1337	102	75-125	0.1337	0.1405	109	5.0	20	-	-	< 0.002
Beryllium - Dissolved mg/l	0.1000	105	80-120	0.100	16-W3346	< 0.0005	0.1024	102	75-125	0.1024	0.1092	109	6.4	20	-	-	< 0.0005
				0.100	16-W3355	< 0.0005	0.1013	101	75-125	0.1013	0.1004	100	0.9	20	-	-	< 0.0005
Beryllium - Total mg/l	0.1000	115	80-120	0.400	16W3354q	< 0.0005	0.4804	120	75-125	0.4804	0.4702	118	2.1	20	-	-	< 0.0005
				0.100	16W3346Dq	< 0.0005	0.1158	116	75-125	0.1158	0.1202	120	3.7	20	-	-	< 0.0005
				0.100	16-W3346D	< 0.0005	0.1024	102	75-125	0.1024	0.1092	109	6.4	20	-	-	< 0.0005



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Quality Control Report

Lab IDs: 16-W3346 to 16-W3356

Project: MDU Lewis & Clark CCR

Work Order: 201682-2483

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Boron - Dissolved mg/l	0.40	108	80-120	0.300	16-W3346	0.25	0.51	87	75-125	0.51	0.53	93	3.8	20	-	-	< 0.1
	0.40	110	80-120	0.300	16-W3356	< 0.1	0.34	113	75-125	0.34	0.34	113	0.0	20	-	-	< 0.1
	0.40	120	80-120	0.300	16-W3117	0.16	0.44	93	75-125	0.44	0.45	97	2.2	20	-	-	< 0.1
				0.300	16-W3355	0.23	0.52	97	75-125	0.52	0.52	97	0.0	20	-	-	< 0.1
Boron - Total mg/l	0.40	105	80-120	0.400	16-W3327	1.13	1.55	105	75-125	1.55	1.59	115	2.5	20	-	-	< 0.1
	0.40	108	80-120	0.400	16-W3354	2.13	2.45	80	75-125	2.45	2.52	97	2.8	20	-	-	< 0.1
	0.40	120	80-120	0.400	16-D3388	0.67	1.06	97	75-125	1.06	1.05	95	0.9	20	-	-	< 0.1
	0.40	112	80-120	0.400	16-W3541	0.27	0.67	100	75-125	0.67	0.69	105	2.9	20	-	-	< 0.1
	0.40	115	80-120	1.50	16-W3548	1.17	2.70	102	75-125	2.70	2.73	104	1.1	20	-	-	< 0.1
Cadmium - Dissolved mg/l	0.1000	117	80-120	0.100	16W3346q	< 0.0005	0.1129	113	75-125	0.1129	0.1158	116	2.5	20	-	-	< 0.0005
	0.1000	115	80-120	0.100	16-W3355	< 0.0005	0.1122	112	75-125	0.1122	0.1156	116	3.0	20	-	-	< 0.0005
Cadmium - Total mg/l	0.1000	117	80-120	0.400	16W3354q	< 0.0005	0.4680	117	75-125	0.4680	0.4698	117	0.4	20	-	-	< 0.0005
				0.100	16W3346Dq	< 0.0005	0.1129	113	75-125	0.1129	0.1158	116	2.5	20	-	-	< 0.0005
Calcium - Dissolved mg/l	20.0	106	80-120	1000	16D3416q	690	1600	91	75-125	1600	1650	96	3.1	20	-	-	< 1
	20.0	105	80-120	100	16W3346q	80.4	174	94	75-125	174	175	95	0.6	20	-	-	< 1
				100	16W3355q	44.2	142	98	75-125	142	145	101	2.1	20	-	-	< 1
Calcium - Total mg/l	20.0	106	80-120	100	16W3354q	93.6	188	94	75-125	188	187	93	0.5	20	-	-	< 1
	20.0	108	80-120	100	16W3370q	17.8	118	100	75-125	118	117	99	0.9	20	-	-	< 1



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Quality Control Report

Lab IDs: 16-W3346 to 16-W3356

Project: MDU Lewis & Clark CCR

Work Order: 201682-2483

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Chloride mg/l	30.0	105	80-120	30.0	16-W3277	2.3	29.5	91	80-120	29.5	34.2	106	14.8	20	-	-	< 1
															-	-	< 1
Chromium - Dissolved mg/l	0.1000	103	80-120	0.100	16W3346q	< 0.002	0.1022	102	75-125	0.1022	0.1052	105	2.9	20	-	-	< 0.002
	0.1000	104	80-120	0.100	16-W3355	< 0.002	0.1043	104	75-125	0.1043	0.1050	105	0.7	20	-	-	< 0.002
															-	-	< 0.002
Chromium - Total mg/l	0.1000	103	80-120	0.400	16W3354q	< 0.002	0.4062	102	75-125	0.4062	0.4100	102	0.9	20	-	-	< 0.002
				0.100	16W3346Dq	< 0.002	0.1022	102	75-125	0.1022	0.1052	105	2.9	20	-	-	< 0.002
															-	-	< 0.002
Cobalt - Dissolved mg/l	0.1000	104	80-120	0.100	16W3346q	< 0.002	0.1006	101	75-125	0.1006	0.1031	103	2.5	20	-	-	< 0.002
	0.1000	103	80-120	0.100	16-W3355	< 0.002	0.1049	105	75-125	0.1049	0.1046	105	0.3	20	-	-	< 0.002
															-	-	< 0.002
Cobalt - Total mg/l	0.1000	104	80-120	0.400	16W3354q	0.0023	0.4102	102	75-125	0.4102	0.4034	100	1.7	20	-	-	< 0.002
				0.100	16W3346Dq	< 0.002	0.1006	101	75-125	0.1006	0.1031	103	2.5	20	-	-	< 0.002
															-	-	< 0.002
Fluoride mg/l	0.50	106	90-110	0.500	16-W3346	0.52	1.09	114	80-120	1.09	1.10	116	0.9	20	-	-	< 0.1
				0.500	16-W3352	0.30	0.73	86	80-120	0.73	0.74	88	1.4	20	-	-	< 0.1
Lead - Dissolved mg/l	0.1000	102	80-120	0.100	16-W3549	< 0.0005	0.1052	105	75-125	0.1052	0.0998	100	5.3	20	-	-	< 0.0005
	0.1000	104	80-120	0.100	16-W3355	< 0.0005	0.1010	101	75-125	0.1010	0.0945	94	6.6	20	-	-	< 0.0005
	0.1000	101	80-120	0.100	16W3346q	< 0.0005	0.0986	99	75-125	0.0986	0.1035	104	4.8	20	-	-	< 0.0005
										0.1022	0.1056		3.3	20	-	-	< 0.0005
Lead - Total mg/l	0.1000	104	80-120	0.400	16W3354q	0.0005	0.4082	102	75-125	0.4082	0.4080	102	0.0	20	-	-	< 0.0005
				0.100	16W3346Dq	< 0.0005	0.0986	99	75-125	0.0986	0.1035	104	4.8	20	-	-	< 0.0005
															-	-	< 0.0005
Lithium - Dissolved mg/l	0.40	98	80-120	0.200	16-W3346	0.03	0.25	110	75-125	0.25	0.26	115	3.9	20	-	-	< 0.1
				0.200	16-W3356	< 0.1	0.23	115	75-125	0.23	0.22	110	4.4	20	-	-	< 0.1
															-	-	< 0.1



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Quality Control Report

Lab IDs: 16-W3346 to 16-W3356

Project: MDU Lewis & Clark CCR

Work Order: 201682-2483

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Lithium - Total mg/l	0.40	102	80-120	0.400	16-W3327	< 0.1	0.45	112	75-125	0.45	0.46	115	2.2	20	-	-	< 0.1
	0.40	100	80-120	0.400	16-W3354	0.06	0.47	102	75-125	0.47	0.48	105	2.1	20	-	-	< 0.1
															-	-	< 0.1
															-	-	< 0.1
Magnesium - Dissolved mg/l	20.0	108	80-120	1000	16D3416q	1030	1950	92	75-125	1950	1980	95	1.5	20	-	-	< 1
	20.0	108	80-120	100	16W3346q	49.5	147	98	75-125	147	148	98	0.7	20	-	-	< 1
				100	16W3355q	24.6	125	100	75-125	125	129	104	3.1	20	-	-	< 1
Magnesium - Total mg/l	20.0	110	80-120	100	16W3354q	152	244	92	75-125	244	243	91	0.4	20	-	-	< 1
	20.0	112	80-120	100	16W3370q	11.5	114	102	75-125	114	114	102	0.0	20	-	-	< 1
															-	-	< 1
															-	-	< 1
Mercury - Dissolved mg/l	0.0020	100	85-115	0.002	16-W3355	< 0.0002	0.0018	90	70-130	0.0018	0.0018	90	0.0	20	-	-	< 0.0002
				0.002	16-W3356	< 0.0002	0.0019	95	70-130	0.0019	0.0019	95	0.0	20	-	-	< 0.0002
Mercury - Total mg/l	0.0020	100	85-115	0.002	16-W3320	< 0.0002	0.0019	95	70-130	0.0019	0.0019	95	0.0	20	-	-	< 0.0002
	0.0020	100	85-115	0.002	16-W3346	< 0.0002	0.0019	95	70-130	0.0019	0.0019	95	0.0	20	-	-	< 0.0002
				0.002	16-W3356	< 0.0002	0.0018	90	70-130	0.0018	0.0019	95	5.4	20	-	-	< 0.0002
Molybdenum - Dissolved mg/l	0.1000	105	80-120	0.100	16W3346q	0.0041	0.1099	106	75-125	0.1099	0.1135	109	3.2	20	-	-	< 0.002
	0.1000	105	80-120	0.100	16-W3355	0.0037	0.1142	110	75-125	0.1142	0.1162	112	1.7	20	-	-	< 0.002
															-	-	< 0.002
Molybdenum - Total mg/l	0.1000	105	80-120	0.400	16W3354q	0.0307	0.4580	107	75-125	0.4580	0.4532	106	1.1	20	-	-	< 0.002
				0.100	16W3346Dq	0.0041	0.1099	106	75-125	0.1099	0.1135	109	3.2	20	-	-	< 0.002
															-	-	< 0.002
pH units	-	-	-	-	-	-	-	-	-	7.1	7.2	-	1.4	20	-	-	-
	-	-	-	-	-	-	-	-	-	7.1	7.1	-	0.0	20	-	-	-
Potassium - Dissolved mg/l	10.0	89	80-120	200	16D3416q	165	360	98	75-125	360	369	102	2.5	20	-	-	< 1
	10.0	88	80-120	20.0	16W3346q	6.2	26.0	99	75-125	26.0	25.9	98	0.4	20	-	-	< 1
				20.0	16W3355q	8.0	28.6	103	75-125	28.6	29.3	106	2.4	20	-	-	< 1



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Quality Control Report

Lab IDs: 16-W3346 to 16-W3356

Project: MDU Lewis & Clark CCR

Work Order: 201682-2483

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Potassium - Total mg/l	10.0 10.0	92 94	80-120 80-120	20.0 20.0	16W3354q 16W3370q	7.9 10.4	28.0 29.8	100 97	75-125 75-125	28.0 29.8	28.0 29.8	100 97	0.0 0.0	20 20	- - - -	- - - -	< 1 < 1 < 1 < 1
Selenium - Dissolved mg/l	0.1000 0.1000	102 98	80-120 80-120	0.100 0.100	16-W3346 16-W3355	< 0.01 < 0.01	0.1044 0.0996	104 100	75-125 75-125	0.1044 0.0996	0.1094 0.1086	109 109	4.7 8.6	20 20	- -	- -	< 0.002 < 0.002
Selenium - Total mg/l	0.1000 0.1000	105 102	80-120 80-120	0.400 0.100	16-W3354 16-W3346Q	0.0722 0.0025	0.4924 0.1044	105 102	75-125 75-125	0.4924 0.1044	0.4850 0.1094	103 107	1.5 4.7	20 20	- -	- -	< 0.002 < 0.002
Sodium - Dissolved mg/l	20.0 20.0	98 96	80-120 80-120	1000 100 100	16D3416q 16W3346q 16W3355q	1660 75.1 243	2530 170 326	87 95 83	75-125 75-125 75-125	2530 169 326	2560 169 328	90 94 85	1.2 0.6 0.6	20 20 20	- - -	- - -	< 1 < 1 < 1
Sodium - Total mg/l	20.0 20.0	97 99	80-120 80-120	100 100	16W3354q 16W3370q	78.1 6.3	173 102	95 96	75-125 75-125	173 102	172 102	94 96	0.6 0.0	20 20	- - - -	- - - -	< 1 < 1 < 1 < 1
Sulfate mg/l	100 100	105 108	90-110 90-110	100 100	16-W3281 16-W3356	29.2 < 5	126 95.2	97 95	80-120 80-120	123 95.2	126 93.9	94 94	2.4 1.4	20 20	- -	- -	< 5 < 5
Thallium - Dissolved mg/l	0.1000 0.1000	101 96	80-120 80-120	0.100 0.100	16W3346q 16-W3355	< 0.0005 < 0.0005	0.0947 0.0972	95 97	75-125 75-125	0.0947 0.0972	0.1006 0.1007	101 101	6.0 3.5	20 20	- - -	- - -	< 0.0005 < 0.0005 < 0.0005
Thallium - Total mg/l	0.1000	101	80-120	0.400 0.100	16W3354q 16W3346Dq	< 0.0005 < 0.0005	0.3840 0.0947	96 95	75-125 75-125	0.3840 0.0947	0.3928 0.1006	98 101	2.3 6.0	20 20	- - -	- - -	< 0.0005 < 0.0005 < 0.0005
Total Alkalinity mg/l CaCO3	410	99	90-110	410 410	16-W3349 16-W3372	376 194	760 578	94 94	80-120 80-120	760 578	772 574	97 93	1.6 0.7	20 20	104	80-120	< 20 < 20
Total Dissolved Solids mg/l	- -	- -	- -	- -	- -	- -	- -	- -	- -	7650 1200	7690 1200	- -	0.5 0.0	20 20	- -	- -	< 5



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MEMBER
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Quality Control Report

Lab IDs: 16-W3346 to 16-W3356

Project: MDU Lewis & Clark CCR

Work Order: 201682-2483

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Total Suspended Solids mg/l	-	-	-	-	-	-	-	-	-	175	170	-	2.9	20	-	-	< 1
	-	-	-	-	-	-	-	-	-	40	38	-	5.1	20	-	-	< 1
	-	-	-	-	-	-	-	-	-	167	164	-	1.8	20	-	-	
	-	-	-	-	-	-	-	-	-	106	109	-	2.8	20	-	-	

Approved by: C. Campbell
Amended - 6 Sep 16
(Sulfate)



MINNESOTA VALLEY TESTING LABORATORIES, INC.

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August 12, 2016

Montana Dakota Utilities
Attn: Samantha Marshall
400 N. 4th St.
Bismarck, ND 58501

RE: Groundwater Sampling Event - 2016 at MDU Lewis & Clark Site

Dear Ms. Marshall:

From August 8-10, 2016, MVTL Laboratories' Field Services division collected ground water samples at the MDU Lewis & Clark Station near Sidney, MT. The wells were sampled for CCR analysis, dissolved metals, and TSS. Samples were collected from 9 wells. A duplicate sample was also collected at well MW210. The wells were located, and were found to be in generally good condition. Samples collected were placed on ice and transported to MVTL in Bismarck, ND for analysis.

Thank you for your trust and support of our services. If you have any questions, please call me at (701) 391-4900.

Sincerely,

Jeremy Meyer
MVTL Field Services



Field Datasheet

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Water Level

Sampling Personnel:

Darren Nieswaag

Company:

MDU Lewis and Clark

Well ID	Date	Time	Depth to Water	Comments
MW101	8 Aug 16	1123	9.13	
MW105	8 Aug 16	1137	8.90	
MW106	8 Aug 16	1135	9.23	
MW107	8 Aug 16	1126	4.67	
MW108	8 Aug 16	1133	16.43	
MW116	8 Aug 16	1130	10.49	

MVTL Calibration Worksheet

Site: MDU Lewis and Clark

Technician: Darren Wisway

Instrument
(Circle One):

#1 650 MDS 08F100203

#2 650 MDS 04H14736

#3 556 MPS 12E102056

Pre Site Calibration

Date: 8 Aug 16 Time: 0700

	pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7		<u>22.87</u>	<u>6.94</u>	<u>7.00</u>	6.95-7.05	<u>-36.2</u>	0 +/- 50
Buffer 10		<u>22.89</u>	<u>10.04</u>	<u>10.00</u>	9.95-10.05	<u>-215.7</u>	-180 +/- 50
Conductivity							Check
Buffer 1413		<u>23.01</u>	<u>1414</u>	<u>1413</u>	±10%	Buffer 5000 <u>500A</u>	<u>4976</u>
ORP							
231 mV @ 25C		<u>3.67</u>	<u>260.9</u>	<u>257.1</u>	±10 mV		
DO							
<u>Time</u> <u>1146</u>		<u>24.91</u>	<u>8.10</u>	<u>8.02</u>		Barometric Pressure (mm Hg)	<u>704.2</u>
						mg/L	

Pre Site Calibration

Date: 9 Aug 16 Time: 0655

	pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7		<u>22.09</u>	<u>7.07</u>	<u>7.00</u>	6.95-7.05	<u>-40.3</u>	0 +/- 50
Buffer 10		<u>22.10</u>	<u>10.01</u>	<u>10.00</u>	9.95-10.05	<u>-219.8</u>	-180 +/- 50
Conductivity							Check
Buffer 1413		<u>22.03</u>	<u>1482</u>	<u>1414</u>	±10%	Buffer 5000 <u>500A</u>	<u>4920</u>
ORP							
231 mV @ 25C		<u>7.38</u>	<u>255.7</u>	<u>257.3</u>	±10 mV		
DO							
		<u>21.72</u>	<u>7.84</u>	<u>8.17</u>		Barometric Pressure (mm Hg)	<u>706.6</u>
						mg/L	

Post Site Check

Time: 1836

	pH	Temp °C	Reading
Buffer 7		<u>28.23</u>	<u>7.02</u>
Conductivity			
Buffer 1413		<u>29.38</u>	<u>1417</u>

Post Site Check

Time: 1744

	pH	Temp °C	Reading
Buffer 7		<u>25.03</u>	<u>6.99</u>
Conductivity			
Buffer 1413		<u>25.38</u>	<u>1401</u>

MVTL Calibration Worksheet

Site: MDU Lewis and Clark

Technician: Darren Nieswaag

Instrument
(Circle One):

#1 650 MDS 08F100203

#2 650 MDS 04H14736

#3 556 MPS 12E102056

Pre Site Calibration

Date: 10/24/16 Time: 0640

pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7	<u>22.06</u>	<u>7.01</u>	<u>7.00</u>	6.95-7.05	<u>-40.9</u>	0 +/- 50
Buffer 10	<u>22.09</u>	<u>9.95</u>	<u>10.00</u>	9.95-10.05	<u>-217.3</u>	-180 +/- 50
Conductivity						Check
Buffer 1413	<u>22.09</u>	<u>1387</u>	<u>1415</u>	±10%	Buffer 5000	<u>4924</u>
ORP						
231 mV @ 25C	<u>4.50</u>	<u>256.0</u>	<u>258.2</u>	±10 mV		
DO						Barometric Pressure (mm Hg)
	<u>2.97</u>	<u>8.54</u>	<u>8.08</u>	mg/L	<u>704.5</u>	

Date: _____ Time: _____

pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7				6.95-7.05		0 +/- 50
Buffer 10				9.95-10.05		-180 +/- 50
Conductivity						Check
Buffer 1413				±10%	Buffer 5000	
ORP						
231 mV @ 25C				±10 mV		
DO						Barometric Pressure (mm Hg)
				mg/L		

Post Site Check

Time: 1005

pH	Temp °C	Reading
Buffer 7	<u>20.53</u>	<u>7.03</u>
Conductivity		
Buffer 1413	<u>20.86</u>	<u>1418</u>

Time: _____

pH	Temp °C	Reading
Buffer 7		
Conductivity		
Buffer 1413		



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW 110
Sampling Personal: *Darrin Vasway*

Weather Conditions: Temp: *83* °F Wind: *SW 5-10* Precip: *(Sunny) Partly Cloudy / Cloudy*

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/>	No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	9.13 ft		
Total Well Depth:	16.95 ft		
Well Volume:	4.9 liters		
Depth to Top of Pump:	13.44 ft		
Water Level After Sample:	9.25 ft		
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder	Control Settings
Sampling Method:	Bladder	Purge: 5 sec.
Dedicated Equip?:	Yes <input checked="" type="checkbox"/>	Recover: 56 sec.
Duplicate Sample?:	Yes <input checked="" type="checkbox"/>	PSI: <input checked="" type="checkbox"/>
Duplicate Sample ID:	<input checked="" type="checkbox"/>	Pumping Rate: 100 mL/min
Purge Date:	8 Aug 16	Time Purging Began: 1152 am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/>	Time Purged Dry: <input checked="" type="checkbox"/>
Sample Date:	8 Aug 16	Time of Sampling: 1307 am/pm
Bottle List:	500 mL Nitric	1 Liter Raw
	500 mL Nitric (filtered)	4 - 1 Liter Nitric

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
SEQ #	Time								clear, slightly turbid, turbid	
1	1157	15.19	1035	7.28	2.95	113.7	54.0	9.19	500	clear
2	1212	14.64	1034	7.30	3.08	108.1	21.5	9.25	1500	clear
3	1227	14.52	1034	7.29	3.09	110.0	12.2	9.25	1500	clear
4	1242	14.50	1036	7.28	3.13	110.5	7.64	9.25	1500	clear
5	1252	14.77	1035	7.29	3.24	111.1	7.37	9.25	1000	clear
6	1257	14.56	1034	7.26	3.15	110.6	2.97	9.25	500	clear
7	1302	14.48	1036	7.29	3.21	110.2	3.09	9.25	500	clear
8	1307	14.44	1034	7.29	3.21	109.8	3.28	9.25	500	clear
9										
10										

Stabilized: Yes No
Comments:

Total Volume Removed: 7500 mL



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: 2016
Sample ID: AW119
Sampling Personal: Darren Nieswaj

Weather Conditions: Temp: 91 °F Wind: SW 10 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	9.03	ft	
Total Well Depth:	16.65	ft	
Well Volume:	4.7	liters	
Depth to Top of Pump:	12.65	ft	
Water Level After Sample:	9.04	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder	Control Settings	
Sampling Method:	Bladder	Purge:	7 sec.
Dedicated Equip?:	Yes <input checked="" type="checkbox"/>	Recover:	5-5-55 sec.
Duplicate Sample?:	Yes <input checked="" type="checkbox"/>	PSI:	-
Duplicate Sample ID:	Pumping Rate: 100 mL/min		
Purge Date:	8 Aug 16	Time Purging Began:	1408 am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/>	Time Purged Dry:	- am/pm
Sample Date:	8 Aug 16	Time of Sampling:	1503 am/pm
Bottle List:	500 mL Nitric	1 Liter Raw	
	500 mL Nitric (filtered)	4 - 1 Liter Nitric	

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
SEQ #	Time								clear, slightly turbid, turbid	
1	1413	17.95	1101	7.39	0.62	839	20.2	9.04	500	clear
2	1428	17.67	1116	7.34	0.55	17.9	14.9	9.04	1500	clear
3	1443	17.83	1126	7.35	0.70	6.7	4.47	9.04	1500	clear
4	1448	17.77	1120	7.36	0.72	6.6	3.34	9.04	500	clear
5	1453	17.45	1116	7.36	0.71	6.9	2.60	9.04	500	clear
6	1458	17.33	1117	7.35	0.80	5.8	2.54	9.04	500	clear
7	1503	17.47	1116	7.36	0.81	5.8	2.46	9.04	500	clear
8										
9										
10										

Stabilized: Yes No
Comments:

Total Volume Removed: 4500 mL



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: 2016
Sample ID: nw 210
Sampling Personal: Dad Han Nieswaj

Weather Conditions: Temp: 91 °F Wind: SW 10 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Not Visible
Repairs Necessary:	—	
Casing Diameter:	2"	
Water Level Before Purge:	9.21	ft
Total Well Depth:	35.43	ft
Well Volume:	16.2	liters
Depth to Top of Pump:	28.82	ft
Water Level After Sample:	10.99	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	5 sec.
Dedicated Equip?:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Recover:	55 sec.
Duplicate Sample?:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		PSI:	10-15
Duplicate Sample ID:	— Dupl		Pumping Rate:	100 mL/min
Purge Date:	8 Aug 16	Time Purging Began:	1600	am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Time Purged Dry:	—	am/pm
Sample Date:	8 Aug 16	Time of Sampling:	1715	am/pm
Bottle	2- 500 mL Nitric	2- 1 Liter Raw		
List:	2- 500 mL Nitric (filtered)	8- 1 Liter Nitric		

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
SEQ #	Time								clear, slightly turbid, turbid	
1	1605	16.98	1442	7.59	0.63	-58.4	34.3	10.10	500	clear
2	1620	15.70	1430	7.56	0.25	-72.0	17.4	10.71	1500	clear
3	1635	15.76	1430	7.58	0.20	-74.9	8.84	10.93	1500	clear
4	1645	16.09	1439	7.58	0.19	-74.4	6.15	10.93	1000	clear
5	1655	15.54	1435	7.59	0.18	-74.2	4.88	10.99	1000	clear
6	1700	15.60	1435	7.59	0.19	-75.4	4.04	10.99	500	clear
7	1705	15.63	1440	7.57	0.19	-75.9	3.22	10.99	500	clear
8	1710	16.09	1445	7.60	0.17	-78.4	3.31	10.99	500	clear
9	1715	15.60	1437	7.59	0.17	-78.4	3.23	10.99	500	clear
10										

Stabilized: Yes No
Comments:

Total Volume Removed: 7500 mL



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW118
Sampling Personal: *Dustin Nieswazy*

Weather Conditions: Temp: *84* °F Wind: *E5* Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Well Labeled?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Casing Straight?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Grout Seal Intact?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	<i>8.58</i>	ft	
Total Well Depth:	<i>11.90</i>	ft	
Well Volume:		liters	
Depth to Top of Pump:	<i>9.20</i>	ft	
Water Level After Sample:		ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	<i>5</i> sec.
Dedicated Equip?:	Yes	<input checked="" type="checkbox"/> No	Recover:	<i>55</i> sec.
Duplicate Sample?:	Yes	<input checked="" type="checkbox"/> No	PSI:	<i>-</i>
Duplicate Sample ID:	<i>-</i>		Pumping Rate:	<i>100</i> mL/min
Purge Date:	<i>9 Aug 16</i>	Time Purging Began:	<i>1325</i>	am/pm
Well Purged Dry?	Yes	<input checked="" type="checkbox"/> No	Time Purged Dry:	<i>-</i> am/pm
Sample Date:	<i>9 Aug 16</i>	Time of Sampling:	<i>1440</i>	am/pm
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
SEQ #	Time								clear, slightly turbid, turbid	
1	1330	20.29	1664	7.32	1.70	58.0	75.9	8.83	500	<i>clear slightly turbid</i>
2	1345	19.67	1668	7.34	1.48	17.9	23.2	8.83	1500	clear
3	1400	19.53	1671	7.35	1.51	20.4	13.9	8.83	1500	clear
4	1415	18.29	1667	7.36	1.50	25.1	6.57	8.83	1500	clear
5	1430	18.59	1665	7.38	1.47	30.7	4.87	8.83	1500	clear
6	1435	18.46	1665	7.39	1.47	31.7	4.71	8.83	500	clear
7	1440	18.36	1665	7.39	1.51	32.9	4.48	8.83	500	clear
8										
9										
10										

Stabilized: Yes No
Comments:

Total Volume Removed: *7500* mL



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW 111
Sampling Personal: Darren Nieswaag

Weather Conditions: Temp: 78 °F Wind: ES Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	No	
Well Labeled?	Yes	No	
Casing Straight?	Yes	No	
Grout Seal Intact?	Yes	No	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	8.15	ft	
Total Well Depth:	17.81	ft	
Well Volume:	6.0	liters	
Depth to Top of Pump:	14.70	ft	
Water Level After Sample:	8.21	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder	Control Settings	
Sampling Method:	Bladder	Purge:	5 sec.
Dedicated Equip?:	Yes No	Recover:	55 sec.
Duplicate Sample?:	Yes No	PSI:	-
Duplicate Sample ID:	Pumping Rate: 100 mL/min		
Purge Date:	9 Aug 16	Time Purging Began:	1111 am/pm
Well Purged Dry?:	Yes No	Time Purged Dry:	- am/pm
Sample Date:	9 Aug 16	Time of Sampling:	1226 am/pm
Bottle List:	500 mL Nitric	1 Liter Raw	
	500 mL Nitric (filtered)	4 - 1 Liter Nitric	

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
SEQ #	Time								clear, slightly turbid, turbid	
1	1116	16.38	3865	6.94	0.38	72.2	590	8.21	500	Turbid
2	1131	18.10	3705	6.96	0.44	62.6	51.5	8.21	1500	clear
3	1146	16.95	3355	7.07	1.56	69.8	18.9	8.21	1500	clear
4	1201	18.00	3202	7.12	2.40	68.1	7.77	8.21	1500	clear
5	1211	18.04	3214	7.13	2.61	68.6	4.46	8.21	1000	clear
6	1216	18.44	3212	7.14	2.51	68.5	3.67	8.21	500	clear
7	1221	18.22	3229	7.13	2.62	69.1	3.78	8.21	500	clear
8	1226	18.47	3225	7.14	2.65	69.3	3.94	8.21	500	clear
9										
10										

Stabilized: Yes No
Comments:

Total Volume Removed: 7500 mL



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW117
Sampling Personal: *Parren Nieswanger*

Weather Conditions: Temp: *64* °F Wind: *Light* Precip: *Sunny* / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Well Labeled?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Casing Straight?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Grout Seal Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Not Visible
Repairs Necessary:	<i>—</i>	
Casing Diameter:	2"	
Water Level Before Purge:	<i>7.10</i>	ft
Total Well Depth:	<i>11.51</i>	ft
Well Volume:	<i>2.8</i>	liters
Depth to Top of Pump:	<i>9.95</i>	ft
Water Level After Sample:	<i>11.48</i>	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	<i>5</i> sec.
Dedicated Equip?:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		Recover:	<i>55</i> sec.
Duplicate Sample?:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		PSI:	<i>10</i>
Duplicate Sample ID:	<i>—</i>		Pumping Rate:	<i>100</i> mL/min
Purge Date:	<i>9 Aug 16</i>	Time Purging Began:	<i>1020</i>	am/pm
Well Purged Dry?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Time Purged Dry:	<i>1050</i>	am/pm
Sample Date:	<i>10 Aug 16</i>	Time of Sampling:	<i>0735</i>	am/pm
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

SEQ #	Stabilization (3 consecutive) Time	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
1	<i>1025</i>	<i>15.46</i>	<i>7452</i>	<i>7.00</i>	<i>4.23</i>	<i>42.8</i>	<i>71.3</i>	<i>7.39</i>	<i>500</i>	<i>Slightly turbid</i>	
2	<i>1030</i>	<i>15.73</i>	<i>7229</i>	<i>6.98</i>	<i>4.31</i>	<i>63.8</i>	<i>26.2</i>	<i>7.51</i>	<i>500</i>	<i>Clear</i>	
3	<i>1035</i>	<i>15.73</i>	<i>7249</i>	<i>6.99</i>	<i>4.67</i>	<i>62.9</i>	<i>19.8</i>	<i>7.98</i>	<i>500</i>	<i>Clear</i>	
4	<i>purged well dry</i>										
5								<i>9.95</i>		<i>depth to top of pump</i>	
6											
7											
8											
9	<i>0730</i>	<i>purged line to clear</i>									
10	<i>0735</i>	<i>14.00</i>	<i>7458</i>	<i>7.02</i>	<i>5.00</i>	<i>189.0</i>	<i>3.71</i>	<i>8.51</i>	<i>500</i>	<i>Clear</i>	

Stabilized: Yes No Total Volume Removed: *—* mL

Comments:

9 Aug 16 water level wasnt keeping up so purged the well dry.



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: 2016

Sample ID: MW103

Sampling Personal: Darren Wiseman

Weather Conditions: Temp: 70 °F Wind: Light Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	<input checked="" type="checkbox"/> No	
Well Labeled?	<input checked="" type="checkbox"/> Yes	No	
Casing Straight?	<input checked="" type="checkbox"/> Yes	No	
Grout Seal Intact?	Yes	No	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	10.59		ft
Total Well Depth:	21.15		ft
Well Volume:			liters
Depth to Top of Pump:	17.81		ft
Water Level After Sample:	10.60		ft
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder	Control Settings	
Sampling Method:	Bladder	Purge:	5 sec.
Dedicated Equip?:	Yes <input checked="" type="checkbox"/> No	Recover:	55 sec.
Duplicate Sample?:	Yes <input checked="" type="checkbox"/> No	PSI:	15
Duplicate Sample ID:		Pumping Rate:	180 mL/min
Purge Date:	10 Aug 16	Time Purging Began:	0831 am/pm
Well Purged Dry?:	Yes <input checked="" type="checkbox"/> No	Time Purged Dry:	am/pm
Sample Date:	10 Aug 16	Time of Sampling:	0951 am/pm
Bottle List:	500 mL Nitric	1 Liter Raw	
	500 mL Nitric (filtered)	4 - 1 Liter Nitric	

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
SEQ #	Time								clear, slightly turbid, turbid	
1	0836	15.45	3691	7.23	0.64	156.6	66.4	10.60	500	clear
2	0851	14.89	2308	7.29	0.29	140.7	99.2	10.60	1500	clear
3	0906	15.80	1478	7.30	0.25	132.7	50.5	10.60	1500	clear
4	0921	16.05	1469	7.30	0.22	129.5	13.7	10.60	1500	clear
5	0931	16.04	1460	7.30	0.20	127.0	15.4	10.60	1000	clear
6	0936	16.07	1460	7.30	0.20	126.2	3.60	10.60	4500	clear
7	0941	15.99	1456	7.30	0.19	125.2	3.01	10.60	500	clear
8	0946	16.10	1456	7.30	0.19	124.3	2.98	10.60	500	clear
9	0951	16.30	1453	7.30	0.19	123.3	3.18	10.60	500	clear
10										

Stabilized: Yes No

Total Volume Removed: 8000 mL

Comments:



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark
 Event: 2016
 Sample ID: MW 109
 Sampling Personal: Darrin Nieswaag

Weather Conditions: Temp: ~~77~~ 77.2 °F Wind: NE 5 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No	
Grout Seal Intact?	Yes	No	Not Visible
Repairs Necessary:	-		
Casing Diameter:	2"		
Water Level Before Purge:	10.56	ft	
Total Well Depth:	17.04	ft	
Well Volume:	4.0	liters	
Depth to Top of Pump:	14.18	ft	
Water Level After Sample:	10.58	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	5 sec.
Dedicated Equip?:	Yes	No <input checked="" type="checkbox"/>	Recover:	5.5 sec.
Duplicate Sample?:	Yes	No <input checked="" type="checkbox"/>	PSI:	
Duplicate Sample ID:	-		Pumping Rate:	mL/min
Purge Date:	9 Aug 16	Time Purging Began:	1643	am/pm
Well Purged Dry?	Yes	No <input checked="" type="checkbox"/>	Time Purged Dry:	am/pm
Sample Date:	9 Aug 16	Time of Sampling:	1738	am/pm
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.
1	15.61	1612	7.24	0.60	57.9	53.1	10.58	500	clear
2	16.63	1585	7.25	0.29	58.2	14.3	10.58	1500	clear
3	16.20	1607	7.24	0.18	61.7	4.26	10.58	1500	clear
4	16.41	1611	7.24	0.16	61.7	3.14	10.58	500	clear
5	16.43	1602	7.24	0.15	62.6	2.76	10.58	500	clear
6	16.12	1597	7.24	0.14	62.7	2.91	10.58	500	clear
7	15.84	1595	7.25	0.14	62.7	2.70	10.58	500	clear
8									
9									
10									

Stabilized: Yes No

Total Volume Removed: 5500 mL

Comments:



Laboratories, Inc.

2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name: MDU Lewis and Clark CCR Groundwater August Event 2016				Name of Sampler(s): Darren Nieswaag				
Report To: MDU Attn: Samantha Marshall Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-222-7829			Carbon Copy: Attn: Address:			Work Order Number: 82-2483		

Sample Information						Bottle Type			Field Parameters			Analysis
Lab Number	Sample ID	Date	Time	Sample Type	Gradient	500 ml HNO ₃	1 liter	500 ml HNO ₃ (filtered)	Field Temperature °C	Field Spec. Cond.	Field pH	Analysis Required
W3346	MW110	8 Aug 16	1307	GW	Up	X	X	X	14.44	1034	7.29	MDU CCR List with TSS and Dissolved CCR Metals. No RadChem.
W3347	MW119	8 Aug 16	1503	GW	Up	X	X	X	17.43	1116	7.36	
W3348	MW210	8 Aug 16	1715	GW	Up	X	X	X	15.60	1437	7.59	
W3349	MW102	9 Aug 16	0925	GW	Down	X	X	X	11.96	6350	6.90	
W3350	MW118	9 Aug 16	1214	GW	Down	X	X	X	18.36	1665	7.39	
W3351	MW111	9 Aug 16	1226	GW	Down	X	X	X	18.47	3225	7.14	
W3352	MW117	10 Aug 16	0735	GW	Down	X	X	X	14.00	7458	7.02	
W3353	MW103	10 Aug 16	0730	GW		X	X	X	16.30	1453	7.30	
W3354	MW109	9 Aug 16	1738	GW		X	X	X	15.84	1595	7.25	
W3355	Dup 1	8 Aug 16	NA	W		X	X	X	NA	NA	NA	
W3356	Field Blank (FB)	10 Aug 16	NA	W		X	X	X	NA	NA	NA	

Comments:
*DN 9 Aug 16
*ON 10 Aug 16

	Transferred by:	Sample Condition	Date/Time	Received by:	Sample Condition	Date/Time	°C
1	James King	Log in	10 Aug 16 1538	[Signature]		10 Aug 2016 1533	4.1°C TMS38
2							
3							



CASE NARRATIVE – AMENDED 19 SEP 2016 (Revised IML Case Narrative)

MVTL Lab Reference No/SDG: 201682-2485
IML Lab Reference No/SDG: S1608272
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – August 2016 Event
MVTL Laboratory Identifications: 16-W3357 through 16-W3367
Page 1 of 2

Table with 3 columns: MDU Sample Identification, IML Sample Identification, MVTL Laboratory #. Rows include MW110 through MW109, Dup 1, and Field Blank (FB).

I. RECEIPT

- All samples were received at the laboratory on 10 Aug 2016 at 1538.
Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
Samples were received on ice and evidence of cooling had begun.
Temperature of samples upon receipt was 4.1°C.
No other exceptions on sample receipt were encountered on this sample set unless noted here.
All samples requiring radiochemistry analysis were sent via courier to Inter-Mountain Labs (IML) for analysis there. Samples were received at IML on 15 Aug 2016.
All samples were properly preserved unless noted on the individual analytical laboratory report or on the IML Case Narrative.

II. HOLDING TIMES

- All holding times were met for both preparation and analysis unless noted on the individual analytical laboratory report or on the IML Case Narrative.



CASE NARRATIVE – AMENDED 19 SEP 2016 (Revised IML Case Narrative)

MVTL Lab Reference No/SDG: 201682-2485
IML Lab Reference No/SDG: S1608272
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – August 2016 Event
MVTL Laboratory Identifications: 16-W3357 through 16-W3367
Page 2 of 2

III. METHODS

- Approved methodology was followed for all sample analyses.
 - Please refer to the IML Case Narrative for more information regarding methodology.

IV. ANALYSIS

- All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted on the individual analytical laboratory report or on the IML Case Narrative.

V. REPORTING

- Per email dated 19 September 2016 from Terri Olson with Barr, a request was sent to IML asking their laboratory to review the QC data for the data package. IML revised the data package on 19 Sep 2016 to include a data qualifier for one duplicate analysis in the data package.

All laboratory data has been approved by MVTL Laboratories.

SIGNED: Claudette Carroll DATE: 19 Sep 16
Claudette Carroll - MVTL Bismarck Laboratory Manager



MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2 North German St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.mvttl.com



Page: 1 of 1

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 14 Sep 16
Lab Number: 16-W3357
Work Order #: 82-2485
Account #: 002800
Date Sampled: 8 Aug 16 13:07
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR Radiochem
Sample Description: MW110

Temp at Receipt: 4.1C

Event and Year: August 2016

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.29	units	NA	SM 4500 H+ B	8 Aug 16 13:07	DJN
Temperature - Field	14.4	Degrees C	NA	SM 2550B	8 Aug 16 13:07	DJN
Conductivity - Field	1034	umhos/cm	1	EPA 120.1	8 Aug 16 13:07	DJN
Radium 226	See Attached Report				29 Aug 16	OL
Radium 228	See Attached Report				4 Sep 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Claudette K. Carroll

CC
15 Sep 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
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www.mvttl.com



Page: 1 of 1

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 14 Sep 16
Lab Number: 16-W3358
Work Order #: 82-2485
Account #: 002800
Date Sampled: 8 Aug 16 15:03
Date Received: 10 Aug 16 15:38
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR Radiochem
Sample Description: MW119

Temp at Receipt: 4.1C

Event and Year: August 2016

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.36	units	NA	SM 4500 H+ B	8 Aug 16 15:03	DJN
Temperature - Field	17.4	Degrees C	NA	SM 2550B	8 Aug 16 15:03	DJN
Conductivity - Field	1116	umhos/cm	1	EPA 120.1	8 Aug 16 15:03	DJN
Radium 226	See Attached Report				29 Aug 16	OL
Radium 228	See Attached Report				4 Sep 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by: Claudette K. Carroll ^{cc} 15 Sep 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
 2 North German St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
 2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
 1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
 www.mvttl.com



Page: 1 of 1

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 14 Sep 16
 Lab Number: 16-W3360
 Work Order #: 82-2485
 Account #: 002800
 Date Sampled: 9 Aug 16 9:25
 Date Received: 10 Aug 16 15:38
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR Radiochem
 Sample Description: MW102

Temp at Receipt: 4.1C

Event and Year: August 2016

	As Received Result		Method RL	Method Reference	Date Analyzed		Analyst
pH - Field	6.90	units	NA	SM 4500 H+ B	9 Aug 16	9:25	DJN
Temperature - Field	12.0	Degrees C	NA	SM 2550B	9 Aug 16	9:25	DJN
Conductivity - Field	6350	umhos/cm	1	EPA 120.1	9 Aug 16	9:25	DJN
Radium 226	See Attached Report				29 Aug 16		OL
Radium 228	See Attached Report				4 Sep 16		OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Claudette K. Carroll

*cc
15 Sep 16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
 @ = Due to sample matrix # = Due to concentration of other analytes
 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



Date: 9/13/2016

CLIENT: MVTL Laboratories, Inc.
Project: 201682-2485
Lab Order: S1608272

CASE NARRATIVE
Report ID: S1608272001

Samples 16-W3357 MW110, 16-W3358 MW119, 16-W3359 MW210, 16-W3360 MW102, 16-W3361 MW118, 16-W3362 MW111, 16-W3363 MW117, 16-W3364 MW103, 16-W3365 MW109, 16-W3366 Dup 1, and 16-W3367 Field Blank were received on August 15, 2016.

All samples were received and analyzed within the EPA recommended holding times, except those noted below in this case narrative. Samples were analyzed using the methods outlined in the following references:

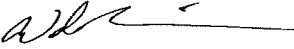
"Standard Methods For The Examination of Water and Wastewater", approved method versions
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition
40 CFR Parts 136 and 141
40 CFR Part 50, Appendices B, J, L, and O
Methods indicated in the Methods Update Rule published in the Federal Register Friday, May 18, 2012
ASTM approved and recognized standards

All Quality Control parameters met the acceptance criteria defined by EPA and Inter-Mountain Laboratories except as indicated in this case narrative.

Qualifiers by sample

LCSD-382 - Radium 228 by Ga/Tech/Total Radium 228 - RPD outside accepted recovery limits

S1608272002 replaces S1608272001. See attached.

Reviewed by: 
Wade Nieuwsma, Assistant Laboratory Manager

Wade Nieuwsma

From: Claudette Carroll [ccarroll@mvtl.com]
Sent: Monday, September 19, 2016 8:08 AM
To: Wade Nieuwsma
Subject: FW: Emailing - 201682-2485 MDU LEWIS & CLARK AUG 2016 RADIOCHEM.pdf

Hi Wade,

Could you please check the data package S1608272 in regards to the email below and let me know what you find out.

Thanks!

CLAUDETTE CARROLL
Minnesota Valley Testing Laboratories, Inc.
2616 E. Broadway Ave.
Bismarck, ND 58501
701-258-9720
ccarroll@mvtl.com



Hi Claudette,

Reviewed the report and had a question on the Rad-228 QC. The LCS and LCSD recoveries labeled 382 were acceptable but the RPD was outside lab criteria (20.4, lab criteria = 20). There wasn't a qualifier applied by the lab – could you please check with them and determine how they typically handle this?

Thank-you,

Terri A. Olson
Senior Data Quality Specialist
Minneapolis, MN office: 952.842.3578
TOlson@barr.com
www.barr.com

resourceful. naturally.



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Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 9/13/2016
Report ID S1608272001

ProjectName: 201682-2485
Lab ID: S1608272-001
ClientSample ID: 16-W3357 MW110
COC: 201682-2485

WorkOrder: S1608272
CollectionDate: 8/8/2016 1:07:00 PM
DateReceived: 8/15/2016 12:02:00 PM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
----------	--------	-------	------	----	--------	--------------------

Radionuclides - Total

Radium 226	0.1	pCi/L		0.2	SM 7500 Ra-B	08/29/2016 1202 MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	08/29/2016 1202 MB
Radium 228	-10.1	pCi/L		1	Ga-Tech	09/04/2016 338 WN
Radium 228 Precision (±)	3.7	pCi/L			Ga-Tech	09/04/2016 338 WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:	B	Analyte detected in the associated Method Blank	C	Calculated Value
	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by another laboratory
	M	Value exceeds Monthly Ave or MCL or is less than LCL	ND	Not Detected at the Reporting Limit
	O	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	X	Matrix Effect		

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 9/13/2016
Report ID S1608272001

ProjectName: 201682-2485
Lab ID: S1608272-002
ClientSample ID: 16-W3358 MW119
COC: 201682-2485

WorkOrder: S1608272
CollectionDate: 8/8/2016 3:03:00 PM
DateReceived: 8/15/2016 12:02:00 PM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
----------	--------	-------	------	----	--------	--------------------

Radionuclides - Total

Radium 226	0.17	pCi/L		0.2	SM 7500 Ra-B	08/29/2016 1202 MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	08/29/2016 1202 MB
Radium 228	-8.9	pCi/L		1	Ga-Tech	09/04/2016 539 WN
Radium 228 Precision (±)	3.9	pCi/L			Ga-Tech	09/04/2016 539 WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- M Value exceeds Monthly Ave or MCL or is less than LCL
- O Outside the Range of Dilutions
- X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 9/13/2016
Report ID S1608272001

ProjectName: 201682-2485
Lab ID: S1608272-003
ClientSample ID: 16-W3359 MW210
COC: 201682-2485

WorkOrder: S1608272
CollectionDate: 8/8/2016 5:15:00 PM
DateReceived: 8/15/2016 12:02:00 PM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.1	pCi/L		0.2	SM 7500 Ra-B	08/29/2016 1202	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	08/29/2016 1202	MB
Radium 228	0.8	pCi/L		1	Ga-Tech	09/04/2016 740	WN
Radium 228 Precision (±)	3.9	pCi/L			Ga-Tech	09/04/2016 740	WN

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- M Value exceeds Monthly Ave or MCL or is less than LCL
- O Outside the Range of Dilutions
- X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 9/13/2016
Report ID S1608272001

ProjectName: 201682-2485
Lab ID: S1608272-004
ClientSample ID: 16-W3360 MW102
COC: 201682-2485

WorkOrder: S1608272
CollectionDate: 8/9/2016 9:25:00 AM
DateReceived: 8/15/2016 12:02:00 PM
FieldSampler:
Matrix: Water

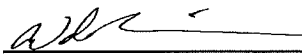
Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.5	pCi/L		0.2	SM 7500 Ra-B	08/29/2016 1202	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	08/29/2016 1202	MB
Radium 228	-5.4	pCi/L		1	Ga-Tech	09/04/2016 941	WN
Radium 228 Precision (±)	4.0	pCi/L			Ga-Tech	09/04/2016 941	WN

These results apply only to the samples tested.

RL - Reporting Limit

- | | | |
|--------------------|--|--|
| Qualifiers: | B Analyte detected in the associated Method Blank | C Calculated Value |
| | E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| | J Analyte detected below quantitation limits | L Analyzed by another laboratory |
| | M Value exceeds Monthly Ave or MCL or is less than LCL | ND Not Detected at the Reporting Limit |
| | O Outside the Range of Dilutions | S Spike Recovery outside accepted recovery limits |
| | X Matrix Effect | |

Reviewed by: 
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 9/13/2016
Report ID S1608272001

ProjectName: 201682-2485
Lab ID: S1608272-005
ClientSample ID: 16-W3361 MW118
COC: 201682-2485

WorkOrder: S1608272
CollectionDate: 8/9/2016 2:40:00 PM
DateReceived: 8/15/2016 12:02:00 PM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.1	pCi/L		0.2	SM 7500 Ra-B	08/29/2016 1202	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	08/29/2016 1202	MB
Radium 228	0.1	pCi/L		1	Ga-Tech	09/04/2016 1143	WN
Radium 228 Precision (±)	1.9	pCi/L			Ga-Tech	09/04/2016 1143	WN

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - M Value exceeds Monthly Ave or MCL or is less than LCL
 - O Outside the Range of Dilutions
 - X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 9/13/2016
Report ID S1608272001

ProjectName: 201682-2485
Lab ID: S1608272-006
ClientSample ID: 16-W3362 MW111
COC: 201682-2485

WorkOrder: S1608272
CollectionDate: 8/9/2016 12:26:00 PM
DateReceived: 8/15/2016 12:02:00 PM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.4	pCi/L		0.2	SM 7500 Ra-B	08/30/2016 849	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	08/30/2016 849	MB
Radium 228	-5.2	pCi/L		1	Ga-Tech	09/04/2016 1344	WN
Radium 228 Precision (±)	4.1	pCi/L			Ga-Tech	09/04/2016 1344	WN

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - M Value exceeds Monthly Ave or MCL or is less than LCL
 - O Outside the Range of Dilutions
 - X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 9/13/2016
Report ID S1608272001

ProjectName: 201682-2485
Lab ID: S1608272-007
ClientSample ID: 16-W3363 MW117
COC: 201682-2485

WorkOrder: S1608272
CollectionDate: 8/10/2016 7:35:00 AM
DateReceived: 8/15/2016 12:02:00 PM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	1.3	pCi/L		0.2	SM 7500 Ra-B	08/30/2016 849	MB
Radium 226 Precision (±)	0.3	pCi/L			SM 7500 Ra-B	08/30/2016 849	MB
Radium 228	-0.6	pCi/L		1	Ga-Tech	09/06/2016 1655	WN
Radium 228 Precision (±)	2.1	pCi/L			Ga-Tech	09/06/2016 1655	WN

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - M Value exceeds Monthly Ave or MCL or is less than LCL
 - O Outside the Range of Dilutions
 - X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 9/13/2016
Report ID S1608272001

ProjectName: 201682-2485
Lab ID: S1608272-008
ClientSample ID: 16-W3364 MW103
COC: 201682-2485

WorkOrder: S1608272
CollectionDate: 8/10/2016 9:51:00 AM
DateReceived: 8/15/2016 12:02:00 PM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.3	pCi/L		0.2	SM 7500 Ra-B	08/30/2016 849	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	08/30/2016 849	MB
Radium 228	0.1	pCi/L		1	Ga-Tech	09/06/2016 1856	WN
Radium 228 Precision (±)	1.9	pCi/L			Ga-Tech	09/06/2016 1856	WN

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - M Value exceeds Monthly Ave or MCL or is less than LCL
 - O Outside the Range of Dilutions
 - X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 9/13/2016
Report ID S1608272001

ProjectName: 201682-2485
Lab ID: S1608272-009
ClientSample ID: 16-W3365 MW109
COC: 201682-2485

WorkOrder: S1608272
CollectionDate: 8/9/2016 5:38:00 PM
DateReceived: 8/15/2016 12:02:00 PM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.2	pCi/L		0.2	SM 7500 Ra-B	08/30/2016 849	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	08/30/2016 849	MB
Radium 228	-2.3	pCi/L		1	Ga-Tech	09/06/2016 2058	WN
Radium 228 Precision (±)	2.1	pCi/L			Ga-Tech	09/06/2016 2058	WN

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - M Value exceeds Monthly Ave or MCL or is less than LCL
 - O Outside the Range of Dilutions
 - X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 9/13/2016
Report ID S1608272001

ProjectName: 201682-2485
Lab ID: S1608272-010
ClientSample ID: 16-W3366 Dup 1
COC: 201682-2485

WorkOrder: S1608272
CollectionDate: 8/8/2016
DateReceived: 8/15/2016 12:02:00 PM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
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Radionuclides - Total

Radium 226	0.3	pCi/L		0.2	SM 7500 Ra-B	08/30/2016 849 MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	08/30/2016 849 MB
Radium 228	-1.3	pCi/L		1	Ga-Tech	09/06/2016 2259 WN
Radium 228 Precision (±)	2.0	pCi/L			Ga-Tech	09/06/2016 2259 WN

These results apply only to the samples tested.

RL - Reporting Limit

- | | | | | |
|--------------------|---|--|----|--|
| Qualifiers: | B | Analyte detected in the associated Method Blank | C | Calculated Value |
| | E | Value above quantitation range | H | Holding times for preparation or analysis exceeded |
| | J | Analyte detected below quantitation limits | L | Analyzed by another laboratory |
| | M | Value exceeds Monthly Ave or MCL or is less than LCL | ND | Not Detected at the Reporting Limit |
| | O | Outside the Range of Dilutions | S | Spike Recovery outside accepted recovery limits |
| | X | Matrix Effect | | |

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 9/13/2016
Report ID S1608272001

ProjectName: 201682-2485
Lab ID: S1608272-011
ClientSample ID: 16-W3367 Field Blank
COC: 201682-2485

WorkOrder: S1608272
CollectionDate: 8/10/2016
DateReceived: 8/15/2016 12:02:00 PM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.1	pCi/L		0.2	SM 7500 Ra-B	08/30/2016 1246	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	08/30/2016 1246	MB
Radium 228	-1.9	pCi/L		1	Ga-Tech	09/07/2016 100	WN
Radium 228 Precision (±)	2.1	pCi/L			Ga-Tech	09/07/2016 100	WN

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - M Value exceeds Monthly Ave or MCL or is less than LCL
 - O Outside the Range of Dilutions
 - X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



ANALYTICAL QC SUMMARY REPORT

CLIENT: MVTL Laboratories, Inc.
Work Order: S1608272
Project: 201682-2485

Date: 9/13/2016
Report ID: S1608272002
(Replaces S1608272001)

Radium 228 by Ga/Tech		Sample Type	MBLK		Units: pCi/L						
MB-381 (09/02/16 15:15)	Analyte	RunNo: 138329	PrepDate: 08/24/16 0:00	BatchID: 12253	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Total Radium 228		ND	1								

MB-382 (09/06/16 10:50)	Analyte	RunNo: 138555	PrepDate: 08/24/16 0:00	BatchID: 12254	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Total Radium 228		ND	1								

Radium 228 by Ga/Tech		Sample Type	LCS		Units: pCi/L						
LCS-381 (09/02/16 17:16)	Analyte	RunNo: 138329	PrepDate: 08/24/16 0:00	BatchID: 12253	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Total Radium 228		41	1	40.3	102	64.4 - 99.5					

LCS-382 (09/06/16 12:52)	Analyte	RunNo: 138555	PrepDate: 08/24/16 0:00	BatchID: 12254	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Total Radium 228		47	1	40.3	116	63.8 - 119					

Radium 228 by Ga/Tech		Sample Type	LCSD		Units: pCi/L						
LCSD-382 (09/06/16 14:53)	Analyte	RunNo: 138555	PrepDate: 08/24/16 0:00	BatchID: 12254	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Total Radium 228		38	1	47	20.4	94.6	20		R		

Radium 228 by Ga/Tech		Sample Type	MS		Units: pCi/L						
MS-381 (09/02/16 21:19)	Analyte	RunNo: 138329	PrepDate: 08/24/16 0:00	BatchID: 12253	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Total Radium 228		39	1	40.3	ND	97.6	55 - 113				

S1608273-001AMS (09/07/16 05:02)	Analyte	RunNo: 138555	PrepDate: 08/24/16 0:00	BatchID: 12254	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Total Radium 228		35	1	40.3	ND	87.5	55 - 113				

Radium 228 by Ga/Tech		Sample Type	MSD		Units: pCi/L						
MSD-381 (09/02/16 23:20)	Analyte	RunNo: 138329	PrepDate: 08/24/16 0:00	BatchID: 12253	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Total Radium 228		41	1	39	4.15	102	30				

S1608273-001AMSD (09/07/16 07:04)	Analyte	RunNo: 138555	PrepDate: 08/24/16 0:00	BatchID: 12254	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Total Radium 228		32	1	35	8.68	80.2	30				

Qualifiers:	B Analyte detected in the associated Method Blank	E Value above quantitation range
	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	L Analyzed by another laboratory	ND Not Detected at the Reporting Limit
	O Outside the Range of Dilutions	R RPD outside accepted recovery limits
	S Spike Recovery outside accepted recovery limits	X Matrix Effect



ANALYTICAL QC SUMMARY REPORT

CLIENT: MVTL Laboratories, Inc.
Work Order: S1608272
Project: 201682-2485

Date: 9/13/2016
Report ID: S1608272002
(Replaces S1608272001)

Radium 226 in Water - Total by SM7500RA_B

Sample Type **MBLK**

Units: pCi/L

MB-1658 (08/30/16 08:49)	RunNo: 138197	PrepDate: 08/23/16 0:00	BatchID: 12233	
Analyte	Result	RL	Spike	Ref Samp

Radium 226 ND 0.2

MB-1657 (08/26/16 10:11)	RunNo: 138228	PrepDate: 08/17/16 0:00	BatchID: 12241	
Analyte	Result	RL	Spike	Ref Samp

Radium 226 ND 0.2

Radium 226 in Water - Total by SM7500RA_B

Sample Type **LCS**

Units: pCi/L

LCS-1658 (08/30/16 08:49)	RunNo: 138197	PrepDate: 08/23/16 0:00	BatchID: 12233	
Analyte	Result	RL	Spike	Ref Samp

Radium 226 6.0 0.2 5.99 100 67.1 - 122

LCS-1657 (08/26/16 10:11)	RunNo: 138228	PrepDate: 08/17/16 0:00	BatchID: 12241	
Analyte	Result	RL	Spike	Ref Samp

Radium 226 5.8 0.2 5.99 97.3 67.1 - 122

Radium 226 in Water - Total by SM7500RA_B

Sample Type **LCSD**

Units: pCi/L

LCSD-1658 (08/30/16 08:49)	RunNo: 138197	PrepDate: 08/23/16 0:00	BatchID: 12233	
Analyte	Result	RL	Conc	%RPD

Radium 226 5.6 0.2 6.0 7.21 93.4 20

Radium 226 in Water - Total by SM7500RA_B

Sample Type **MS**

Units: pCi/L

S1608273-001AMS (08/30/16 12:46)	RunNo: 138197	PrepDate: 08/23/16 0:00	BatchID: 12233	
Analyte	Result	RL	Spike	Ref Samp

Radium 226 11.2 0.2 12 0.3 90.8 65 - 131

MS-1657 (08/26/16 10:11)	RunNo: 138228	PrepDate: 08/17/16 0:00	BatchID: 12241	
Analyte	Result	RL	Spike	Ref Samp

Radium 226 5.9 0.2 5.99 ND 99.2 65 - 131

Radium 226 in Water - Total by SM7500RA_B

Sample Type **MSD**

Units: pCi/L

S1608273-001AMSD (08/30/16 12:46)	RunNo: 138197	PrepDate: 08/23/16 0:00	BatchID: 12233	
Analyte	Result	RL	Conc	%RPD

Radium 226 12.1 0.2 11.2 8.08 98.7 20

MSD-1657 (08/26/16 10:11)	RunNo: 138228	PrepDate: 08/17/16 0:00	BatchID: 12241	
Analyte	Result	RL	Conc	%RPD

Radium 226 5.8 0.2 5.9 3.26 96.0 20

Qualifiers:	B Analyte detected in the associated Method Blank	E Value above quantitation range
	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	L Analyzed by another laboratory	ND Not Detected at the Reporting Limit
	O Outside the Range of Dilutions	R RPD outside accepted recovery limits
	S Spike Recovery outside accepted recovery limits	X Matrix Effect



LABORATORIES, Inc.
 2616 E Broadway Ave
 Bismarck, ND 58501

Chain of Custody Record

Phone: (701) 258-9720
 Toll Free: (800) 279-6885 Fax: (701) 258-9724

201682-2485

Company Name and Address: <p style="text-align: center;">MVTL 2616 E Broadway Bismarck, ND 58501</p>	Account #: 	Phone #: <p style="text-align: center;">701-258-9720</p>
Billing Address (indicate if different from above): <p style="text-align: center;">PO Box 249 New Ulm, MN 56073</p>	Contact: <p style="text-align: center;">Claudette</p>	Fax #: For faxed report check box <input type="checkbox"/>
	Name of Sampler:	E-mail: <p style="text-align: center;">ccarroll@mvtl.com</p> For e-mail report check box <input type="checkbox"/>
	Quote Number	Date Submitted: <p style="text-align: center;">8/11/2016</p>
	Project Name/Number:	Purchase Order #: <p style="text-align: center;">BL5641</p>

Sample Information						Bottle Type						Analysis
IML Lab Number	MVTL Lab Number	Client Sample ID	Sample Type	Date Sampled	Time Sampled	Untreated	1000 ml HNO3	VOC Vials Unpreserved	Glass Jar	Other	cooler temp	Analysis Required
001	16-W3357	MW110	GW	8-Aug-16	1307						23.3	Ra226 & Ra228
002	16-W3358	MW119	GW	8-Aug-16	1503						23.3	Ra226 & Ra228
003	16-W3359	MW210	GW	8-Aug-16	1715						23.3	Ra226 & Ra228
004	16-W3360	MW102	GW	9-Aug-16	925						23.3	Ra226 & Ra228
005	16-W3361	MW118	GW	9-Aug-16	1440						23.3	Ra226 & Ra228
006	16-W3362	MW111	GW	9-Aug-16	1226						23.2	Ra226 & Ra228
007	16-W3363	MW117	GW	10-Aug-16	735						23.2	Ra226 & Ra228
008	16-W3364	MW103	GW	10-Aug-16	951						23.2	Ra226 & Ra228
009	16-W3365	MW109	GW	9-Aug-16	1738						23.2	Ra226 & Ra228
010	16-W3366	Dup 1	GW	8-Aug-16							23.2	Ra226 & Ra228

Comments: All results must be reported as a numerical value.

Transferred by:	Date:	Time:	Sample Condition:	Received by:	Date:	Temp:
T. Olson	8/11/2016	1700		<i>Xerese Schneider</i>	8-15-16	12:02
2.						



LABORATORIES, Inc.
 2616 E Broadway Ave
 Bismarck, ND 58501

Chain of Custody Record

Phone: (701) 258-9720
 Toll Free: (800) 279-6885 Fax: (701) 258-9724

201682-2485

Company Name and Address: <p style="text-align: center;">MVTL 2616 E Broadway Bismarck, ND 58501</p>	Account #: Contact: Claudette Name of Sampler: Quote Number: Project Name/Number:	Phone #: <p style="text-align: center;">701-258-9720</p> Fax #: For faxed report check box <input type="checkbox"/> E-mail: ccarroll@mvtl.com For e-mail report check box <input type="checkbox"/> Date Submitted: <p style="text-align: center;">8/11/2016</p> Purchase Order #: <p style="text-align: center;">BL5641</p>
Billing Address (indicate if different from above): <p style="text-align: center;">PO Box 249 New Ulm, MN 56073</p>		

Sample Information						Bottle Type					Analysis
IML Lab Number	MVTL Lab Number	Client Sample ID	Sample Type	Date Sampled	Time Sampled	Untreated	1000 ml HNO3	VOC Vials Impreserved	Glass Jar	Other	Analysis Required
S160B27Z											
011	16-W3367	Field Blank	GW	10-Aug-16						23.4	Ra226 & Ra228

Comments: All results must be reported as a numerical value.

Transferred by:	Date:	Time:	Sample Condition:	Received by:	Date:	Temp:
T. Olson	8/11/2016	1700				
2.						



2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Water Level

Sampling Personnel:

Darren Nieswaag

Company:

MDU Lewis and Clark

Well ID	Date	Time	Depth to Water	Comments
MW101	8 Aug 16	1123	9.13	
MW105	8 Aug 16	1137	8.90	
MW106	8 Aug 16	1135	9.73	
MW107	8 Aug 16	1126	4.67	
MW108	8 Aug 16	1133	16.43	
MW116	8 Aug 16	1130	10.49	

MVTL Calibration Worksheet

Site: MDU Lewis and Clark

Technician: Darren Wisway

Instrument
(Circle One):

#1 650 MDS 08F100203

#2 650 MDS 04H14736

#3 556 MPS 12E102056

Pre Site Calibration

Date: 8 Aug 16 Time: 0700

	pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7		<u>22.87</u>	<u>6.94</u>	<u>7.00</u>	6.95-7.05	<u>-36.2</u>	0 +/- 50
Buffer 10		<u>22.89</u>	<u>10.04</u>	<u>10.00</u>	9.95-10.05	<u>-215.7</u>	-180 +/- 50
Conductivity							Check
Buffer 1413		<u>23.01</u>	<u>1414</u>	<u>1413</u>	±10%	Buffer 5000 <u>BCCA</u>	<u>4976</u>
ORP							
231 mV @ 25C		<u>3.67</u>	<u>260.9</u>	<u>257.1</u>	±10 mV		
DO							
Time <u>1146</u>		<u>24.91</u>	<u>8.10</u>	<u>8.02</u>	Barometric Pressure (mm Hg)	<u>704.2</u>	mg/L

Pre Site Calibration

Date: 9 Aug 16 Time: 0655

	pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7		<u>22.09</u>	<u>7.07</u>	<u>7.00</u>	6.95-7.05	<u>-40.3</u>	0 +/- 50
Buffer 10		<u>22.10</u>	<u>10.01</u>	<u>10.00</u>	9.95-10.05	<u>-219.8</u>	-180 +/- 50
Conductivity							Check
Buffer 1413		<u>22.03</u>	<u>1482</u>	<u>1414</u>	±10%	Buffer 5000 <u>BCCA</u>	<u>4920</u>
ORP							
231 mV @ 25C		<u>7.38</u>	<u>255.7</u>	<u>257.3</u>	±10 mV		
DO							
		<u>21.72</u>	<u>7.84</u>	<u>8.17</u>	Barometric Pressure (mm Hg)	<u>706.6</u>	mg/L

Post Site Check

Time: 1836

	pH	Temp °C	Reading
Buffer 7		<u>28.23</u>	<u>7.02</u>
Conductivity			
Buffer 1413		<u>29.38</u>	<u>1417</u>

Post Site Check

Time: 1744

	pH	Temp °C	Reading
Buffer 7		<u>25.03</u>	<u>6.99</u>
Conductivity			
Buffer 1413		<u>25.38</u>	<u>1401</u>

MVTL Calibration Worksheet

Site: MDU Lewis and Clark

Technician: Darren Nilsen

Instrument
(Circle One):

#1 650 MDS 08F100203

#2 650 MDS 04H14736

#3 556 MPS 12E102056

Pre Site Calibration						
Date:			Time:			
	pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv Range +/- 50
	Buffer 7	22.06	7.01	7.00	6.95-7.05	-40.9 0 +/- 50
	Buffer 10	22.09	9.95	10.00	9.95-10.05	-217.3 -180 +/- 50
	Conductivity					Check
	Buffer 1413	22.09	1387	1413	±10%	Buffer 5000 4924
	ORP					
	231 mV @ 25C	4.50	256.0	258.2	±10 mV	
	DO				Barometric Pressure (mm Hg)	
		21.97	8.54	8.08	mg/L	704.5

Pre Site Calibration						
Date:			Time:			
	pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv Range +/- 50
	Buffer 7				6.95-7.05	0 +/- 50
	Buffer 10				9.95-10.05	-180 +/- 50
	Conductivity					Check
	Buffer 1413				±10%	Buffer 5000
	ORP					
	231 mV @ 25C				±10 mV	
	DO				Barometric Pressure (mm Hg)	
					mg/L	

Post Site Check		
Time:		
	pH	Temp °C
	Buffer 7	20.53
		7.03
	Conductivity	
	Buffer 1413	20.86
		1418

Post Site Check		
Time:		
	pH	Temp °C
	Buffer 7	
	Conductivity	
	Buffer 1413	



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: mw110
Sampling Personal: Darlan Nesway

Weather Conditions: Temp: 83 °F Wind: SW 5-10 Precip: (Sunny) Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	9.13 ft		
Total Well Depth:	16.95 ft		
Well Volume:	4.9 liters		
Depth to Top of Pump:	13.44 ft		
Water Level After Sample:	9.25 ft		
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	5 sec.
Dedicated Equip?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Recover:	56 sec.
Duplicate Sample?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	PSI:	—
Duplicate Sample ID:	<input checked="" type="checkbox"/>		Pumping Rate:	100 mL/min
Purge Date:	8 Aug 16	Time Purging Began:	1152	am/pm
Well Purged Dry?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Time Purged Dry:	— am/pm
Sample Date:	8 Aug 16	Time of Sampling:	1307	am/pm
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
SEQ #	Time								clear, slightly turbid, turbid	
1	1157	15.19	1035	7.28	2.95	113.7	54.0	9.19	500	clear
2	1212	14.64	1034	7.30	3.08	108.1	21.5	9.25	1500	clear
3	1227	14.52	1034	7.29	3.09	110.0	12.2	9.25	1500	clear
4	1242	14.50	1036	7.28	3.13	110.5	7.64	9.25	1500	clear
5	1252	14.77	1035	7.29	3.24	111.1	7.37	9.25	1000	clear
6	1257	14.56	1034	7.26	3.15	110.6	2.97	9.25	500	clear
7	1302	14.48	1036	7.29	3.21	110.2	3.09	9.25	500	clear
8	1307	14.44	1034	7.29	3.21	109.8	3.28	9.25	500	clear
9										
10										

Stabilized: Yes No

Total Volume Removed: 7500 mL

Comments:



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW119
Sampling Personal: Darren Nieswaj

Weather Conditions: Temp: 91 °F Wind: SW 10 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	9.03	ft	
Total Well Depth:	16.65	ft	
Well Volume:	4.7	liters	
Depth to Top of Pump:	12.65	ft	
Water Level After Sample:	9.04	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	7 sec.
Dedicated Equip?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Recover:	5-55 sec.
Duplicate Sample?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	PSI:	-
Duplicate Sample ID:			Pumping Rate:	100 mL/min
Purge Date:	8 Aug 16	Time Purging Began:	1408	am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Time Purged Dry:	
Sample Date:	8 Aug 16	Time of Sampling:	1503	am/pm
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

SEQ #	Time	Stabilization (3 consecutive) Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.
2	1428	17.67	1116	7.34	0.55	17.9	14.9	9.04	1500	clear
3	1443	17.83	1126	7.35	0.70	6.7	4.47	9.04	1500	clear
4	1448	17.77	1120	7.36	0.72	6.6	3.34	9.04	500	clear
5	1453	17.45	1116	7.36	0.71	6.9	2.60	9.04	500	clear
6	1458	17.33	1117	7.35	0.80	5.8	2.54	9.04	500	clear
7	1503	17.47	1116	7.36	0.81	5.8	2.46	9.04	500	clear
8										
9										
10										

Stabilized: Yes No
Comments:

Total Volume Removed: 4500 mL



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW 210
Sampling Personal: Darren Niswayer

Weather Conditions: Temp: 91 °F Wind: SW 10 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	<input checked="" type="radio"/> NO	
Well Labeled?	<input checked="" type="radio"/> Yes	No	
Casing Straight?	<input checked="" type="radio"/> Yes	No	
Grout Seal Intact?	<input checked="" type="radio"/> Yes	No	Not Visible
Repairs Necessary:	—		
Casing Diameter:	2"		
Water Level Before Purge:	9.21	ft	
Total Well Depth:	35.43	ft	
Well Volume:	16.2	liters	
Depth to Top of Pump:	28.82	ft	
Water Level After Sample:	10.99	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	5 sec.
Dedicated Equip?:	Yes	<input checked="" type="radio"/> No	Recover:	55 sec.
Duplicate Sample?:	<input checked="" type="radio"/> Yes	<input checked="" type="radio"/> No	PSI:	10-15
Duplicate Sample ID:	Dupl		Pumping Rate:	120 mL/min
Purge Date:	8 Aug 16	Time Purging Began:	1600	am/pm
Well Purged Dry?:	Yes	<input checked="" type="radio"/> No	Time Purged Dry:	— am/pm
Sample Date:	8 Aug 16	Time of Sampling:	1715	am/pm
Bottle	2- 500 mL Nitric	2- 1 Liter Raw		
List:	2- 500 mL Nitric (filtered)	8- 1 Liter Nitric		

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.
									clear, slightly turbid, turbid
1	16.98	1442	7.59	0.63	-58.4	34.3	10.10	500	clear
2	15.70	1430	7.56	0.25	-72.0	17.4	10.71	1500	clear
3	15.26	1430	7.58	0.20	-74.9	8.84	10.93	1500	clear
4	16.09	1439	7.58	0.19	-74.9	6.15	10.93	1000	clear
5	15.54	1435	7.59	0.18	-74.2	4.88	10.99	1000	clear
6	15.60	1435	7.59	0.19	-75.4	4.04	10.99	500	clear
7	15.63	1440	7.57	0.19	-75.9	3.22	10.99	500	clear
8	16.09	1445	7.60	0.17	-78.78	3.31	10.99	500	clear
9	15.60	1437	7.59	0.17	-78.9	3.23	10.99	500	clear
10									

Stabilized: Yes No

Total Volume Removed: 7500 mL

Comments:



2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark

Event: 2016

Sample ID: MW102

Sampling Personal: Darren Nidwag

Weather Conditions: Temp: 63 °F Wind: Light Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	No	
Well Labeled?	Yes	No	
Casing Straight?	Yes	No	
Grout Seal Intact?	Yes	No	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	19.47	ft	
Total Well Depth:	24.70	ft	
Well Volume:	2 3.3	liters	
Depth to Top of Pump:	20.90	ft	
Water Level After Sample:	19.91	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder	Control Settings	
Sampling Method:	Bladder	Purge:	5 sec.
Dedicated Equip?:	Yes	Recover:	55 sec.
Duplicate Sample?:	Yes	PSI:	10-15
Duplicate Sample ID:		Pumping Rate:	100 mL/min
Purge Date:	9 Aug 16	Time Purging Began:	0755 am/pm
Well Purged Dry?	Yes	Time Purged Dry:	am/pm
Sample Date:	9 Aug 16	Time of Sampling:	0925 am/pm
Bottle List:	500 mL Nitric	1 Liter Raw	
	500 mL Nitric (filtered)	4 - 1 Liter Nitric	

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
										SEQ #
1	0800	12.45	666336	6.85	1.97	22.6	323	19.72	500	Slightly turbid
2	0815	11.56	6358	6.88	0.73	26.8	88.8	19.91	1500	clear
3	0830	11.54	6336	6.88	0.59	-3.4	35.7	19.91	1500	clear
4	0845	11.66	6309	6.89	0.57	-3.1	22.3	19.91	1500	clear
5	0900	11.79	6318	6.89	0.61	-6.1	14.1	19.91	1500	clear
6	0915	11.86	6327	6.89	0.60	-8.5	4.85	19.91	1500	clear
7	0920	11.89	6333	6.89	0.58	-9.8	4.63	19.91	500	clear
8	0925	11.96	6350	6.90	0.59	-10.1	4.67	19.91	500	clear
9										
10										

Stabilized: Yes No

Total Volume Removed: 9000 mL

Comments:



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW18
Sampling Personal: Darren Nieswazy

Weather Conditions: Temp: 84 °F Wind: E5 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	88.68	ft	
Total Well Depth:	11.90	ft	
Well Volume:		liters	
Depth to Top of Pump:	9.20	ft	
Water Level After Sample:		ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder	Control Settings
Sampling Method:	Bladder	Purge: 5 sec.
Dedicated Equip?:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Recover: 55 sec.
Duplicate Sample?:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	PSI: -
Duplicate Sample ID:	-	Pumping Rate: 100 mL/min
Purge Date:	9 Aug 16	Time Purging Began: 1325 am/pm
Well Purged Dry?:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Time Purged Dry: - am/pm
Sample Date:	9 Aug 16	Time of Sampling: 1440 am/pm
Bottle List:	500 mL Nitric	1 Liter Raw
	500 mL Nitric (filtered)	4 - 1 Liter Nitric

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
SEQ #	Time								clear, slightly turbid, turbid	
1	1330	20.29	1664	7.32	1.70	58.0	75.9	8.83	500	clear slightly turbid
2	1345	19.67	1668	7.34	1.48	17.9	23.2	8.83	1500	clear
3	1400	19.53	1671	7.35	1.51	20.4	13.9	8.83	1500	clear
4	1415	18.29	1667	7.36	1.50	25.1	6.57	8.83	1500	clear
5	1430	18.59	1665	7.38	1.47	30.7	4.87	8.83	1500	clear
6	1435	18.46	1665	7.39	1.47	31.7	4.71	8.83	500	clear
7	1440	18.36	1665	7.39	1.51	32.9	4.48	8.83	500	clear
8										
9										
10										

Stabilized: Yes No
Comments:

Total Volume Removed: 7500 mL



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW111
Sampling Personal: Darren Nieswanger

Weather Conditions: Temp: 78 °F Wind: E5 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	No	
Well Labeled?	Yes	No	
Casing Straight?	Yes	No	
Grout Seal Intact?	Yes	No	Not Visible
Repairs Necessary:			
Casing Diameter:	2"		
Water Level Before Purge:	8.15	ft	
Total Well Depth:	17.81	ft	
Well Volume:	6.0	liters	
Depth to Top of Pump:	14.70	ft	
Water Level After Sample:	8.21	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder	Control Settings	
Sampling Method:	Bladder	Purge:	5 sec.
Dedicated Equip?:	Yes	Recover:	55 sec.
Duplicate Sample?:	Yes	PSI:	-
Duplicate Sample ID:	Pumping Rate: 100 mL/min		
Purge Date:	9 Aug 16	Time Purging Began:	1111 am/pm
Well Purged Dry?	Yes	Time Purged Dry:	- am/pm
Sample Date:	9 Aug 16	Time of Sampling:	1226 am/pm
Bottle List:	500 mL Nitric	1 Liter Raw	
	500 mL Nitric (filtered)	4 - 1 Liter Nitric	

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
SEQ #	Time								clear, slightly turbid, turbid	
1	1116	16.38	3865	6.94	0.38	72.2	590	8.21	500	Turbid
2	1131	18.10	3705	6.96	0.44	62.6	51.5	8.21	1500	clear
3	1146	16.95	3355	7.07	1.56	64.8	18.9	8.21	1500	clear
4	1201	18.00	3202	7.12	2.40	68.1	7.77	8.21	1500	clear
5	1211	18.04	3214	7.13	2.61	68.6	4.46	8.21	1000	clear
6	1216	18.44	3212	7.14	2.51	68.5	3.67	8.21	500	clear
7	1221	18.22	3229	7.13	2.62	69.1	3.78	8.21	500	clear
8	1226	18.47	3225	7.14	2.65	69.3	3.94	8.21	500	clear
9										
10										

Stabilized: Yes No
Comments:

Total Volume Removed: 7500 mL



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW17
Sampling Personal: *Ragnar Nilsen*

Weather Conditions: Temp: *64* °F Wind: *Light* Precip: *Sunny / Partly Cloudy / Cloudy*

Well Information

Well Locked?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Not Visible
Repairs Necessary:	<i>---</i>	
Casing Diameter:	<i>2"</i>	
Water Level Before Purge:	<i>7.10</i>	ft
Total Well Depth:	<i>11.51</i>	ft
Well Volume:	<i>2.8</i>	liters
Depth to Top of Pump:	<i>9.95</i>	ft
Water Level After Sample:	<i>11.48</i>	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	<i>5</i> sec.
Dedicated Equip?:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Recover:	<i>75</i> sec.
Duplicate Sample?:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		PSI:	<i>10</i>
Duplicate Sample ID:	<i>---</i>		Pumping Rate:	<i>100</i> mL/min
Purge Date:	<i>9 Aug 16</i>	Time Purging Began:	<i>1020</i>	<i>am</i> pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Time Purged Dry:	<i>1050</i>	<i>am</i> pm
Sample Date:	<i>10 Aug 16</i>	Time of Sampling:	<i>0735</i>	<i>am</i> pm
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
SEQ #	Time									
1	<i>1025</i>	<i>15.46</i>	<i>7452</i>	<i>7.00</i>	<i>42.3</i>	<i>42.8</i>	<i>21.3</i>	<i>7.39</i>	<i>500</i>	<i>Slightly turbid</i>
2	<i>1030</i>	<i>15.73</i>	<i>7229</i>	<i>6.98</i>	<i>43.6</i>	<i>63.8</i>	<i>26.2</i>	<i>7.51</i>	<i>500</i>	<i>Clear</i>
3	<i>1035</i>	<i>15.73</i>	<i>7249</i>	<i>6.99</i>	<i>46.7</i>	<i>62.9</i>	<i>19.8</i>	<i>7.98</i>	<i>500</i>	<i>Clear</i>
4			<i>Purged well dry</i>				<i>9.95</i>			<i>Depth to top of pump</i>
5										
6										
7										
8										
9	<i>0730</i>		<i>Purged line to clear</i>					<i>8.51</i>		
10	<i>0735</i>	<i>14.00</i>	<i>7458</i>	<i>7.02</i>	<i>5.00</i>	<i>189.0</i>	<i>3.71</i>	<i>8.98</i>	<i>500</i>	<i>Clear</i>

Stabilized: Yes No Total Volume Removed: *---* mL

Comments:

9 Aug 16 water level was keeping up so purged the well dry.



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
 Event: 2016
 Sample ID: MW103
 Sampling Personal: Darren Nitzsman

Weather Conditions: _____ Temp: 70 °F Wind: Light Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	<u>Not Visible</u>
Repairs Necessary:			
Casing Diameter:	<u>2"</u>		
Water Level Before Purge:	<u>10.59</u>	ft	
Total Well Depth:	<u>21.15</u>	ft	
Well Volume:		liters	
Depth to Top of Pump:	<u>17.81</u>	ft	
Water Level After Sample:	<u>10.60</u>	ft	
Measurement Method:	<u>Electric Water Level Indicator</u>		

Sampling Information

Purging Method:	<u>Bladder</u>		Control Settings	
Sampling Method:	<u>Bladder</u>		Purge:	<u>5</u> sec.
Dedicated Equip?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Recover:	<u>55</u> sec.
Duplicate Sample?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	PSI:	<u>15</u>
Duplicate Sample ID:			Pumping Rate:	<u>100</u> mL/min
Purge Date:	<u>10 Aug 16</u>	Time Purging Began:	<u>0831</u>	<u>am/pm</u>
Well Purged Dry?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Time Purged Dry:	_____ am/pm
Sample Date:	<u>10 Aug 16</u>	Time of Sampling:	<u>0951</u>	<u>am/pm</u>
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
										SEQ #
									clear, slightly turbid, turbid	
1	<u>0836</u>	<u>15.45</u>	<u>3691</u>	<u>7.23</u>	<u>0.64</u>	<u>156.6</u>	<u>66.4</u>	<u>10.60</u>	<u>500</u>	<u>clear</u>
2	<u>0851</u>	<u>14.89</u>	<u>2308</u>	<u>7.29</u>	<u>0.29</u>	<u>140.7</u>	<u>99.2</u>	<u>10.60</u>	<u>1500</u>	<u>clear</u>
3	<u>0906</u>	<u>15.80</u>	<u>7478</u>	<u>7.30</u>	<u>0.25</u>	<u>132.7</u>	<u>50.5</u>	<u>10.60</u>	<u>1500</u>	<u>clear</u>
4	<u>0921</u>	<u>16.05</u>	<u>1469</u>	<u>7.30</u>	<u>0.22</u>	<u>129.5</u>	<u>13.7</u>	<u>10.60</u>	<u>1500</u>	<u>clear</u>
5	<u>0931</u>	<u>16.04</u>	<u>1460</u>	<u>7.30</u>	<u>0.20</u>	<u>127.2</u>	<u>15.46</u>	<u>10.60</u>	<u>1000</u>	<u>clear</u>
6	<u>0936</u>	<u>16.07</u>	<u>1460</u>	<u>7.30</u>	<u>0.20</u>	<u>126.2</u>	<u>3.60</u>	<u>10.60</u>	<u>4500</u>	<u>clear</u>
7	<u>0941</u>	<u>15.99</u>	<u>1456</u>	<u>7.30</u>	<u>0.19</u>	<u>125.2</u>	<u>3.01</u>	<u>10.60</u>	<u>500</u>	<u>clear</u>
8	<u>0946</u>	<u>16.10</u>	<u>1456</u>	<u>7.30</u>	<u>0.19</u>	<u>124.3</u>	<u>2.98</u>	<u>10.60</u>	<u>500</u>	<u>clear</u>
9	<u>0951</u>	<u>16.30</u>	<u>1453</u>	<u>7.30</u>	<u>0.19</u>	<u>123.3</u>	<u>3.18</u>	<u>10.60</u>	<u>500</u>	<u>clear</u>
10										

Stabilized: Yes No
 Comments: _____

Total Volume Removed: 8000 mL



2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: MDU Lewis and Clark
Event: 2016
Sample ID: MW 109
Sampling Personal: Darren Nieswaag

Weather Conditions: _____ Temp: 77 °F Wind: NE 5 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	<input checked="" type="checkbox"/> No	
Well Labeled?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Casing Straight?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Grout Seal Intact?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<u>Not Visible</u>
Repairs Necessary:	<u>—</u>		
Casing Diameter:	<u>2"</u>		
Water Level Before Purge:	<u>10.56</u>		ft
Total Well Depth:	<u>17.04</u>		ft
Well Volume:	<u>4.0</u>		liters
Depth to Top of Pump:	<u>14.18</u>		ft
Water Level After Sample:	<u>10.58</u>		ft
Measurement Method:	<u>Electric Water Level Indicator</u>		

Sampling Information

Purging Method:	<u>Bladder</u>	Control Settings
Sampling Method:	<u>Bladder</u>	Purge: <u>5</u> sec.
Dedicated Equip?:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Recover: <u>55</u> sec.
Duplicate Sample?:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	PSI:
Duplicate Sample ID:	<u>—</u>	Pumping Rate: mL/min
Purge Date:	<u>9 Aug 16</u>	Time Purging Began: <u>1643</u> am/pm
Well Purged Dry?:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Time Purged Dry: _____ am/pm
Sample Date:	<u>9 Aug 16</u>	Time of Sampling: <u>1738</u> am/pm
Bottle List:	500 mL Nitric	1 Liter Raw
	500 mL Nitric (filtered)	4 - 1 Liter Nitric

Field Measurements

SEQ #	Time	Stabilization (3 consecutive) Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.
2	1703	16.63	1585	7.25	0.29	58.2	14.3	10.58	1500	clear
3	1718	16.20	1607	7.24	0.18	61.7	4.26	10.58	1500	clear
4	1723	16.41	1611	7.24	0.16	61.7	3.14	10.58	500	clear
5	1728	16.43	1602	7.24	0.15	62.6	2.76	10.58	500	clear
6	1733	16.12	1597	7.24	0.14	62.7	2.91	10.58	500	clear
7	1738	15.84	1595	7.25	0.14	62.7	2.70	10.58	500	clear
8										
9										
10										

Stabilized: Yes No
Comments: _____

Total Volume Removed: 5500 mL



Laboratories, Inc.

2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name: MDU Lewis and Clark CCR Radiochem August Event 2016				Name of Sampler(s): <i>Darren Niaswaag</i>			
Report To: MDU Attn: Samantha Marshall Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-222-7829				Carbon Copy: Attn: Address:			
				Work Order Number: 82-2485			

Sample Information						Bottle Type				Field Parameters			Analysis	
Lab Number	Sample ID	Date	Time	Sample Type	Gradient	1000 ml HNO ₃					Field Temperature °C	Field Spec. Cond.	Field pH	Analysis Required
W3357	MW110	8 Aug 16	1307	GW	Up	4					14.44	1034	7.29	MDU CCR combined
W3358	MW119	8 Aug 16	1503	GW	Up	4					17.43	1116	7.36	RadChem
W3359	MW210	8 Aug 16	1715	GW	Up	4					15.60	1437	7.59	
W3360	MW102	9 Aug 16	0925	GW	Down	4					11.96	6350	6.90	
W3361	MW118	9 Aug 16	1440	GW	Down	4					18.36	1665	7.39	
W3362	MW111	9 Aug 16	1226	GW	Down	4					18.47	3225	7.14	
W3363	MW117	10 Aug 16	0735	GW	Down	4					14.00	7458	7.02	
W3364	MW103	10 Aug 16	0957	GW		4					16.30	1453	7.30	
W3365	MW109	9 Aug 16	1738	GW		4					15.84	1595	7.25	
W3366	Dup 1	8 Aug 16	NA	W		4					NA	NA	NA	
W3367	Field Blank (FB)	10 Aug 16	NA	W		4					NA	NA	NA	

Comments:

	Transferred by:	Sample Condition	Date/Time	Received by:	Sample Condition	Date/Time	°C
1	<i>Darren Niaswaag</i>	Log in	10 Aug 16 15:38	<i>[Signature]</i>		10 Aug 2016 15:38	4.1°C TMS88
2							
3							



MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2 North German St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.mvttl.com



October 14, 2016

Montana Dakota Utilities
Attn: Samantha Marshall
400 N. 4th St.
Bismarck, ND 58501

RE: Groundwater Sampling Event - 2016 at MDU Lewis & Clark Site

Dear Ms. Marshall:

From October 10-12, 2016, MVTL Laboratories' Field Services division collected ground water samples at the MDU Lewis & Clark Station near Sidney, MT. The wells were sampled for CCR analysis, dissolved metals, and TSS. Samples were collected from 9 wells. A duplicate sample was also collected at well MW111. The wells were located, and were found to be in generally good condition. Samples collected were placed on ice and transported to MVTL in Bismarck, ND for analysis.

Thank you for your trust and support of our services. If you have any questions, please call me at (701) 391-4900.

Sincerely,

Jeremy Meyer
MVTL Field Services



MVT L Laboratories Inc.
FIELD DATA REPORT

WO# 82-3352
82-3347

MDU Lewis and Clark

Quarterly CCR Sampling

Attn: Samantha Marshall
400 North 4th St
Bismarck, ND 58501

WELL ID	PURGE DATE	START PURGE TIME	SAMPLE DATE	TIME OF SAMPLE	WATER LEVEL START (FT)	TOTAL DEPTH (FT)	WATER LEVEL END (FT)	VOLUME IN WELL (Liters)	VOLUME REMOVED (mL)	SAMPLE METHOD	FIELD READINGS				SAMPLE APPEARANCE
											TEMP (°C)	EC	pH	Turb. NTU	
MW110	11-Oct-16	8:37	11-Oct-16	10:02	8.74	16.95	8.89	5.1	9000.0	Bladder	9.74	1058	7.27	4.69	clear
MW119	11-Oct-16	11:05	11-Oct-16	11:45	8.62	16.65	8.64	5.0	4000.0	Bladder	13.44	1130	7.27	3.10	clear
MW210	11-Oct-16	12:47	11-Oct-16	13:42	8.77	35.43	10.54	16.5	5500.0	Bladder	10.60	1411	7.55	2.40	clear
MW102	11-Oct-16	14:51	11-Oct-16	16:11	18.93	24.70	20.42	3.3	8000.0	Bladder	10.68	6518	6.92	4.71	clear
MW118	12-Oct-16	8:54	12-Oct-16	9:49	8.39	11.90	8.45	2.2	5500.0	Bladder	13.64	1699	7.41	2.78	clear
MW111	11-Oct-16	17:15	11-Oct-16	18:00	7.90	17.81	7.92	6.2	4500.0	Bladder	11.38	3159	7.16	3.57	clear
MW117	11-Oct-16	7:55	12-Oct-16	7:53	5.96	11.51	8.09	3.5	4000.0	Bladder	13.21	8017	7.03	4.92	clear
MW103	12-Oct-16	12:25	12-Oct-16	13:15	10.26	21.15	10.27	6.8	5000.0	Bladder	11.87	1562	7.26	2.41	clear
MW109	12-Oct-16	10:53	12-Oct-16	11:23	10.26	17.04	10.28	4.2	3000.0	Bladder	10.20	1603	7.24	0.86	clear
MW101	NA	NA	10-Oct-16	19:38	8.73	NA	NA	NA	NA	WL	NA	NA	NA	NA	Water Level
MW105	NA	NA	10-Oct-16	19:55	8.63	NA	NA	NA	NA	WL	NA	NA	NA	NA	Water Level
MW106	NA	NA	10-Oct-16	19:53	9.44	NA	NA	NA	NA	WL	NA	NA	NA	NA	Water Level
MW107	NA	NA	10-Oct-16	19:36	4.39	NA	NA	NA	NA	WL	NA	NA	NA	NA	Water Level
MW108	NA	NA	10-Oct-16	19:50	16.72	NA	NA	NA	NA	WL	NA	NA	NA	NA	Water Level
MW116	NA	NA	10-Oct-16	19:47	10.95	NA	NA	NA	NA	WL	NA	NA	NA	NA	Water Level

ammended on 18 Nov 16

MVTL Calibration Worksheet

Site: MDU Lewis and Clark

Technician: Darren Nieswazy

Instrument
(Circle One):

#1 650 MDS 08F100203

#2 650 MDS 04H14736

#3 556 MPS 12E102056

Pre Site Calibration

Date: 10/oct/16 Time: 0714

	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
pH Buffer 7	<u>20.74</u>	<u>6.96</u>	<u>7.00</u>	6.95-7.05	<u>-44.7</u>	0 +/- 50
Buffer 10	<u>20.81</u>	<u>10.02</u>	<u>9.99</u>	9.95-10.05	<u>-22.8</u>	-180 +/- 50
Conductivity						Check
Buffer 1413	<u>20.66</u>	<u>1390</u>	<u>1413</u>	±10%	Buffer 5000	<u>5070</u>
ORP						
²⁵⁷ ₂₃₁ mV @ 25C	<u>8.12</u>	<u>256.9</u>	<u>257.2</u>	±10 mV		
DO				Barometric Pressure (mm Hg)		
				mg/L		

Post Site Check

Time: 1830

	Temp °C	Reading
pH Buffer 7		
Conductivity		
Buffer 1413		

Date: 11/oct/16 Time: 0645

	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
pH Buffer 7	<u>18.87</u>	<u>7.04</u>	<u>7.00</u>	6.95-7.05	<u>-47.5</u>	0 +/- 50
Buffer 10	<u>19.02</u>	<u>10.00</u>	<u>10.00</u>	9.95-10.05	<u>-224.0</u>	-180 +/- 50
Conductivity						Check
Buffer 1413	<u>18.79</u>	<u>1466</u>	<u>1413</u>	±10%	Buffer 5000	<u>4964</u>
ORP						
231 mV @ 25C	<u>19.01</u>	<u>240</u>	<u>231.3</u>	±10 mV		
DO				Barometric Pressure (mm Hg)		
	<u>18.88</u>	<u>9.43</u>	<u>8.66</u>	mg/L	<u>713.4</u>	

Time: 1830

	Temp °C	Reading
pH Buffer 7	<u>13.00</u>	<u>7.01</u> <u>7.00</u>
Conductivity		
Buffer 1413	<u>12.11</u>	<u>1404</u>

MVTL Calibration Worksheet

Site: MDU Lewis and Clark

Technician: Parren Nierow

Instrument
(Circle One):

#1 650 MDS 08F100203

#2 650 MDS 04H14736

#3 556 MPS 12E102056

Pre Site Calibration						
Date:	Time:					
pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7	18.19	7.03	6.99	6.95-7.05	-49.1	0 +/- 50
Buffer 10	18.12	9.95	10.00	9.95-10.05	-222.3	-180 +/- 50
Conductivity						Check
Buffer 1413	17.92	1380	1413	±10%	Buffer 5000	4988
ORP						
231 mV @ 25C	18.08	233.3	231.0	±10 mV		
DO					Barometric Pressure (mm Hg)	
	18.23	10.18	8.85	mg/L	716.6	

Post Site Check		
Time:		
pH	Temp °C	Reading
Buffer 7	11.56	7.00
Conductivity		
Buffer 1413	12.31	1416

Date:	Time:					
pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7				6.95-7.05		0 +/- 50
Buffer 10				9.95-10.05		-180 +/- 50
Conductivity						Check
Buffer 1413				±10%	Buffer 5000	
ORP						
231 mV @ 25C				±10 mV		
DO					Barometric Pressure (mm Hg)	
				mg/L		

Time:		
pH	Temp °C	Reading
Buffer 7		
Conductivity		
Buffer 1413		



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: 2016
Sample ID: 110
Sampling Personal: Darren Mesny

Weather Conditions: Temp: 32 °F Wind: N9 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Well Labeled?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Casing Straight?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
Grout Seal Intact?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Not Visible
Repairs Necessary:	<input type="checkbox"/>		
Casing Diameter:	2"		
Water Level Before Purge:	8.74	ft	
Total Well Depth:	16.95	ft	
Well Volume:	5.1	liters	
Depth to Top of Pump:	13.50	ft	
Water Level After Sample:	8.89	ft	
Measurement Method:	Electric Water Level Indicator		

Sampling Information

Purging Method:	Bladder		Control Settings	
Sampling Method:	Bladder		Purge:	5 sec.
Dedicated Equip?:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Recover:	55 sec.
Duplicate Sample?:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	PSI:	-
Duplicate Sample ID:	<input type="checkbox"/>		Pumping Rate:	100 mL/min
Purge Date:	11 Oct 16	Time Purging Began:	0837	am/pm
Well Purged Dry?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Time Purged Dry:	- am/pm
Sample Date:	11 Oct 16	Time of Sampling:	1002	am/pm
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

SEQ #	Time	Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.
1	0842		10.38	1105	7.28	5.83	177.6	33.6	8.89	500	clear
2	0857		9.38	1068	7.28	5.628	174.8	25.3	8.98	1500	clear
3	0912		9.63	1061	7.28	5.57	173.7	18.8	8.83	1500	clear
4	0927		10.30	1057	7.28	5.24	173.4	10.0	8.88	1500	clear
5	0942		9.37	1058	7.29	5.65	172.3	7.56	8.84	1500	clear
6	0952		9.48	1059	7.29	5.18	172.6	4.52	8.84	1500	clear
7	0957		9.52	1060	7.28	5.22	172.6	4.73	8.88	500	clear
8	1002		9.74	1058	7.27	5.47	172.1	4.69	8.85	500	clear
9											
10											

Stabilized: Yes No

Total Volume Removed: 9000 mL

Comments:



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company: MDU Lewis and Clark

Event: 2016

Sample ID: 102

Sampling Personal: Parren Niesway

Weather Conditions: Temp: 37 °F Wind: NW9 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	<input checked="" type="radio"/> No	
Well Labeled?	<input checked="" type="radio"/> Yes	No	
Casing Straight?	<input checked="" type="radio"/> Yes	No	
Grout Seal Intact?	Yes	No	<u>Not Visible</u>
Repairs Necessary:	<u>—</u>		
Casing Diameter:	<u>2"</u>		
Water Level Before Purge:	<u>18.93</u>	ft	
Total Well Depth:	<u>29.70</u>	ft	
Well Volume:		liters	
Depth to Top of Pump:	<u>20.42</u>	ft	
Water Level After Sample:		ft	
Measurement Method:	<u>Electric Water Level Indicator</u>		

Sampling Information

Purging Method:	<u>Bladder</u>		Control Settings	
Sampling Method:	<u>Bladder</u>		Purge:	<u>5</u> sec.
Dedicated Equip?:	Yes	<input checked="" type="radio"/> No	Recover:	<u>55</u> sec.
Duplicate Sample?:	Yes	<input checked="" type="radio"/> No	PSI:	<u>10-15</u>
Duplicate Sample ID:	<u>—</u>		Pumping Rate:	<u>100</u> mL/min
Purge Date:	<u>11 Oct 16</u>	Time Purging Began:	<u>1451</u>	<u>am/pm</u>
Well Purged Dry?	Yes	<input checked="" type="radio"/> No	Time Purged Dry:	<u>—</u> <u>am/pm</u>
Sample Date:	<u>11 Oct 16</u>	Time of Sampling:	<u>1611</u>	<u>am/pm</u>
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.	
										SEQ #
									clear, slightly turbid, turbid	
1	1456	11.21	6500	6.91	1.68	31.3	98.7	19.19	500	<u>slightly turbid</u>
2	1511	10.89	6492	6.91	1.22	25.4	38.7	19.21	1500	<u>clear</u>
3	1526	10.83	6519	6.92	0.99	22.5	29.5	19.24	1500	<u>clear</u>
4	1541	10.66	6499	6.91	0.40	21.9	13.1	19.28	1500	<u>clear</u>
5	1556	10.78	6496	6.91	1.10	21.2	6.31	19.28	1500	<u>clear</u>
6	1601	10.69	6514	6.92	1.89	21.0	4.97	19.28	500	<u>clear</u>
7	1606	10.68	6513	6.92	1.77	20.9	4.71	19.31	500	<u>clear</u>
8	1611	10.68	6518	6.92	1.90	20.6	4.71	19.30	500	<u>clear</u>
9										
10										

Stabilized: Yes No

Total Volume Removed: 8000 mL

Comments:



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: 2016
Sample ID: 117
Sampling Personal: Rachel Nieswan

Weather Conditions: Temp: 33 °F Wind: w 6 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Not Visible
Repairs Necessary:	<input checked="" type="checkbox"/>	
Casing Diameter:	2"	
Water Level Before Purge:	5.96	ft
Total Well Depth:	11.51	ft
Well Volume:	3.5	liters
Depth to Top of Pump:	8.09	ft
Water Level After Sample:	8.09	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder	Control Settings
Sampling Method:	Bladder	Purge: <u>5</u> sec.
Dedicated Equip?:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Recover: <u>55</u> sec.
Duplicate Sample?:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	PSI: -
Duplicate Sample ID:		Pumping Rate: <u>100</u> mL/min
Purge Date:	<u>11 Oct 16</u>	Time Purging Began: <u>0755</u> am/pm
Well Purged Dry?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Time Purged Dry: <u>0830</u> am/pm
Sample Date:	<u>12 Oct 16</u>	Time of Sampling: <u>0753</u> am/pm
Bottle List:	500 mL Nitric	1 Liter Raw
	500 mL Nitric (filtered)	4 - 1 Liter Nitric

Field Measurements

Stabilization (3 consecutive)	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.
SEQ #	Time								clear, slightly turbid, turbid
1	0800	7514	7.01	7.28	196.5	6.87	6.88	500	clear
2	0810	7381	7.09	8.20	189.0	6.46	7.22	1000	clear
3	0820	7343	7.04	8.09	188.3	9.66	7.82	1000	clear
4	0830	7382	7.00	8.84	187.6	11.9	8.09	1000	clear
5									
6	0748	started to purge line						12 Oct 16	
7	0753	8017	7.03	7.23	168.2	4.92	7.29	500	clear
8									
9									
10									rehydrate

Stabilized: Yes No
Comments:

Total Volume Removed: 3500 mL



Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND
Phone: (701) 258-9720

Company: MDU Lewis and Clark
Event: 2016
Sample ID: @ 109
Sampling Personal: Darren Niaswaag

Weather Conditions: Temp: 35 °F Wind: SE 59 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Well Labeled?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Casing Straight?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Grout Seal Intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	<u>Not Visible</u>
Repairs Necessary:	<u>—</u>		
Casing Diameter:	<u>2"</u>		
Water Level Before Purge:	<u>10.26</u>	ft	
Total Well Depth:	<u>17.04</u>	ft	
Well Volume:	<u>4.2</u>	liters	
Depth to Top of Pump:	<u>13.21</u>	ft	
Water Level After Sample:	<u>10.28</u>	ft	
Measurement Method:	<u>Electric Water Level Indicator</u>		

Sampling Information

Purging Method:	<u>Bladder</u>		Control Settings	
Sampling Method:	<u>Bladder</u>		Purge:	<u>5</u> sec.
Dedicated Equip?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Recover:	<u>55</u> sec.
Duplicate Sample?:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	PSI:	<u>—</u>
Duplicate Sample ID:	<u>—</u>		Pumping Rate:	<u>100</u> mL/min
Purge Date:	<u>12 Oct 16</u>	Time Purging Began:	<u>1053</u>	<u>am/pm</u>
Well Purged Dry?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Time Purged Dry:	<u>—</u> am/pm
Sample Date:	<u>12 Oct 16</u>	Time of Sampling:	<u>1123</u>	<u>am/pm</u>
Bottle List:	500 mL Nitric	1 Liter Raw		
	500 mL Nitric (filtered)	4 - 1 Liter Nitric		

Field Measurements

SEQ #	Stabilization (3 consecutive) Time	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect.
1	<u>1058</u>	<u>10.69</u>	<u>1614</u>	<u>7.25</u>	<u>3.21</u>	<u>125.8</u>	<u>4.62</u>	<u>10.28</u>	<u>500</u>	<u>clear</u>
2	<u>1103</u>	<u>10.25</u>	<u>1601</u>	<u>7.25</u>	<u>2.67</u>	<u>126.7</u>	<u>3.05</u>	<u>10.28</u>	<u>500</u>	<u>clear</u>
3	<u>1108</u>	<u>10.30</u>	<u>1598</u>	<u>7.24</u>	<u>2.39</u>	<u>127.0</u>	<u>1.19</u>	<u>10.28</u>	<u>500</u>	<u>clear</u>
4	<u>1113</u>	<u>10.09</u>	<u>1662</u>	<u>7.25</u>	<u>2.26</u>	<u>127.0</u>	<u>0.95</u>	<u>10.28</u>	<u>500</u>	<u>clear</u>
5	<u>1118</u>	<u>10.04</u>	<u>1602</u>	<u>7.24</u>	<u>2.15</u>	<u>127.0</u>	<u>0.92</u>	<u>10.28</u>	<u>500</u>	<u>clear</u>
6	<u>1123/1123</u>	<u>10.20</u>	<u>1603</u>	<u>7.24</u>	<u>2.08</u>	<u>126.7</u>	<u>0.86</u>	<u>10.28</u>	<u>500</u>	<u>clear</u>
7										
8										
9										
10										

Stabilized: (Yes) No
Comments: ()

Total Volume Removed: 3000 mL



2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Water Level

Sampling Personnel:

Darren Nieswrag

Company:

MDU Lewis and Clark

Well ID	Date	Time	Gauge Reading	Comments
East Scrubber Pond Gauge	12 Oct 16	1217	2.6	
West Scrubber Pond Gauge	12 Oct 16	1217	6.0	



Field Datasheet

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Water Level

Sampling Personnel:

Darren Nieswog

Company:

MDU Lewis and Clark

Well ID	Date	Time	Depth to Water	Comments
MW101	10 Oct 16	1938	8.73	
MW105	10 Oct 16	1955	8.63	
MW106	10 Oct 16	01947	10.95	Time 1953 Depth to water 9.44
MW107	10 Oct 16	1936	4.39	
MW108	10 Oct 16	1950	16.72	
MW116	10 Oct 16	1947	10.95	



CASE NARRATIVE

MVTl Lab Reference No/SDG: 201682-3347
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater - October 2016 Event
MVTl Laboratory Identifications: 16-W4672 through 16-W4682
Page 1 of 2

Table with 2 columns: MDU Sample Identification, MVTl Laboratory #. Rows include MW110, MW119, MW210, MW102, MW118, MW111, MW117, MW103, MW109, Dup 1, and Field Blank (FB).

I. RECEIPT

- All samples were received at the laboratory on 13 October 2016 at 0800.
Samples were collected and hand delivered by MVTl Field Service personnel to the laboratory.
Samples were received on ice and evidence of cooling had begun.
Temperature of samples upon receipt was 1.8°C.
All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
No other exceptions on sample receipt were encountered on this sample set unless noted here.

II. HOLDING TIMES

- With the exception of laboratory pH, all holding times were met for both preparation and analysis unless noted here.

III. METHODS

- Approved methodology was followed for all sample analyses.
Methods 6010D and Method 6020B were used to analyze the metals.



CASE NARRATIVE

MVTL Lab Reference No/SDG: 201682-3347
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – October 2016 Event
MVTL Laboratory Identifications: 16-W4672 through 16-W4682
Page 2 of 2

IV. ANALYSIS

- All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted here and/or flagged on the individual analytical laboratory report.
 - For some metals, the reported results were elevated due to instrument performance at the lower limit of quantitation (LLOQ).
 - For some metals, the reported results were elevated due to additional dilutions required to minimize the effects of sample matrix.
 - One beryllium matrix spike duplicate recovery was outside the acceptable limits. Recovery for the matrix spike was acceptable. RPD for the recoveries of the matrix spike duplicate and the matrix spike was within limits. No further action was taken.
 - Recovery for one mercury matrix spike was outside of the acceptable limits. Recovery of the matrix spike duplicate was acceptable. RPD for the recoveries of the matrix spike/matrix spike duplicate was acceptable. No further action was taken.

All laboratory data has been approved by MVTL Laboratories.

SIGNED: Claudette Carroll DATE: 5/11/16
Claudette Carroll - MVTL Bismarck Laboratory Manager



MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 N. Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
 2616 E. Broadway Ave. ~ Bismarck, ND 58502 ~ 800-279-6885 ~ Fax 701-258-9724
 1201 Lincoln Highway ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
 www.mvtl.com

MEMBER
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Quality Control Report

Lab IDs: 16-W4672 to 16-W4682

Project: MDU Lewis & Clark CCR GW Oct 2016

Work Order: 201682-3347

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Antimony - Dissolved mg/l	0.1000	104	80-120	0.100	16-W4672	< 0.001	0.0926	93	75-125	0.0926	0.0964	96	4.0	20	-	-	< 0.001
				0.100	16-W4682	< 0.001	0.0901	90	75-125	0.0901	0.0890	89	1.2	20	-	-	< 0.001
Antimony - Total mg/l	0.1000	111	80-120	0.400	16W4672q	< 0.001	0.4748	119	75-125	0.4748	0.4670	117	1.7	20	-	-	< 0.001
	0.1000	107	80-120	0.400	16W4681q	< 0.001	0.4184	105	75-125	0.4184	0.4266	107	1.9	20	-	-	< 0.001
Arsenic - Dissolved mg/l	0.1000	105	80-120	0.100	16-W4672	< 0.002	0.0966	97	75-125	0.0966	0.1008	101	4.3	20	-	-	< 0.002
				0.100	16-W4682	< 0.002	0.0920	92	75-125	0.0920	0.0890	89	3.3	20	-	-	< 0.002
Arsenic - Total mg/l	0.1000	111	80-120	0.400	16W4672q	< 0.002	0.4754	119	75-125	0.4754	0.4770	119	0.3	20	-	-	< 0.002
	0.1000	108	80-120	0.400	16W4681q	< 0.002	0.4202	105	75-125	0.4202	0.4356	109	3.6	20	-	-	< 0.002
Barium - Dissolved mg/l	0.1000	101	80-120	0.100	16-W4672	0.0309	0.1234	92	75-125	0.1234	0.1203	89	2.5	20	-	-	< 0.002
	0.1000	107	80-120	0.100	16-W4682	< 0.002	0.0858	86	75-125	0.0858	0.0830	83	3.3	20	-	-	< 0.002
				0.100	16-W4679	0.0265	0.1258	99	75-125	0.1258	0.1257	99	0.1	20	-	-	< 0.002
Barium - Total mg/l	0.1000	106	80-120	0.400	16W4672q	0.0370	0.4796	111	75-125	0.4796	0.5140	119	6.9	20	-	-	< 0.002
	0.1000	105	80-120	0.400	16W4681q	0.0208	0.4378	104	75-125	0.4378	0.4422	105	1.0	20	-	-	< 0.002
Beryllium - Dissolved mg/l	0.1000	101	80-120	0.100	16-W4672	< 0.0005	0.0962	96	75-125	0.0962	0.0947	95	1.6	20	-	-	< 0.0005
				0.100	16-W4682	< 0.0005	0.0933	93	75-125	0.0933	0.0875	88	6.4	20	-	-	< 0.0005
Beryllium - Total mg/l	0.1000	106	80-120	0.400	16W4672q	< 0.0005	0.4792	120	75-125	0.4792	0.5044	126	5.1	20	-	-	< 0.0005
	0.1000	114	80-120	0.400	16W4681q	< 0.0005	0.4586	115	75-125	0.4586	0.4556	114	0.7	20	-	-	< 0.0005
Boron - Dissolved mg/l	0.40	110	80-120	0.300	16-W4561	0.66	0.92	87	75-125	0.92	0.90	80	2.2	20	-	-	< 0.1
	0.40	115	80-120	3.00	16-W4678	8.20	11.1	97	75-125	11.1	11.0	93	0.9	20	-	-	< 0.1
				0.600	16-W4720	0.46	1.00	90	75-125	1.00	0.98	87	2.0	20	-	-	< 0.1
				1.50	16-W4730	1.04	2.36	88	75-125	2.36	2.40	91	1.7	20	-	-	< 0.1
Boron - Total mg/l	0.40	112	80-120	0.400	16-W4616	0.44	0.84	100	75-125	0.84	0.85	102	1.2	20	-	-	< 0.1
	0.40	112	80-120	0.400	16-W4623	0.49	0.86	92	75-125	0.86	0.86	92	0.0	20	-	-	< 0.1
				0.400	16-W4672	0.27	0.65	95	75-125	0.65	0.67	100	3.0	20	-	-	< 0.1
				3.00	16-W4681	8.17	10.8	88	75-125	10.8	11.1	98	2.7	20	-	-	< 0.1



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1201 Lincoln Highway ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.mvtl.com

MEMBER
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Quality Control Report

Lab IDs: 16-W4672 to 16-W4682

Project: MDU Lewis & Clark CCR GW Oct 2016

Work Order: 201682-3347

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/Dup Orig Result	MSD/Dup Result	MSD Rec %	MSD/Dup RPD	MSD/Dup RPD Limit (<=)	Known Rec (%)	Known % Rec Limits	Method Blank
Cadmium - Dissolved mg/l	0.1000	107	80-120	0.100	16-W4672	< 0.0005	0.0932	93	75-125	0.0932	0.0939	94	0.7	20	-	-	< 0.0005
				0.100	16-W4682	< 0.0005	0.0934	93	75-125	0.0934	0.0904	90	3.3	20	-	-	
Cadmium - Total mg/l	0.1000 0.1000	113 110	80-120 80-120	0.400	16W4672q	< 0.0005	0.4702	118	75-125	0.4702	0.4720	118	0.4	20	-	-	< 0.0005
				0.400	16W4681q	< 0.0005	0.4152	104	75-125	0.4152	0.4298	107	3.5	20	-	-	< 0.0005
Calcium - Dissolved mg/l	20.0 20.0	104 108	80-120 80-120	100	16D4346q	47.7	137	89	75-125	137	137	89	0.0	20	-	-	< 1
				100	16W4672q	83.2	174	91	75-125	174	173	90	0.6	20	-	-	< 1
				100	16W4680q	91.2	181	90	75-125	181	183	92	1.1	20	-	-	
Calcium - Total mg/l	20.0 20.0	104 102	80-120 80-120	100	16W4663q	163	253	90	75-125	253	251	88	0.8	20	-	-	< 1
				100	16W4672q	84.8	176	91	75-125	176	177	92	0.6	20	-	-	< 1
				500	16W4681q	149	610	92	75-125	610	610	92	0.0	20	-	-	< 1
				500	16W4717q	346	845	100	75-125	845	845	100	0.0	20	-	-	< 1
Chloride mg/l	30.0 30.0	97 96	80-120 80-120	30.0	16-W4677	30.5	59.5	97	80-120	59.5	60.9	101	2.3	20	-	-	< 1
															-	-	< 1
															-	-	< 1
Chromium - Dissolved mg/l	0.1000	99	80-120	0.100	16-W4672	< 0.002	0.0858	86	75-125	0.0858	0.0886	89	3.2	20	-	-	< 0.002
				0.100	16-W4682	< 0.002	0.0880	88	75-125	0.0880	0.0852	85	3.2	20	-	-	
Chromium - Total mg/l	0.1000 0.1000	105 104	80-120 80-120	0.400	16W4672q	< 0.002	0.4382	110	75-125	0.4382	0.4398	110	0.4	20	-	-	< 0.002
				0.400	16W4681q	< 0.002	0.3978	99	75-125	0.3978	0.4010	100	0.8	20	-	-	< 0.002
Cobalt - Dissolved mg/l	0.1000	99	80-120	0.100	16-W4672	< 0.002	0.0850	85	75-125	0.0850	0.0886	89	4.1	20	-	-	< 0.002
				0.100	16-W4682	< 0.002	0.0884	88	75-125	0.0884	0.0861	86	2.6	20	-	-	
Cobalt - Total mg/l	0.1000 0.1000	104 105	80-120 80-120	0.400	16W4672q	< 0.002	0.4400	110	75-125	0.4400	0.4338	108	1.4	20	-	-	< 0.002
				0.400	16W4681q	< 0.002	0.3996	100	75-125	0.3996	0.4048	101	1.3	20	-	-	< 0.002
Fluoride mg/l	0.50	104	90-110	0.500	16-W4672	0.51	1.03	104	80-120	1.03	1.03	104	0.0	20	-	-	< 0.1
				0.500	16-W4680	0.85	1.38	106	80-120	1.38	1.39	108	0.7	20	-	-	< 0.1
Lead - Dissolved mg/l	0.1000	105	80-120	0.100	16-W4672	< 0.0005	0.0850	85	75-125	0.0850	0.0824	82	3.1	20	-	-	< 0.0005
				0.100	16-W4682	< 0.0005	0.0843	84	75-125	0.0843	0.0813	81	3.6	20	-	-	
Lead - Total mg/l	0.1000 0.1000	109 99	80-120 80-120	0.400	16W4672q	< 0.0005	0.4326	108	75-125	0.4326	0.4576	114	5.6	20	-	-	< 0.0005
				0.400	16W4681q	< 0.0005	0.4036	101	75-125	0.4036	0.4034	101	0.0	20	-	-	< 0.0005



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MEMBER
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Quality Control Report

Lab IDs: 16-W4672 to 16-W4682

Project: MDU Lewis & Clark CCR GW Oct 2016

Work Order: 201682-3347

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Lithium - Dissolved mg/l	0.40	95	80-120	0.200	16-W4680	0.06	0.29	115	75-125	0.29	0.30	120	3.4	20	-	-	< 0.1
				0.200	16-W4722	< 0.1	0.23	115	75-125	0.23	0.23	115	0.0	20	-	-	< 0.1
				1.00	16-W4730	1.87	2.99	112	75-125	2.99	2.96	109	1.0	20	-	-	< 0.1
															-	-	< 0.1
Lithium - Total mg/l	0.40	95	80-120	0.400	16-W4612	< 0.1	0.39	98	75-125	0.39	0.38	95	2.6	20	-	-	< 0.1
				0.400	16-W4616	< 0.1	0.46	115	75-125	0.46	0.44	110	4.4	20	-	-	< 0.1
				0.400	16-W4672	< 0.1	0.41	102	75-125	0.41	0.42	105	2.4	20	-	-	< 0.1
				0.400	16-W4681	0.15	0.56	102	75-125	0.56	0.57	105	1.8	20	-	-	< 0.1
				0.400	16-W4717	0.54	1.00	115	75-125	1.00	0.98	110	2.0	20	-	-	< 0.1
Magnesium - Dissolved mg/l	20.0	106	80-120	100	16D4346q	20.4	114	94	75-125	114	114	94	0.0	20	-	-	< 1
				100	16W4672q	51.6	147	95	75-125	147	146	94	0.7	20	-	-	< 1
				100	16W4680q	137	225	88	75-125	225	228	91	1.3	20	-	-	
Magnesium - Total mg/l	20.0	106	80-120	100	16W4663q	62.2	160	98	75-125	160	158	96	1.3	20	-	-	< 1
				100	16W4672q	52.1	148	96	75-125	148	148	96	0.0	20	-	-	< 1
				500	16W4681q	402	845	89	75-125	845	855	91	1.2	20	-	-	< 1
				500	16W4717q	276	790	103	75-125	790	795	104	0.6	20	-	-	< 1
Mercury - Dissolved mg/l	0.0020	100	85-115	0.002	16-W4678	< 0.0002	0.0017	85	70-130	0.0017	0.0018	90	5.7	20	-	-	< 0.0002
				0.002	16-W4720	< 0.0002	0.0017	85	70-130	0.0017	0.0017	85	0.0	20	-	-	
Mercury - Total mg/l	0.0020	100	85-115	0.002	16-W4634	< 0.0002	0.0020	100	70-130	0.0020	0.0020	100	0.0	20	-	-	< 0.0002
				0.002	16-W4673	< 0.0002	0.0020	100	70-130	0.0020	0.0020	100	0.0	20	-	-	< 0.0002
				0.002	16-W4697	< 0.0002	0.0013	65	70-130	0.0013	0.0014	70	7.4	20	-	-	
				0.002	16-W4716	< 0.0002	0.0020	100	70-130	0.0020	0.0020	100	0.0	20	-	-	
Molybdenum - Dissolved mg/l	0.1000	84	80-120	0.100	16-W4672	0.0045	0.0974	93	75-125	0.0974	0.0965	92	0.9	20	-	-	< 0.002
				0.100	16-W4682	< 0.002	0.0828	83	75-125	0.0828	0.0800	80	3.4	20	-	-	
Molybdenum - Total mg/l	0.1000	90	80-120	0.400	16W4672q	0.0047	0.4510	112	75-125	0.4510	0.4842	120	7.1	20	-	-	< 0.002
				0.400	16W4681q	0.0784	0.4966	105	75-125	0.4966	0.5126	109	3.2	20	-	-	< 0.002



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Quality Control Report

Lab IDs: 16-W4672 to 16-W4682

Project: MDU Lewis & Clark CCR GW Oct 2016

Work Order: 201682-3347

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
pH units	-	-	-	-	-	-	-	-	-	7.9	7.9	-	0.0	20	-	-	-
	-	-	-	-	-	-	-	-	-	7.5	7.4	-	1.3	20	-	-	-
Potassium - Dissolved mg/l	10.0	91	80-120	20.0	16D4346q	4.4	22.7	92	75-125	22.7	22.8	92	0.4	20	-	-	< 1
				20.0	16W4672q	7.1	26.3	96	75-125	26.3	26.1	95	0.8	20	-	-	< 1
				20.0	16W4680q	8.4	27.4	95	75-125	27.4	27.6	96	0.7	20	-	-	< 1
Potassium - Total mg/l	10.0	92	80-120	20.0	16W4663q	6.9	26.8	99	75-125	26.8	26.6	98	0.7	20	-	-	< 1
	10.0	91	80-120	20.0	16W4672q	7.2	26.2	95	75-125	26.2	26.2	95	0.0	20	-	-	< 1
				100	16W4681q	10.0	100	90	75-125	100	100	90	0.0	20	-	-	< 1
				100	16W4717q	19.3	122	103	75-125	122	122	103	0.0	20	-	-	< 1
Selenium - Dissolved mg/l	0.1000	113	80-120	0.100	16-W4672	< 0.005	0.1111	111	75-125	0.1111	0.1122	112	1.0	20	-	-	< 0.002
				0.100	16-W4682	< 0.005	0.1028	103	75-125	0.1028	0.1060	106	3.1	20	-	-	< 0.002
Selenium - Total mg/l	0.1000	108	80-120	0.400	16-W4672	0.0029	0.4652	116	75-125	0.4652	0.4830	120	3.8	20	-	-	< 0.002
				0.400	16-W4681	0.0896	0.5632	118	75-125	0.5632	0.5720	121	1.6	20	-	-	< 0.002
Sodium - Dissolved mg/l	20.0	102	80-120	100	16D4346q	80.8	171	90	75-125	171	173	92	1.2	20	-	-	< 1
				100	16W4672q	85.3	177	92	75-125	177	181	96	2.2	20	-	-	< 1
				100	16W4680q	79.4	173	94	75-125	173	174	95	0.6	20	-	-	< 1
Sodium - Total mg/l	20.0	102	80-120	100	16W4663q	194	287	93	75-125	287	285	91	0.7	20	-	-	< 1
	20.0	100	80-120	100	16W4672q	88.5	183	94	75-125	183	184	96	0.5	20	-	-	< 1
				500	16W4681q	122	600	96	75-125	600	600	96	0.0	20	-	-	< 1
				500	16W4717q	575	1100	105	75-125	1100	1110	107	0.9	20	-	-	< 1
Sulfate mg/l	100	96	90-110	100	16-W4640	< 5	98.1	98	80-120	98.1	95.6	96	2.6	20	-	-	< 5
	100	93	90-110	100	16-W4682	< 5	92.2	92	80-120	92.2	92.2	92	0.0	20	-	-	< 5
Thallium - Dissolved mg/l	0.1000	103	80-120	0.100	16-W4672	< 0.0005	0.0854	85	75-125	0.0854	0.0838	84	1.9	20	-	-	< 0.0005
				0.100	16-W4682	< 0.0005	0.0844	84	75-125	0.0844	0.0812	81	3.9	20	-	-	< 0.0005
Thallium - Total mg/l	0.1000	110	80-120	0.400	16W4672q	< 0.0005	0.4286	107	75-125	0.4286	0.4612	115	7.3	20	-	-	< 0.0005
	0.1000	98	80-120	0.400	16W4681q	< 0.0005	0.3958	99	75-125	0.3958	0.4030	101	1.8	20	-	-	< 0.0005
Total Alkalinity mg/l CaCO3	410	98	90-110	410	16-W4663	535	918	93	80-120	918	919	94	0.1	20	94	80-120	< 20
				410	16-W4679	313	703	95	80-120	703	704	95	0.1	20			< 20



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Quality Control Report

Lab IDs: 16-W4672 to 16-W4682

Project: MDU Lewis & Clark CCR GW Oct 2016

Work Order: 201682-3347

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike % Rec	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Total Dissolved Solids mg/l	-	-	-	-	-	-	-	-	-	1670	1620	-	3.0	20	-	-	< 5
	-	-	-	-	-	-	-	-	-	1060	1020	-	3.8	20	-	-	
Total Suspended Solids mg/l	-	-	-	-	-	-	-	-	-	598	615	-	2.8	20	-	-	< 1
	-	-	-	-	-	-	-	-	-	3820	4000	-	4.6	20	-	-	< 1
	-	-	-	-	-	-	-	-	-	5	5	-	0.0	*	-	-	< 1
	-	-	-	-	-	-	-	-	-	154	149	-	3.3	20	-	-	< 1
	-	-	-	-	-	-	-	-	-	3	3	-	0.0	*	-	-	
	-	-	-	-	-	-	-	-	-	297	316	-	6.2	20	-	-	
	-	-	-	-	-	-	-	-	-	174	188	-	7.7	20	-	-	

* Due to result < 10 mg/L, data reported based on acceptance criteria of Relative % Difference of +/- 3 mg/L.

Approved by: C. Caldwell
5/11/16



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Page: 1 of 2

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 3 Nov 16
 Lab Number: 16-W4672
 Work Order #: 82-3347
 Account #: 002800
 Date Sampled: 11 Oct 16 10:02
 Date Received: 13 Oct 16 8:00
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
 Sample Description: MW110

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	13 Oct 16	ML
pH	* 7.1	units	N/A	SM4500 H+ B	13 Oct 16 17:00	ML
Total Suspended Solids	9	mg/l	1	I3765-85	14 Oct 16 10:26	ML
pH - Field	7.27	units	NA	SM 4500 H+ B	11 Oct 16 10:02	DJN
Temperature - Field	9.74	Degrees C	NA	SM 2550B	11 Oct 16 10:02	DJN
Total Alkalinity	345	mg/l CaCO3	20	SM2320-B	13 Oct 16 17:00	ML
Conductivity - Field	1058	umhos/cm	1	EPA 120.1	11 Oct 16 10:02	DJN
Fluoride	0.51	mg/l	0.10	SM4500-F-C	13 Oct 16 17:00	ML
Sulfate	179	mg/l	5.00	ASTM D516-07	14 Oct 16 14:09	EMS
Chloride	18.5	mg/l	1.0	SM4500-Cl-E	20 Oct 16 10:35	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	24 Oct 16 11:32	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	20 Oct 16 12:41	EV
Total Dissolved Solids	634	mg/l	5	I1750-85	13 Oct 16 14:51	ML
Calcium - Total	84.8	mg/l	1.0	6010	17 Oct 16 11:57	SZ
Magnesium - Total	52.1	mg/l	1.0	6010	17 Oct 16 11:57	SZ
Sodium - Total	88.5	mg/l	1.0	6010	17 Oct 16 11:57	SZ
Potassium - Total	7.2	mg/l	1.0	6010	17 Oct 16 11:57	SZ
Lithium - Total	< 0.1	mg/l	0.10	6010	19 Oct 16 9:59	KMD
Boron - Total	0.27	mg/l	0.10	6010	18 Oct 16 11:20	KMD
Calcium - Dissolved	83.2	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Magnesium - Dissolved	51.6	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Sodium - Dissolved	85.3	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Potassium - Dissolved	7.1	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Lithium - Dissolved	< 0.1	mg/l	0.10	6010	19 Oct 16 12:59	KMD
Boron - Dissolved	0.23	mg/l	0.10	6010	18 Oct 16 14:20	KMD
Antimony - Total	< 0.001	mg/l	0.0010	6020	21 Oct 16 8:35	KMD
Arsenic - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 8:35	KMD
Barium - Total	0.0370	mg/l	0.0020	6020	21 Oct 16 8:35	KMD
Beryllium - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 8:35	KMD
Cadmium - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 8:35	KMD
Chromium - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 8:35	KMD
Cobalt - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 8:35	KMD
Lead - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 8:35	KMD
Molybdenum - Total	0.0047	mg/l	0.0020	6020	21 Oct 16 8:35	KMD
Selenium - Total	< 0.005	mg/l	0.0020	6020	21 Oct 16 14:25	KMD
Thallium - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 8:35	KMD
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020	21 Oct 16 10:23	KMD
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
 ! = Due to sample quantity * = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 3 Nov 16
Lab Number: 16-W4672
Work Order #: 82-3347
Account #: 002800
Date Sampled: 11 Oct 16 10:02
Date Received: 13 Oct 16 8:00
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
Sample Description: MW110

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0309	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Molybdenum - Dissolved	0.0045	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Selenium - Dissolved	< 0.005 ^	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by: Claudette K. Carroll ^{cc} SNV/ls

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

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! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 3 Nov 16
 Lab Number: 16-W4673
 Work Order #: 82-3347
 Account #: 002800
 Date Sampled: 11 Oct 16 11:45
 Date Received: 13 Oct 16 8:00
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
 Sample Description: MW119

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	13 Oct 16	ML
pH	* 7.2	units	N/A	SM4500 H+ B	13 Oct 16 17:00	ML
Total Suspended Solids	5	mg/l	1	I3765-85	14 Oct 16 10:26	ML
pH - Field	7.27	units	NA	SM 4500 H+ B	11 Oct 16 11:45	DJN
Temperature - Field	13.4	Degrees C	NA	SM 2550B	11 Oct 16 11:45	DJN
Total Alkalinity	372	mg/l CaCO3	20	SM2320-B	13 Oct 16 17:00	ML
Conductivity - Field	1130	umhos/cm	1	EPA 120.1	11 Oct 16 11:45	DJN
Fluoride	0.47	mg/l	0.10	SM4500-F-C	13 Oct 16 17:00	ML
Sulfate	194	mg/l	5.00	ASTM D516-07	14 Oct 16 14:09	EMS
Chloride	22.5	mg/l	1.0	SM4500-Cl-E	20 Oct 16 10:35	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	24 Oct 16 11:32	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	20 Oct 16 12:41	EV
Total Dissolved Solids	644	mg/l	5	I1750-85	13 Oct 16 14:51	ML
Calcium - Total	93.2	mg/l	1.0	6010	17 Oct 16 11:57	SZ
Magnesium - Total	57.7	mg/l	1.0	6010	17 Oct 16 11:57	SZ
Sodium - Total	91.2	mg/l	1.0	6010	17 Oct 16 11:57	SZ
Potassium - Total	8.5	mg/l	1.0	6010	17 Oct 16 11:57	SZ
Lithium - Total	< 0.1	mg/l	0.10	6010	19 Oct 16 9:59	KMD
Boron - Total	0.28	mg/l	0.10	6010	18 Oct 16 12:20	KMD
Calcium - Dissolved	89.8	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Magnesium - Dissolved	56.3	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Sodium - Dissolved	88.4	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Potassium - Dissolved	8.4	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Lithium - Dissolved	< 0.1	mg/l	0.10	6010	19 Oct 16 12:59	KMD
Boron - Dissolved	0.24	mg/l	0.10	6010	18 Oct 16 14:20	KMD
Antimony - Total	< 0.001	mg/l	0.0010	6020	21 Oct 16 8:35	KMD
Arsenic - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 8:35	KMD
Barium - Total	0.0396	mg/l	0.0020	6020	21 Oct 16 8:35	KMD
Beryllium - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 8:35	KMD
Cadmium - Total	0.0009	mg/l	0.0005	6020	21 Oct 16 8:35	KMD
Chromium - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 8:35	KMD
Cobalt - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 8:35	KMD
Lead - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 8:35	KMD
Molybdenum - Total	0.0057	mg/l	0.0020	6020	21 Oct 16 8:35	KMD
Selenium - Total	< 0.005 ^	mg/l	0.0020	6020	21 Oct 16 14:25	KMD
Thallium - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 8:35	KMD
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020	21 Oct 16 10:23	KMD
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD

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CERTIFICATION: ND # ND-00016



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Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 3 Nov 16
 Lab Number: 16-W4673
 Work Order #: 82-3347
 Account #: 002800
 Date Sampled: 11 Oct 16 11:45
 Date Received: 13 Oct 16 8:00
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
 Sample Description: MW119

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0403	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Cadmium - Dissolved	0.0009	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Lead - Dissolved	0.0007	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Molybdenum - Dissolved	0.0055	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Selenium - Dissolved	0.0050	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by: Claudette K. Carroll ^{CC} SNN/16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 3 Nov 16
 Lab Number: 16-W4674
 Work Order #: 82-3347
 Account #: 002800
 Date Sampled: 11 Oct 16 13:42
 Date Received: 13 Oct 16 8:00
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
 Sample Description: MW210

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0257	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Molybdenum - Dissolved	0.0039	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Selenium - Dissolved	< 0.005 ^	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll ^{cc} *SNV/16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 3 Nov 16
Lab Number: 16-W4675
Work Order #: 82-3347
Account #: 002800
Date Sampled: 11 Oct 16 16:11
Date Received: 13 Oct 16 8:00
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
Sample Description: MW102

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0163	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Cobalt - Dissolved	0.0059	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Molybdenum - Dissolved	0.1022	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Selenium - Dissolved	< 0.005 ^	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll ^{CC}
5/11/16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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CERTIFICATION: ND # ND-00016



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Page: 2 of 2

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 3 Nov 16
Lab Number: 16-W4676
Work Order #: 82-3347
Account #: 002800
Date Sampled: 12 Oct 16 9:49
Date Received: 13 Oct 16 8:00
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
Sample Description: MW118

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0318 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Beryllium - Dissolved	< 0.0005 mg/l		0.0005	6020	21 Oct 16 10:23	KMD
Cadmium - Dissolved	< 0.0005 mg/l		0.0005	6020	21 Oct 16 10:23	KMD
Chromium - Dissolved	< 0.002 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Cobalt - Dissolved	< 0.002 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Lead - Dissolved	< 0.0005 mg/l		0.0005	6020	21 Oct 16 10:23	KMD
Molybdenum - Dissolved	0.0712 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Selenium - Dissolved	0.0847 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Thallium - Dissolved	< 0.0005 mg/l		0.0005	6020	21 Oct 16 10:23	KMD

* Holding time exceeded

Approved by: Claudette K. Carroll SNW16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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Page: 1 of 2

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 3 Nov 16
 Lab Number: 16-W4677
 Work Order #: 82-3347
 Account #: 002800
 Date Sampled: 11 Oct 16 18:00
 Date Received: 13 Oct 16 8:00
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
 Sample Description: MW111

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	13 Oct 16	ML
pH	* 7.2	units	N/A	SM4500 H+ B	13 Oct 16 17:00	ML
Total Suspended Solids	3	mg/l	1	I3765-85	14 Oct 16 10:26	ML
pH - Field	7.16	units	NA	SM 4500 H+ B	11 Oct 16 18:00	DJN
Temperature - Field	11.4	Degrees C	NA	SM 2550B	11 Oct 16 18:00	DJN
Total Alkalinity	381	mg/l CaCO3	20	SM2320-B	13 Oct 16 17:00	ML
Conductivity - Field	3159	umhos/cm	1	EPA 120.1	11 Oct 16 18:00	DJN
Fluoride	2.29	mg/l	0.10	SM4500-F-C	13 Oct 16 17:00	ML
Sulfate	1570	mg/l	5.00	ASTM D516-07	14 Oct 16 14:30	EMS
Chloride	30.5	mg/l	1.0	SM4500-Cl-E	20 Oct 16 14:22	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	24 Oct 16 12:33	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	20 Oct 16 12:41	EV
Total Dissolved Solids	2700	mg/l	5	I1750-85	13 Oct 16 14:51	ML
Calcium - Total	148	mg/l	1.0	6010	17 Oct 16 11:57	SZ
Magnesium - Total	400	mg/l	1.0	6010	17 Oct 16 11:57	SZ
Sodium - Total	121	mg/l	1.0	6010	17 Oct 16 11:57	SZ
Potassium - Total	10.0	mg/l	1.0	6010	17 Oct 16 11:57	SZ
Lithium - Total	0.15	mg/l	0.10	6010	19 Oct 16 10:59	KMD
Boron - Total	8.12	mg/l	0.10	6010	18 Oct 16 12:20	KMD
Calcium - Dissolved	141	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Magnesium - Dissolved	383	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Sodium - Dissolved	122	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Potassium - Dissolved	10.4	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Lithium - Dissolved	0.15	mg/l	0.10	6010	19 Oct 16 12:59	KMD
Boron - Dissolved	7.68	mg/l	0.10	6010	18 Oct 16 14:20	KMD
Antimony - Total	< 0.001	mg/l	0.0010	6020	21 Oct 16 10:23	KMD
Arsenic - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Barium - Total	0.0212	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Beryllium - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Cadmium - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Chromium - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Cobalt - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Lead - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Molybdenum - Total	0.0772	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Selenium - Total	0.0874	mg/l	0.0020	6020	21 Oct 16 14:25	KMD
Thallium - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020	21 Oct 16 10:23	KMD
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD

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CERTIFICATION: ND # ND-00016



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Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 3 Nov 16
 Lab Number: 16-W4677
 Work Order #: 82-3347
 Account #: 002800
 Date Sampled: 11 Oct 16 18:00
 Date Received: 13 Oct 16 8:00
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
 Sample Description: MW111

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0213 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Beryllium - Dissolved	< 0.0005 mg/l		0.0005	6020	21 Oct 16 10:23	KMD
Cadmium - Dissolved	< 0.0005 mg/l		0.0005	6020	21 Oct 16 10:23	KMD
Chromium - Dissolved	< 0.002 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Cobalt - Dissolved	< 0.002 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Lead - Dissolved	< 0.0005 mg/l		0.0005	6020	21 Oct 16 10:23	KMD
Molybdenum - Dissolved	0.0775 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Selenium - Dissolved	0.0953 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Thallium - Dissolved	< 0.0005 mg/l		0.0005	6020	21 Oct 16 10:23	KMD

* Holding time exceeded

Approved by:

Claudette K. Carroll ^{cc} *5/11/16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 1 of 2

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 3 Nov 16
 Lab Number: 16-W4678
 Work Order #: 82-3347
 Account #: 002800
 Date Sampled: 12 Oct 16 7:53
 Date Received: 13 Oct 16 8:00
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
 Sample Description: MW117

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	13 Oct 16	ML
pH	* 7.2	units	N/A	SM4500 H+ B	13 Oct 16 17:00	ML
Total Suspended Solids	29	mg/l	1	I3765-85	14 Oct 16 10:26	ML
pH - Field	7.03	units	NA	SM 4500 H+ B	12 Oct 16 7:53	DJN
Temperature - Field	13.2	Degrees C	NA	SM 2550B	12 Oct 16 7:53	DJN
Total Alkalinity	388	mg/l CaCO3	20	SM2320-B	13 Oct 16 17:00	ML
Conductivity - Field	8017	umhos/cm	1	EPA 120.1	12 Oct 16 7:53	DJN
Fluoride	0.27	mg/l	0.10	SM4500-F-C	13 Oct 16 17:00	ML
Sulfate	6130	mg/l	5.00	ASTM D516-07	14 Oct 16 14:30	EMS
Chloride	46.4	mg/l	1.0	SM4500-Cl-E	20 Oct 16 14:22	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	24 Oct 16 12:33	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	20 Oct 16 12:41	EV
Total Dissolved Solids	7880	mg/l	5	I1750-85	13 Oct 16 14:51	ML
Calcium - Total	422	mg/l	1.0	6010	17 Oct 16 12:57	SZ
Magnesium - Total	1100	mg/l	1.0	6010	17 Oct 16 12:57	SZ
Sodium - Total	585	mg/l	1.0	6010	17 Oct 16 12:57	SZ
Potassium - Total	31.8	mg/l	1.0	6010	17 Oct 16 12:57	SZ
Lithium - Total	< 0.2 @	mg/l	0.10	6010	19 Oct 16 10:59	KMD
Boron - Total	8.35	mg/l	0.10	6010	18 Oct 16 12:20	KMD
Calcium - Dissolved	405	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Magnesium - Dissolved	995	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Sodium - Dissolved	550	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Potassium - Dissolved	30.2	mg/l	1.0	6010	21 Oct 16 9:19	SZ
Lithium - Dissolved	< 0.2 @	mg/l	0.10	6010	19 Oct 16 12:59	KMD
Boron - Dissolved	8.20	mg/l	0.10	6010	18 Oct 16 14:20	KMD
Antimony - Total	< 0.001	mg/l	0.0010	6020	21 Oct 16 10:23	KMD
Arsenic - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Barium - Total	0.0414	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Beryllium - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Cadmium - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Chromium - Total	0.0021	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Cobalt - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Lead - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Molybdenum - Total	0.0050	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Selenium - Total	0.0199	mg/l	0.0020	6020	21 Oct 16 14:25	KMD
Thallium - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020	21 Oct 16 10:23	KMD
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD

RL = Method Reporting Limit

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 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 2 of 2

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 24 Oct 16
Lab Number: 16-W4679
Work Order #: 82-3347
Account #: 002800
Date Sampled: 12 Oct 16 13:15
Date Received: 13 Oct 16 8:00
Sampled By: MVTl Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
Sample Description: MW103

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0265 mg/l		0.0020	6020	3 Nov 16 9:04	CC
Beryllium - Dissolved	< 0.0005 mg/l		0.0005	6020	21 Oct 16 10:23	KMD
Cadmium - Dissolved	< 0.0005 mg/l		0.0005	6020	21 Oct 16 10:23	KMD
Chromium - Dissolved	< 0.002 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Cobalt - Dissolved	< 0.002 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Lead - Dissolved	< 0.0005 mg/l		0.0005	6020	21 Oct 16 10:23	KMD
Molybdenum - Dissolved	0.0274 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Selenium - Dissolved	0.0662 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Thallium - Dissolved	< 0.0005 mg/l		0.0005	6020	21 Oct 16 10:23	KMD

* Holding time exceeded

Approved by: Claudette K. Carroll ^{CC} SNV16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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CERTIFICATION: ND # ND-00016



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Page: 2 of 2

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 3 Nov 16
Lab Number: 16-W4680
Work Order #: 82-3347
Account #: 002800
Date Sampled: 12 Oct 16 11:23
Date Received: 13 Oct 16 8:00
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
Sample Description: MW109

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Barium - Dissolved	0.0222	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Molybdenum - Dissolved	0.0269	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Selenium - Dissolved	0.0806	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD

* Holding time exceeded

Approved by:

C
Claudette K. Carroll SNV16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 2 of 2

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 3 Nov 16
Lab Number: 16-W4681
Work Order #: 82-3347
Account #: 002800
Date Sampled: 11 Oct 16
Date Received: 13 Oct 16 8:00
Sampled By: MVTl Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
Sample Description: Dup 1

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Chromium - Dissolved	< 0.002 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Cobalt - Dissolved	< 0.002 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Lead - Dissolved	< 0.0005 mg/l		0.0005	6020	21 Oct 16 10:23	KMD
Molybdenum - Dissolved	0.0724 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Selenium - Dissolved	0.0908 mg/l		0.0020	6020	21 Oct 16 10:23	KMD
Thallium - Dissolved	< 0.0005 mg/l		0.0005	6020	21 Oct 16 10:23	KMD

* Holding time exceeded

Approved by: Claudette K. Carroll ^{CC} S NVTl
Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 1 of 2

Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 3 Nov 16
 Lab Number: 16-W4682
 Work Order #: 82-3347
 Account #: 002800
 Date Sampled: 12 Oct 16
 Date Received: 13 Oct 16 8:00
 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
 Sample Description: Field Blank

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	13 Oct 16	ML
pH	* 6.0	units	N/A	SM4500 H+ B	13 Oct 16 17:00	ML
Total Suspended Solids	< 1	mg/l	1	I3765-85	14 Oct 16 13:24	ML
Total Alkalinity	< 20	mg/l CaCO3	20	SM2320-B	13 Oct 16 17:00	ML
Fluoride	< 0.1	mg/l	0.10	SM4500-F-C	13 Oct 16 17:00	ML
Sulfate	< 5	mg/l	5.00	ASTM D516-07	14 Oct 16 14:30	EMS
Chloride	< 1	mg/l	1.0	SM4500-Cl-E	20 Oct 16 14:22	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	24 Oct 16 12:33	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	20 Oct 16 12:41	EV
Total Dissolved Solids	< 5	mg/l	5	I1750-85	13 Oct 16 14:51	ML
Calcium - Total	< 1	mg/l	1.0	6010	17 Oct 16 12:57	SZ
Magnesium - Total	< 1	mg/l	1.0	6010	17 Oct 16 12:57	SZ
Sodium - Total	< 1	mg/l	1.0	6010	17 Oct 16 12:57	SZ
Potassium - Total	< 1	mg/l	1.0	6010	17 Oct 16 12:57	SZ
Lithium - Total	< 0.1	mg/l	0.10	6010	19 Oct 16 10:59	KMD
Boron - Total	< 0.1	mg/l	0.10	6010	18 Oct 16 12:20	KMD
Calcium - Dissolved	< 1	mg/l	1.0	6010	21 Oct 16 10:19	SZ
Magnesium - Dissolved	< 1	mg/l	1.0	6010	21 Oct 16 10:19	SZ
Sodium - Dissolved	< 1	mg/l	1.0	6010	21 Oct 16 10:19	SZ
Potassium - Dissolved	< 1	mg/l	1.0	6010	21 Oct 16 10:19	SZ
Lithium - Dissolved	< 0.1	mg/l	0.10	6010	19 Oct 16 12:59	KMD
Boron - Dissolved	< 0.1	mg/l	0.10	6010	18 Oct 16 15:20	KMD
Antimony - Total	< 0.001	mg/l	0.0010	6020	21 Oct 16 10:23	KMD
Arsenic - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Barium - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Beryllium - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Cadmium - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Chromium - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Cobalt - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Lead - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Molybdenum - Total	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Selenium - Total	< 0.005	mg/l	0.0020	6020	21 Oct 16 14:25	KMD
Thallium - Total	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020	21 Oct 16 10:23	KMD
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Barium - Dissolved	< 0.002	mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020	21 Oct 16 10:23	KMD

RL = Method Reporting Limit

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CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 3 Nov 16
Lab Number: 16-W4682
Work Order #: 82-3347
Account #: 002800
Date Sampled: 12 Oct 16
Date Received: 13 Oct 16 8:00
Sampled By: MVTl Field Services

Project Name: MDU Lewis & Clark CCR GW Oct 2016
Sample Description: Field Blank

Temp at Receipt: 1.8C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Chromium - Dissolved	< 0.002 mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Cobalt - Dissolved	< 0.002 mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Lead - Dissolved	< 0.0005 mg/l	0.0005	6020	21 Oct 16 10:23	KMD
Molybdenum - Dissolved	< 0.002 mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Selenium - Dissolved	< 0.005 ^ mg/l	0.0020	6020	21 Oct 16 10:23	KMD
Thallium - Dissolved	< 0.0005 mg/l	0.0005	6020	21 Oct 16 10:23	KMD

* Holding time exceeded

^ Elevated result due to instrument performance at the lower limit of quantification (LLOQ).

Approved by:

Claudette K. Carroll ^{CC} *SNV16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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The reporting limit was elevated for any analyte requiring a dilution as coded below:

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CERTIFICATION: ND # ND-00016



Laboratories, Inc.

2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name: MDU Lewis and Clark CCR Groundwater October 2016				Name of Sampler(s): <i>Darren Nieswaag</i>				
Report To: MDU Attn: Samantha Marshall Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-222-7829			Carbon Copy: Attn: Address:			Work Order Number: <i>82-3347</i>		

Sample Information						Bottle Type			Field Parameters			Analysis	
Lab Number	Sample ID	Date	Time	Sample Type	Gradient	500 ml HNO ₃ 1 liter	500 ml HNO ₃ (filtered)			Field Temperature °C	Field Spec. Cond.	Field pH	Analysis Required
<i>W4672</i>	MW110	<i>11 Oct 16</i>	<i>1002</i>	GW	Up	X X X				<i>9.74</i>	<i>1058</i>	<i>7.27</i>	MDU CCR List with TSS and Dissolved CCR Metals. No RadChem.
<i>W4673</i>	MW119	<i>11 Oct 16</i>	<i>1145</i>	GW	Up	X X X				<i>13.44</i>	<i>1130</i>	<i>7.27</i>	
<i>W4674</i>	MW210	<i>11 Oct 16</i>	<i>1342</i>	GW	Up	X X X				<i>10.60</i>	<i>1411</i>	<i>7.55</i>	
<i>W4675</i>	MW102	<i>11 Oct 16</i>	<i>1611</i>	GW	Down	X X X				<i>10.68</i>	<i>6518</i>	<i>6.92</i>	
<i>W4676</i>	MW118	<i>12 Oct 16</i>	<i>0949</i>	GW	Down	X X X				<i>13.64</i>	<i>1699</i>	<i>7.41</i>	
<i>W4677</i>	MW111	<i>11 Oct 16</i>	<i>1800</i>	GW	Down	X X X				<i>11.38</i>	<i>3159</i>	<i>7.16</i>	
<i>W4678</i>	MW117	<i>12 Oct 16</i>	<i>0753</i>	GW	Down	X X X				<i>13.21</i>	<i>8017</i>	<i>7.03</i>	
<i>W4679</i>	MW103	<i>12 Oct 16</i>	<i>1315</i>	GW		X X X				<i>11.87</i>	<i>1562</i>	<i>7.26</i>	
<i>W4680</i>	MW109	<i>12 Oct 16</i>	<i>1123</i>	GW		X X X				<i>10.20</i>	<i>1603</i>	<i>7.24</i>	
<i>W4681</i>	Dup 1	<i>11 Oct 16</i>	NA	W		X X X				NA	NA	NA	
<i>W4682</i>	Field Blank (FB)	<i>12 Oct 16</i>	NA	W		X X X				NA	NA	NA	

Comments:

	Transferred by:	Sample Condition	Date/Time	Received by:	Sample Condition	Date/Time	° C
1	<i>[Signature]</i>	<i>walkin 2</i>	<i>12 Oct 16 1757</i>	<i>C. Jackson</i>		<i>13 Oct 16 0800</i>	<i>ROE 1.8</i>
2							<i>TM 588</i>
3							<i>12 Oct 16 1757</i>



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CASE NARRATIVE

MVTL Lab Reference No/SDG: 201682-3352
IML Lab Reference No/SDG: S1610228
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – October 2016 Event
MVTL Laboratory Identifications: 16-W4685 through 16-W4695
Page 1 of 2

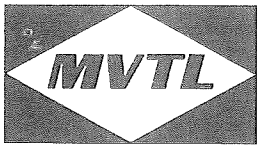
MDU Sample Identification	IML Sample Identification	MVTL Laboratory #
MW110	S1610228-001	16-W4685
MW119	S1610228-002	16-W4686
MW210	S1610228-003	16-W4687
MW102	S1610228-004	16-W4688
MW118	S1610228-005	16-W4689
MW111	S1610228-006	16-W4690
MW117	S1610228-007	16-W4691
MW103	S1610228-008	16-W4692
MW109	S1610228-009	16-W4693
Dup 1	S1610228-010	16-W4694
Field Blank (FB)	S1610228-011	16-W4695

I. RECEIPT

- All samples were received at the laboratory on 13 Oct 2016 at 0800.
- Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
- Samples were received on ice and evidence of cooling had begun.
 - Temperature of samples upon receipt was 1.8°C.
- No other exceptions on sample receipt were encountered on this sample set unless noted here.
- All samples requiring radiochemistry analysis were sent via courier to Inter-Mountain Labs (IML) for analysis there. Samples were received at IML on 17 Oct 2016.
 - All samples were properly preserved unless noted on the individual analytical laboratory report or on the IML Case Narrative.

II. HOLDING TIMES

- All holding times were met for both preparation and analysis unless noted on the individual analytical laboratory report or on the IML Case Narrative.



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CASE NARRATIVE

MVTl Lab Reference No/SDG: 201682-3352
IML Lab Reference No/SDG: S1610228
Client: Montana Dakota Utilities
Location: MDU Lewis & Clark
Project Identification: CCR Groundwater – October 2016 Event
MVTl Laboratory Identifications: 16-W4685 through 16-W4695
Page 2 of 2

III. METHODS

- Approved methodology was followed for all sample analyses.
 - Please refer to the IML Case Narrative for more information regarding methodology.

IV. ANALYSIS

- All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted on the individual analytical laboratory report or on the IML Case Narrative.

All laboratory data has been approved by MVTL Laboratories.

SIGNED: Claudette Carroll **DATE:** 29 NOV 16
Claudette Carroll - MVTL Bismarck Laboratory Manager



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 29 Nov 16
Lab Number: 16-W4686
Work Order #: 82-3352
Account #: 002800
Date Sampled: 11 Oct 16 11:45
Date Received: 13 Oct 16 8:00
Sampled By: MVTL Field Services

Project Name: MDU L & C CCR Radiochem Oct 2016
Sample Description: MW119

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.27	units	NA	SM 4500 H+ B	11 Oct 16 11:45	DJN
Temperature - Field	13.4	Degrees C	NA	SM 2550B	11 Oct 16 11:45	DJN
Conductivity - Field	1130	umhos/cm	1	EPA 120.1	11 Oct 16 11:45	DJN
Radium 226	See Attached Report				31 Oct 16	OL
Radium 228	See Attached Report				14 Nov 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Claudette K. Carroll

C
29 Nov 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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CERTIFICATION: ND # ND-00016



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Page: 1 of 1

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 29 Nov 16
Lab Number: 16-W4687
Work Order #: 82-3352
Account #: 002800
Date Sampled: 11 Oct 16 13:42
Date Received: 13 Oct 16 8:00
Sampled By: MVTL Field Services

Project Name: MDU L & C CCR Radiochem Oct 2016
Sample Description: MW210

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.55	units	NA	SM 4500 H+ B	11 Oct 16 13:42	DJN
Temperature - Field	10.6	Degrees C	NA	SM 2550B	11 Oct 16 13:42	DJN
Conductivity - Field	1411	umhos/cm	1	EPA 120.1	11 Oct 16 13:42	DJN
Radium 226	See Attached Report				31 Oct 16	OL
Radium 228	See Attached Report				14 Nov 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Claudette K. Carroll

*CC
29 Nov 16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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CERTIFICATION: ND # ND-00016



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Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 29 Nov 16
 Lab Number: 16-W4688
 Work Order #: 82-3352
 Account #: 002800
 Date Sampled: 11 Oct 16 16:11
 Date Received: 13 Oct 16 8:00
 Sampled By: MVTL Field Services

Project Name: MDU L & C CCR Radiochem Oct 2016
 Sample Description: MW102

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	6.92	units	NA	SM 4500 H+ B	11 Oct 16 16:11	DJN
Temperature - Field	10.7	Degrees C	NA	SM 2550B	11 Oct 16 16:11	DJN
Conductivity - Field	6518	umhos/cm	1	EPA 120.1	11 Oct 16 16:11	DJN
Radium 226	See Attached Report				31 Oct 16	OL
Radium 228	See Attached Report				16 Nov 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

CC
 Claudette K. Carroll 29 NOV 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

⊙ = Due to sample matrix # = Due to concentration of other analytes
 ! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



MINNESOTA VALLEY TESTING LABORATORIES, INC.

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Samantha Marshall
 Montana Dakota Utilities
 400 N. 4th
 Bismarck ND 58501

Report Date: 29 Nov 16
 Lab Number: 16-W4689
 Work Order #: 82-3352
 Account #: 002800
 Date Sampled: 12 Oct 16 9:49
 Date Received: 13 Oct 16 8:00
 Sampled By: MVTL Field Services

Project Name: MDU L & C CCR Radiochem Oct 2016
 Sample Description: MW118

Temp at Receipt: 1.8C

	As Received Result	units	Method RL	Method Reference	Date Analyzed	Time	Analyst
pH - Field	7.41	units	NA	SM 4500 H+ B	12 Oct 16	9:49	DJN
Temperature - Field	13.6	Degrees C	NA	SM 2550B	12 Oct 16	9:49	DJN
Conductivity - Field	1699	umhos/cm	1	EPA 120.1	12 Oct 16	9:49	DJN
Radium 226	See Attached Report				31 Oct 16		OL
Radium 228	See Attached Report				16 Nov 16		OL

OL = Analysis performed by an Outside Laboratory.

Approved by: Claudette K. Carroll ^{CC} 29 NOV 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

- ⊙ = Due to sample matrix
- ! = Due to sample quantity
- # = Due to concentration of other analytes
- + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 29 Nov 16
Lab Number: 16-W4691
Work Order #: 82-3352
Account #: 002800
Date Sampled: 12 Oct 16 7:53
Date Received: 13 Oct 16 8:00
Sampled By: MVTL Field Services

Project Name: MDU L & C CCR Radiochem Oct 2016
Sample Description: MW117

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed		Analyst
pH - Field	7.03	units	NA	SM 4500 H+ B	12 Oct 16	7:53	DJN
Temperature - Field	13.2	Degrees C	NA	SM 2550B	12 Oct 16	7:53	DJN
Conductivity - Field	8017	umhos/cm	1	EPA 120.1	12 Oct 16	7:53	DJN
Radium 226	See Attached Report				31 Oct 16		OL
Radium 228	See Attached Report				16 Nov 16		OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Cc
Claudette K. Carroll

29 Nov 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 29 Nov 16
Lab Number: 16-W4692
Work Order #: 82-3352
Account #: 002800
Date Sampled: 12 Oct 16 13:15
Date Received: 13 Oct 16 8:00
Sampled By: MVTL Field Services

Project Name: MDU L & C CCR Radiochem Oct 2016
Sample Description: MW103

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.26	units	NA	SM 4500 H+ B	12 Oct 16 13:15	DJN
Temperature - Field	11.9	Degrees C	NA	SM 2550B	12 Oct 16 13:15	DJN
Conductivity - Field	1562	umhos/cm	1	EPA 120.1	12 Oct 16 13:15	DJN
Radium 226	See Attached Report				31 Oct 16	OL
Radium 228	See Attached Report				16 Nov 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

CC
Claudette K. Carroll 29 Nov 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 1 of 1

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 29 Nov 16
Lab Number: 16-W4693
Work Order #: 82-3352
Account #: 002800
Date Sampled: 12 Oct 16 11:23
Date Received: 13 Oct 16 8:00
Sampled By: MVTL Field Services

Project Name: MDU L & C CCR Radiochem Oct 2016
Sample Description: MW109

Temp at Receipt: 1.8C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.24	units	NA	SM 4500 H+ B	12 Oct 16 11:23	DJN
Temperature - Field	10.2	Degrees C	NA	SM 2550B	12 Oct 16 11:23	DJN
Conductivity - Field	1603	umhos/cm	1	EPA 120.1	12 Oct 16 11:23	DJN
Radium 226	See Attached Report				31 Oct 16	OL
Radium 228	See Attached Report				16 Nov 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Claudette K. Carroll ^{CC} *29 Nov 16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 29 Nov 16
Lab Number: 16-W4694
Work Order #: 82-3352
Account #: 002800
Date Sampled: 11 Oct 16
Date Received: 13 Oct 16 8:00
Sampled By: MVTL Field Services

Project Name: MDU L & C CCR Radiochem Oct 2016
Sample Description: Dup 1

Temp at Receipt: 1.8C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Radium 226	See Attached Report			31 Oct 16	OL
Radium 228	See Attached Report			16 Nov 16	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Claudette K. Carroll

*CC
29 Nov 16*

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 1 of 1

Samantha Marshall
Montana Dakota Utilities
400 N. 4th
Bismarck ND 58501

Report Date: 29 Nov 16
Lab Number: 16-W4695
Work Order #: 82-3352
Account #: 002800
Date Sampled: 12 Oct 16
Date Received: 13 Oct 16 8:00
Sampled By: MVTL Field Services

Project Name: MDU L & C CCR Radiochem Oct 2016
Sample Description: Field Blank

Temp at Receipt: 1.8C

Table with 6 columns: As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include Radium 226 and Radium 228, both with 'See Attached Report' results and 'OL' analysts.

OL = Analysis performed by an Outside Laboratory.

Approved by: Claudette K. Carroll (handwritten signature) CC 29 Nov 16

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



Date: 11/23/2016

CLIENT: MVTL Laboratories, Inc.
Project: 201682-3352
Lab Order: S1610228

CASE NARRATIVE
Report ID: S1610228001

Samples 16-W4685 MW110, 16-W4686 MW119, 16-W4687 MW210, 16-W4688 MW102, 16-W4689 MW118, 16-W4690 MW111, 16-W4691 MW117, 16-W4692 MW103, 16-W4693 MW109, 16-W4694 Dup 1, and 16-W4695 Field Blank were received on October 17, 2016.

All samples were received and analyzed within the EPA recommended holding times, except those noted below in this case narrative. Samples were analyzed using the methods outlined in the following references:

"Standard Methods For The Examination of Water and Wastewater", approved method versions
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition
40 CFR Parts 136 and 141
40 CFR Part 50, Appendices B, J, L, and O
Methods indicated in the Methods Update Rule published in the Federal Register Friday, May 18, 2012
ASTM approved and recognized standards

All Quality Control parameters met the acceptance criteria defined by EPA and Inter-Mountain Laboratories except as indicated in this case narrative.

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 11/23/2016
Report ID S1610228001

ProjectName: 201682-3352
Lab ID: S1610228-001
ClientSample ID: 16-W4685 MW110
COC: 201682-3352

WorkOrder: S1610228
CollectionDate: 10/11/2016 10:02:00 AM
DateReceived: 10/17/2016 10:33:00 AM
FieldSampler:
Matrix: Water

Comments

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Radionuclides - Total, Radium 226, Radium 226 Precision (±), Radium 228, and Radium 228 Precision (±).

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
M Value exceeds Monthly Ave or MCL or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

- C Calculated Value
H Holding times for preparation or analysis exceeded
L Analyzed by another laboratory
ND Not Detected at the Reporting Limit
S Spike Recovery outside accepted recovery limits

Reviewed by: [Signature]
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 11/23/2016
Report ID S1610228001

ProjectName: 201682-3352
Lab ID: S1610228-002
ClientSample ID: 16-W4686 MW119
COC: 201682-3352

WorkOrder: S1610228
CollectionDate: 10/11/2016 11:45:00 AM
DateReceived: 10/17/2016 10:33:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.17	pCi/L		0.2	SM 7500 Ra-B	10/31/2016 1831	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	10/31/2016 1831	MB
Radium 228	-4.9	pCi/L		2	Ga-Tech	11/14/2016 857	MB
Radium 228 Precision (±)	3.2	pCi/L			Ga-Tech	11/14/2016 857	MB

These results apply only to the samples tested.

RL - Reporting Limit

- | | | |
|--------------------|--|--|
| Qualifiers: | B Analyte detected in the associated Method Blank | C Calculated Value |
| | E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| | J Analyte detected below quantitation limits | L Analyzed by another laboratory |
| | M Value exceeds Monthly Ave or MCL or is less than LCL | ND Not Detected at the Reporting Limit |
| | O Outside the Range of Dilutions | S Spike Recovery outside accepted recovery limits |
| | X Matrix Effect | |

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 11/23/2016
Report ID S1610228001

ProjectName: 201682-3352
Lab ID: S1610228-003
ClientSample ID: 16-W4687 MW210
COC: 201682-3352

WorkOrder: S1610228
CollectionDate: 10/11/2016 1:42:00 PM
DateReceived: 10/17/2016 10:33:00 AM
FieldSampler:
Matrix: Water

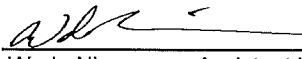
Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.3	pCi/L		0.2	SM 7500 Ra-B	10/31/2016 1831	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	10/31/2016 1831	MB
Radium 228	-4.3	pCi/L		2	Ga-Tech	11/14/2016 1202	MB
Radium 228 Precision (±)	3.1	pCi/L			Ga-Tech	11/14/2016 1202	MB

These results apply only to the samples tested.

RL - Reporting Limit

- | | | |
|--------------------|--|--|
| Qualifiers: | B Analyte detected in the associated Method Blank | C Calculated Value |
| | E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| | J Analyte detected below quantitation limits | L Analyzed by another laboratory |
| | M Value exceeds Monthly Ave or MCL or is less than LCL | ND Not Detected at the Reporting Limit |
| | O Outside the Range of Dilutions | S Spike Recovery outside accepted recovery limits |
| | X Matrix Effect | |

Reviewed by: 
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 11/23/2016
Report ID S1610228001

ProjectName: 201682-3352
Lab ID: S1610228-004
ClientSample ID: 16-W4688 MW102
COC: 201682-3352

WorkOrder: S1610228
CollectionDate: 10/11/2016 4:11:00 PM
DateReceived: 10/17/2016 10:33:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.7	pCi/L		0.2	SM 7500 Ra-B	10/31/2016 1831	MB
Radium 226 Precision (±)	0.2	pCi/L			SM 7500 Ra-B	10/31/2016 1831	MB
Radium 228	0.5	pCi/L		2	Ga-Tech	11/16/2016 600	MB
Radium 228 Precision (±)	3.2	pCi/L			Ga-Tech	11/16/2016 600	MB

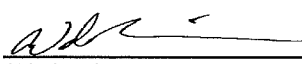
These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- J Analyte detected below quantitation limits
- M Value exceeds Monthly Ave or MCL or is less than LCL
- O Outside the Range of Dilutions
- X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by: 
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 11/23/2016
Report ID S1610228001

ProjectName: 201682-3352
Lab ID: S1610228-005
ClientSample ID: 16-W4689 MW118
COC: 201682-3352

WorkOrder: S1610228
CollectionDate: 10/12/2016 9:49:00 AM
DateReceived: 10/17/2016 10:33:00 AM
FieldSampler:
Matrix: Water

Comments

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Radionuclides - Total, Radium 226, Radium 226 Precision (±), Radium 228, and Radium 228 Precision (±).

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers: B Analyte detected in the associated Method Blank, E Value above quantitation range, J Analyte detected below quantitation limits, M Value exceeds Monthly Ave or MCL or is less than LCL, O Outside the Range of Dilutions, X Matrix Effect, C Calculated Value, H Holding times for preparation or analysis exceeded, L Analyzed by another laboratory, ND Not Detected at the Reporting Limit, S Spike Recovery outside accepted recovery limits

Reviewed by: [Signature]
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 11/23/2016
Report ID S1610228001

ProjectName: 201682-3352
Lab ID: S1610228-006
ClientSample ID: 16-W4690 MW111
COC: 201682-3352

WorkOrder: S1610228
CollectionDate: 10/11/2016 6:00:00 PM
DateReceived: 10/17/2016 10:33:00 AM
FieldSampler:
Matrix: Water

Comments

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Radionuclides - Total, Radium 226, Radium 226 Precision (±), Radium 228, and Radium 228 Precision (±).

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
M Value exceeds Monthly Ave or MCL or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

- C Calculated Value
H Holding times for preparation or analysis exceeded
L Analyzed by another laboratory
ND Not Detected at the Reporting Limit
S Spike Recovery outside accepted recovery limits

Reviewed by: [Signature]
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 11/23/2016
Report ID S1610228001

ProjectName: 201682-3352
Lab ID: S1610228-007
ClientSample ID: 16-W4691 MW117
COC: 201682-3352

WorkOrder: S1610228
CollectionDate: 10/12/2016 7:53:00 AM
DateReceived: 10/17/2016 10:33:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	1.0	pCi/L		0.2	SM 7500 Ra-B	10/31/2016 2307	MB
Radium 226 Precision (±)	0.2	pCi/L			SM 7500 Ra-B	10/31/2016 2307	MB
Radium 228	1.9	pCi/L		2	Ga-Tech	11/16/2016 1514	MB
Radium 228 Precision (±)	3.1	pCi/L			Ga-Tech	11/16/2016 1514	MB

These results apply only to the samples tested.

RL - Reporting Limit

- | | | |
|--------------------|--|--|
| Qualifiers: | B Analyte detected in the associated Method Blank | C Calculated Value |
| | E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| | J Analyte detected below quantitation limits | L Analyzed by another laboratory |
| | M Value exceeds Monthly Ave or MCL or is less than LCL | ND Not Detected at the Reporting Limit |
| | O Outside the Range of Dilutions | S Spike Recovery outside accepted recovery limits |
| | X Matrix Effect | |

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 11/23/2016
Report ID S1610228001

ProjectName: 201682-3352
Lab ID: S1610228-008
ClientSample ID: 16-W4692 MW103
COC: 201682-3352

WorkOrder: S1610228
CollectionDate: 10/12/2016 1:15:00 PM
DateReceived: 10/17/2016 10:33:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init
Radionuclides - Total						
Radium 226	0.1	pCi/L		0.2	SM 7500 Ra-B	10/31/2016 2307 MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	10/31/2016 2307 MB
Radium 228	0.4	pCi/L		2	Ga-Tech	11/16/2016 1820 MB
Radium 228 Precision (±)	2.9	pCi/L			Ga-Tech	11/16/2016 1820 MB

These results apply only to the samples tested.

RL - Reporting Limit

- | | | |
|--------------------|--|--|
| Qualifiers: | B Analyte detected in the associated Method Blank | C Calculated Value |
| | E Value above quantitation range | H Holding times for preparation or analysis exceeded |
| | J Analyte detected below quantitation limits | L Analyzed by another laboratory |
| | M Value exceeds Monthly Ave or MCL or is less than LCL | ND Not Detected at the Reporting Limit |
| | O Outside the Range of Dilutions | S Spike Recovery outside accepted recovery limits |
| | X Matrix Effect | |

Reviewed by: Wade Nieuwsma
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 11/23/2016
Report ID S1610228001

ProjectName: 201682-3352
Lab ID: S1610228-009
ClientSample ID: 16-W4693 MW109
COC: 201682-3352

WorkOrder: S1610228
CollectionDate: 10/12/2016 11:23:00 AM
DateReceived: 10/17/2016 10:33:00 AM
FieldSampler:
Matrix: Water

Comments

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Radionuclides - Total, Radium 226, Radium 226 Precision (±), Radium 228, and Radium 228 Precision (±).

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers: B Analyte detected in the associated Method Blank, E Value above quantitation range, J Analyte detected below quantitation limits, M Value exceeds Monthly Ave or MCL or is less than LCL, O Outside the Range of Dilutions, X Matrix Effect, C Calculated Value, H Holding times for preparation or analysis exceeded, L Analyzed by another laboratory, ND Not Detected at the Reporting Limit, S Spike Recovery outside accepted recovery limits

Reviewed by: [Signature]
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 11/23/2016
Report ID S1610228001

ProjectName: 201682-3352
Lab ID: S1610228-010
ClientSample ID: 16-W4694 Dup 1
COC: 201682-3352

WorkOrder: S1610228
CollectionDate: 10/11/2016
DateReceived: 10/17/2016 10:33:00 AM
FieldSampler:
Matrix: Water

Comments

Table with 7 columns: Analyses, Result, Units, Qual, RL, Method, Date Analyzed/Init. Rows include Radionuclides - Total, Radium 226, Radium 226 Precision (±), Radium 228, and Radium 228 Precision (±).

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers: B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
M Value exceeds Monthly Ave or MCL or is less than LCL
O Outside the Range of Dilutions
X Matrix Effect

- C Calculated Value
H Holding times for preparation or analysis exceeded
L Analyzed by another laboratory
ND Not Detected at the Reporting Limit
S Spike Recovery outside accepted recovery limits

Reviewed by: [Signature]
Wade Nieuwsma, Assistant Laboratory Manager



Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 11/23/2016
Report ID S1610228001

ProjectName: 201682-3352
Lab ID: S1610228-011
ClientSample ID: 16-W4695 Field Blank
COC: 201682-3352

WorkOrder: S1610228
CollectionDate: 10/12/2016
DateReceived: 10/17/2016 10:33:00 AM
FieldSampler:
Matrix: Water

Comments

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
Radionuclides - Total							
Radium 226	0.1	pCi/L		0.2	SM 7500 Ra-B	10/31/2016 2307	MB
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	10/31/2016 2307	MB
Radium 228	3.9	pCi/L		2	Ga-Tech	11/17/2016 333	MB
Radium 228 Precision (±)	3.4	pCi/L			Ga-Tech	11/17/2016 333	MB

These results apply only to the samples tested.

RL - Reporting Limit

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - M Value exceeds Monthly Ave or MCL or is less than LCL
 - O Outside the Range of Dilutions
 - X Matrix Effect

- C Calculated Value
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- ND Not Detected at the Reporting Limit
- S Spike Recovery outside accepted recovery limits

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager



ANALYTICAL QC SUMMARY REPORT

CLIENT: MVTL Laboratories, Inc.
 Work Order: S1610228
 Project: 201682-3352

Date: 11/23/2016
 Report ID: S1610228001

Radium 228 by Ga/Tech		Sample Type	MBLK		Units: pCi/L				
MB-396 (11/15/16 10:41)	Analyte	RunNo: 140855	PrepDate: 10/26/16 14:00	BatchID: 12533					
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Total Radium 228		ND	1						

MB-397 (11/15/16 14:37)	Analyte	RunNo: 141068	PrepDate: 11/02/16 14:00	BatchID: 12558					
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Total Radium 228		ND	1						

Radium 228 by Ga/Tech		Sample Type	LCS		Units: pCi/L				
LCS-396 (11/11/16 16:26)	Analyte	RunNo: 140855	PrepDate: 10/26/16 14:00	BatchID: 12533					
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Total Radium 228		38	1	39.1		98.0	61.3 - 120		

LCS-397 (11/15/16 17:41)	Analyte	RunNo: 141068	PrepDate: 11/02/16 14:00	BatchID: 12558					
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Total Radium 228		39	1	39.1		98.6	61.3 - 120		

Radium 228 by Ga/Tech		Sample Type	MS		Units: pCi/L				
MS-396 (11/11/16 22:35)	Analyte	RunNo: 140855	PrepDate: 10/26/16 14:00	BatchID: 12533					
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Total Radium 228		37	1	39.1	ND	93.3	64.3 - 120		

MS-397 (11/15/16 23:50)	Analyte	RunNo: 141068	PrepDate: 11/02/16 14:00	BatchID: 12558					
		Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual	
Total Radium 228		43	1	39.1	ND	110	61.3 - 120		

Radium 228 by Ga/Tech		Sample Type	MSD		Units: pCi/L				
MSD-396 (11/12/16 01:39)	Analyte	RunNo: 140855	PrepDate: 10/26/16 14:00	BatchID: 12533					
		Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
Total Radium 228		40	1	37	8.14	101	20		

MSD-397 (11/16/16 02:55)	Analyte	RunNo: 141068	PrepDate: 11/02/16 14:00	BatchID: 12558					
		Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual	
Total Radium 228		41	1	43	5.30	104	20		

- Qualifiers:**
- B Analyte detected in the associated Method Blank
 - H Holding times for preparation or analysis exceeded
 - L Analyzed by another laboratory
 - O Outside the Range of Dilutions
 - S Spike Recovery outside accepted recovery limits
 - E Value above quantitation range
 - J Analyte detected below quantitation limits
 - ND Not Detected at the Reporting Limit
 - R RPD outside accepted recovery limits
 - X Matrix Effect



ANALYTICAL QC SUMMARY REPORT

CLIENT: MVTL Laboratories, Inc.

Date: 11/23/2016

Work Order: S1610228

Report ID: S1610228001

Project: 201682-3352

Radium 226 in Water -

Sample Type **MBLK**

Units: pCi/L

MB-1680 (10/31/16 23:07)	RunNo: 140413	PrepDate: 10/26/16 0:00	BatchID: 12484	
Analyte	Result	RL	Spike	Ref Samp %REC % Rec Limits Qual

Radium 226 ND 0.2

MB-1680 (10/31/16 23:07)	RunNo: 140414	PrepDate: 10/26/16 0:00	BatchID: 12484	
Analyte	Result	RL	Spike	Ref Samp %REC % Rec Limits Qual

Radium 226 ND 0.2

Radium 226 in Water -

Sample Type **LCS**

Units: pCi/L

LCS-1680 (10/31/16 23:07)	RunNo: 140413	PrepDate: 10/26/16 0:00	BatchID: 12484	
Analyte	Result	RL	Spike	Ref Samp %REC % Rec Limits Qual

Radium 226 5.4 0.2 5.99 90.6 67.1 - 122

LCS-1679 (10/31/16 15:51)	RunNo: 140414	PrepDate: 10/26/16 0:00	BatchID: 12480	
Analyte	Result	RL	Spike	Ref Samp %REC % Rec Limits Qual

Radium 226 4.8 0.2 5.99 80.2 67.1 - 122

Radium 226 in Water -

Sample Type **LCSD**

Units: pCi/L

LCSD-1680 (10/31/16 23:07)	RunNo: 140413	PrepDate: 10/26/16 0:00	BatchID: 12484	
Analyte	Result	RL	Conc	%RPD %REC % RPD Limits Qual

Radium 226 6.2 0.2 5.4 13.7 104 20

LCSD-1679 (10/31/16 15:51)	RunNo: 140414	PrepDate: 10/26/16 0:00	BatchID: 12480	
Analyte	Result	RL	Conc	%RPD %REC % RPD Limits Qual

Radium 226 5.3 0.2 4.8 10.6 89.2 20

Radium 226 in Water -

Sample Type **MS**

Units: pCi/L

S1610228-007AMS (10/31/16 23:07)	RunNo: 140413	PrepDate: 10/26/16 0:00	BatchID: 12484	
Analyte	Result	RL	Spike	Ref Samp %REC % Rec Limits Qual

Radium 226 11.0 0.2 12 1.0 83.2 65 - 131

S1610252-003AMS (10/31/16 15:51)	RunNo: 140414	PrepDate: 10/26/16 0:00	BatchID: 12480	
Analyte	Result	RL	Spike	Ref Samp %REC % Rec Limits Qual

Radium 226 10.6 0.2 12 0.9 80.8 65 - 131

Qualifiers:	B Analyte detected in the associated Method Blank	E Value above quantitation range
	H Holding times for preparation or analysis exceeded	J Analyte detected below quantitation limits
	L Analyzed by another laboratory	ND Not Detected at the Reporting Limit
	O Outside the Range of Dilutions	R RPD outside accepted recovery limits
	S Spike Recovery outside accepted recovery limits	X Matrix Effect



LABORATORIES, Inc.
 2616 E Broadway Ave
 Bismarck, ND 58501

Chain of Custody Record

Phone: (701) 258-9720

Toll Free: (800) 279-6885

Fax: (701) 258-9724

201682-3352

Company Name and Address: <u>MVTL</u> 2616 E Broadway Bismarck, ND 58501	Account #:	Phone #: 701-258-9720
	Contact: Claudette	Fax #: For faxed report check box <input type="checkbox"/>
Billing Address (indicate if different from above): PO Box 249 New Ulm, MN 56073	Name of Sampler:	E-mail: ccarroll@mvtl.com For e-mail report check box <input type="checkbox"/>
	Quote Number	Date Submitted: 10/13/2016
	Project Name/Number:	Purchase Order #: BL5685

Sample Information						Bottle Type					Analysis
IML Lab Number	MVTL Lab Number	Client Sample ID	Sample Type	Date Sampled	Time Sampled	Untreated	1000 ml HNO3	VOC Vials Impreserved	Glass Jar	Other	Analysis Required
001	16-W4685	MW110		10/11/16	1002						Ra226 & Ra228 on all
002	16-W4686	MW119		10/11/16	1145						
003	16-W4687	MW210		10/11/16	1342						
004	16-W4688	MW102		10/11/16	1611						
005	16-W4689	MW118		10/12/16	949						
006	16-W4690	MW111		10/11/16	1800						
007	16-W4691	MW117		10/12/16	753						
008	16-W4692	MW103		10/12/16	1315						
009	16-W4693	MW109		10/12/16	1123						
010	16-W4694	Dup 1		10/11/16							

Comments: All results must be reported as a numerical value.

Transferred by:	Date:	Time:	Sample Condition:	Received by:	Date:	Temp:
C. Jackson	10/13/16	1700		Kathy Boyd	10.17.16	10:33 13.1
2.						13.4 Copiers

MVTL Calibration Worksheet

Site: MDU Lewis and Clark

Technician: Darren Nieswazy

Instrument
(Circle One):

#1 650 MDS 08F100203

#2 650 MDS 04H14736

#3 556 MPS 12E102056

Pre Site Calibration						
Date:	<u>10/04/16</u>		Time: <u>0714</u>			
pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7	<u>20.74</u>	<u>6.96</u>	<u>7.00</u>	6.95-7.05	<u>-44.7</u>	0 +/- 50
Buffer 10	<u>20.81</u>	<u>10.02</u>	<u>9.99</u>	9.95-10.05	<u>-22.8</u>	-180 +/- 50
Conductivity					Check	
Buffer 1413	<u>20.66</u>	<u>1390</u>	<u>1413</u>	±10%	Buffer 5000	<u>5070</u>
ORP						
²⁵⁷ 231 mV @ 25C	<u>8.12</u>	<u>256.9</u>	<u>257.2</u>	±10 mV		
DO				Barometric Pressure (mm Hg)		
				mg/L		

Post Site Check		
Time:	<u>1830</u>	
pH	Temp °C	Reading
Buffer 7		
Conductivity		
Buffer 1413		

Pre Site Calibration						
Date:	<u>11/04/16</u>		Time: <u>0645</u>			
pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7	<u>18.87</u>	<u>7.04</u>	<u>7.00</u>	6.95-7.05	<u>-47.5</u>	0 +/- 50
Buffer 10	<u>19.02</u>	<u>10.00</u>	<u>10.00</u>	9.95-10.05	<u>-224.0</u>	-180 +/- 50
Conductivity					Check	
Buffer 1413	<u>18.79</u>	<u>1466</u>	<u>1413</u>	±10%	Buffer 5000	<u>4964</u>
ORP						
231 mV @ 25C	<u>19.01</u>	<u>240</u>	<u>231.3</u>	±10 mV		
DO				Barometric Pressure (mm Hg)		
	<u>18.88</u>	<u>9.43</u>	<u>8.66</u>	mg/L	<u>713.4</u>	

Post Site Check		
Time:	<u>1830</u>	
pH	Temp °C	Reading
Buffer 7	<u>13.00</u>	<u>7.01</u>
		<u>7.00</u>
Conductivity		
Buffer 1413	<u>12.11</u>	<u>1404</u>

MVTL Calibration Worksheet

Site: MDU Lewis and Clark

Technician: Parren Nierman

Instrument
(Circle One):

#1 650 MDS 08F100203

#2 650 MDS 04H14736

#3 556 MPS 12E102056

Pre Site Calibration

Date: 12/04/16 Time: 0650

pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7	<u>18.19</u>	<u>7.03</u>	<u>6.99</u>	6.95-7.05	<u>-49.1</u>	0 +/- 50
Buffer 10	<u>18.12</u>	<u>9.95</u>	<u>10.00</u>	9.95-10.05	<u>-222.3</u>	-180 +/- 50

Conductivity

Buffer 1413	Pre Cal	Post Cal	Check
<u>17.92</u>	<u>1380</u>	<u>1413</u>	±10% Buffer 5000 <u>4988</u>

ORP

231 mV @ 25C	Pre Cal	Post Cal	Check
<u>18.08</u>	<u>233.3</u>	<u>231.0</u>	±10 mV

DO

Pre Cal	Post Cal	Barometric Pressure (mm Hg)	mg/L
<u>18.23</u>	<u>10.18</u>	<u>8.85</u>	<u>716.6</u>

Post Site Check

Time: 1323

pH	Temp °C	Reading
Buffer 7	<u>11.56</u>	<u>7.00</u>

Conductivity

Buffer 1413	Reading
<u>12.31</u>	<u>1416</u>

Date: _____ Time: _____

pH	Temp °C	Pre Cal	Post Cal	Post Cal Range	mv	mv Range +/- 50
Buffer 7				6.95-7.05		0 +/- 50
Buffer 10				9.95-10.05		-180 +/- 50

Conductivity

Buffer 1413	Check
	±10% Buffer 5000

ORP

231 mV @ 25C	Check
	±10 mV

DO

Pre Cal	Post Cal	Barometric Pressure (mm Hg)	mg/L

Time: _____

pH	Temp °C	Reading
Buffer 7		

Conductivity

Buffer 1413	Reading



2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Water Level

Sampling Personnel:

Darren Nieswaag

Company:

MDU Lewis and Clark

Well ID	Date	Time	Gauge Reading	Comments
East Scrubber Pond Gauge	12 Oct 16	12:17	2.6	
West Scrubber Pond Gauge	12 Oct 16	12:17	6.0	



Field Datasheet

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Water Level

Sampling Personnel:

Darren Nieswag

Company:

MDU Lewis and Clark

Well ID	Date	Time	Depth to Water	Comments
MW101	10 Oct 16	1938	8.73	
MW105	10 Oct 16	1955	8.63	
MW106	10 Oct 16	07947	10.95	Time 1953 Depth to water 9.44
MW107	10 Oct 16	1936	4.39	
MW108	10 Oct 16	1950	16.72	
MW116	10 Oct 16	1947	10.95	