2021 Annual Groundwater Monitoring and Corrective Action Report

Scrubber Ponds

Lewis & Clark Station
Sidney, Montana

Prepared for
Montana Dakota Utilities

January 2022

234 West Century Avenue
Bismarck, ND 58503
701.255.5460
www.barr.com

2021 Annual Groundwater Monitoring and Corrective Action Report

Scrubber Ponds

Lewis & Clark Station
Sidney, Montana

January 2022

Contents

List of Tables

List of Figures

List of Appendices

Acronyms

Acronym	Description
ACM	Assessment of Corrective Measure
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
FGD	Flue-Gas Desulfurization
GWPS	Groundwater Protection Standard
MCL	Maximum Contaminant Level
MDU	Montana Dakota Utilities Company
RL	Reporting Limit
RSL	Regional Screening Level
SSI	Statistically Significant Increase
TSP	Temporary Storage Pad

Executive Summary

This summary provides an overview of the Groundwater Monitoring & Corrective Action Program status as required by 40 CFR 257.94(e)(6). The Site operated under the assessment monitoring program described in § 257.95 at the start and at the end of the 2021 annual reporting period. Lithium was detected at statistically significant levels above the groundwater protection standards (GWPS) for both semiannual monitoring events at all downgradient monitoring wells. An alternative source demonstration showed that the elevated lithium levels resulted from a source other than the CCR unit for the spring monitoring event. While lithium was also detected above the GWPS for the fall monitoring event, the results are still under evaluation. Further documentation resulting from the fall event will be published as required by the CCR Rule.

A selection of remedy was underway in early 2021; however, an alternative source demonstration (ASD) that showed that lithium and selenium concentrations, measured at statistically significant levels above GWPS, were attributable to a source other than the CCR unit was completed. The ASD was attached to the 2020 Groundwater Monitoring & Corrective Action Report, ending the selection of remedy phase on January 31, 2021. No remedial activities were initiated in 2021.

1.0 Introduction

Montana-Dakota Utilities Co. (MDU) owns and operates Lewis & Clark Station, a coal-fired electricity generation unit near Sidney, Montana (Figure 1). Lewis & Clark Station is a coal-fired electrical generating plant, operation of which results in coal combustion residuals (CCR) as a by-product. Management of CCR in two storage ponds at the property is regulated by US Environmental Protection Agency (EPA) CCR Rule (40 CFR Parts 257 and 261, Disposal of Coal Combustion Residuals from Electric Utilities), the CCR Rule. The storage ponds—which comprise a single, multi-unit CCR surface impoundment under the CCR Rule—are named the East and West Scrubber Ponds, or collectively the Scrubber Ponds.

The Scrubber Ponds store sluiced flue-gas desulfurization (FGD) solids. A Temporary Storage Pad (TSP) receives material from the Scrubber Ponds for conditioning before disposal. Monitoring and reporting requirements in the CCR Rule do not apply to the current TSP because it qualifies for the CCR pile exemptions in the CCR Rule. The former TSP, which was located in the same location as the current TSP, is closed.

The locations of the Scrubber Ponds and TSP are shown on Figure 1. This 2021 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) describes the groundwater monitoring program and results for the Scrubber Ponds at MDU's Lewis & Clark Station.

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
- Project key activities for the upcoming year

1.2 Status of the Groundwater Monitoring and Corrective Action Program

The Scrubber Ponds are currently in assessment monitoring. Baseline groundwater monitoring was completed in 2017, as documented in the 2017 Annual Groundwater Monitoring and Corrective Action Report, Scrubber Pond and Temporary Storage Area (Barr, 2018a). A detection monitoring program began on October 17, 2017, and continued until April 14, 2018 (Barr, 2019a). A statistically significant increase (SSI) over background levels was determined for constituents listed in appendix III to the CCR Rule in 2018, so the site transitioned to an assessment monitoring program (§ 257.95(a)) on April 15, 2018. Assessment monitoring continued through 2021.

It was determined on January 2, 2019, that the initial assessment monitoring event resulted in detections of lithium and selenium at statistically significant levels above applicable groundwater protection standards (GWPS). An assessment of corrective measures (ACM) was initiated on April 2, 2019, and

completed on August 29, 2019 (Barr, 2019b). Selection of remedy, as described in § 257.97, was initiated after completion of the ACM, subject to the ongoing evaluation of a potential alternative source. An ASD showing that lithium and selenium levels above GWPS are attributable to a source other than the CCR unit was completed on January 28, 2021 (Barr, 2021), and the selection of remedy was terminated. The Site returned to assessment monitoring after termination of the selection of remedy.

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 Table 1.

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 2021. The groundwater monitoring system is described in Section 2.1, monitoring and analytical results are described in Section 2.2, the corrective action program status is described in Section 2.3, key actions completed and problems encountered are described in Section 2.4, and key activities planned for 2022 are described in Section 2.5.

2.1 Groundwater Monitoring System

2.1.1 Documentation

Figure 1 is an aerial image of the CCR unit and all upgradient (or background) and downgradient monitoring wells in the groundwater monitoring system, including 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 are included in Groundwater Monitoring System Certification, Lewis & Clark Station (Barr, 2018b).

2.1.2 Changes to Monitoring System

There were no changes to the groundwater monitoring system in 2021.

2.2 Monitoring and Analytical Results

The background concentrations, GWPS, groundwater sampling activities, and analytical results are described in the following sections.

2.2.1 Appendix III Background Concentration Levels

Background concentration levels established in accordance with § 257.94(b) are presented in Table 2 in compliance with § 257.95(d)(3).

2.2.2 Appendix IV Groundwater Protection Standards (GWPS)

In compliance with CCR Rule § 257.95(d)(2), GWPS were established for all appendix IV constituents detected in groundwater. GWPS are defined as the highest of the following values: the applicable maximum contaminant level (MCL); or, in the case of cobalt, lead, lithium and molybdenum, the default GWPS values established under the CCR Rule; or, for any constituent, a site-specific background concentration established from background sampling. Background levels of lithium and selenium at the site were demonstrated to be higher than the default GWPS and MCL, respectively. Thus, site-specific GWPS were determined in accordance with the statistical methods established in § 257.93(f-g) and the Statistical Method Selection Certification (Barr, 2017) using the monitoring results from samples collected from upgradient/background monitoring wells. The background concentrations for other appendix IV parameters are lower than the default GWPS or MCL for each parameter. The site-specific GWPS values are presented in Table 3.

Lithium groundwater monitoring results for upgradient samples (from monitoring wells MW-103, MW-110, and MW-119) collected during the baseline period defined by the CCR Rule (ending in October 2017) were reported as non-detect with a reporting limit (RL) of 100 µg/L; therefore, the initial background lithium concentration level was set as the RL of 100 µg/L for lithium. On July 30, 2018, EPA promulgated for the first time a default GWPS (40 µg/L) for lithium in the agency's Phase I revision to CCR Rule § 257.95(h)(2).

After the Phase I CCR Rule revision was published, all wells in the groundwater monitoring system were sampled and analyzed three times for lithium concentrations with a lower RL of 40 µg/L. A lithium GWPS was determined in 2018 using the upgradient lithium monitoring results from the three events that used the lower RL (a total of nine samples; Barr, 2020). Five additional samples from each well were analyzed for lithium in 2019 and 2020. With eight baseline events (the minimum number specified for baseline monitoring in § 257.94(b)) at the lower RL, the lithium GWPS was recalculated in 2020 (Barr, 2021). The lithium GWPS was again recalculated in March 2021 to match the update schedule for other parameters, as described below.

The background levels were updated for all parameters in March 2021 to incorporate additional data, as recommended by EPA guidance (EPA, 2009). Samples collected from background wells from the baseline sample collection period (Barr, 2018a) and other monitoring through March 2021 were also used to establish updated site-specific GWPS for selenium and lithium.

2.2.3 Monitoring Actions and Results

The following actions and results occurred during assessment monitoring in 2021:

- A total of fourteen samples (seven monitoring wells during two sampling events) were collected from the CCR groundwater monitoring system. Samples were analyzed for the constituents listed in appendices III and IV (Part 257), except for radium 226 and 228 combined, which was not included in the 2021 assessment monitoring program sampling because it was not detected in the initial assessment monitoring sampling, in accordance with § 257.95(d)(1). The assessment monitoring sampling events (March 15-17 and September 13-14, 2021) were consistent with the requirements of § 257.95(b) and § 257.95(d)(1).
- The monitoring results for each event were statistically analyzed to determine if any constituent was detected at statistically significant levels above the GWPS.
- Lithium was detected at statistically significant levels above the GWPS for both spring and fall 2021 monitoring events at all downgradient monitoring wells.

Sampling dates are reported on the field data sheets and analytical laboratory reports in Appendix A. A summary of the analytical results and measured groundwater elevations is provided in Table 4.

Statistical analyses were conducted for each monitoring event to evaluate analytical results against background concentrations and the GWPS, as required by § 257.93(f) through § 257.93(h). Statistical analysis was conducted in accordance with the Statistical Method Selection Certification as amended in the ASD that was attached to the 2020 Annual Groundwater Monitoring and Corrective Action Report.

Results of the statistical analyses for the spring 2021 and fall 2021 events are presented in Table 5 and Table 6, respectively.

2.2.4 Groundwater Flow

Groundwater is generally encountered at 8 to 10 feet below ground surface. The groundwater flows generally from west to east across the Site, then radially outward to the north and north-northeast toward Richland County Irrigation Ditch #12 and the east toward the Yellowstone River. Groundwater flow direction and rate were evaluated for the spring and fall 2021 events. Groundwater flow rate calculation results are provided in Appendix C.

2.3 Corrective Action Program Status

An assessment of corrective measures (ACM) was initiated on April 2, 2019, as required by § 257.95(g)(4) after an alternative source demonstration (ASD) could not be prepared within the time allowed by the CCR Rule. The ACM was completed on August 29, 2019 (Barr, 2019b). After completion of the ACM, the corrective action program entered the selection of remedy phase (§ 257.97).

An alternative source demonstration (ASD) was completed for lithium and selenium and published with the 2020 groundwater monitoring and corrective action report. The results of the ASD demonstrated that a source other than the CCR unit caused lithium and selenium levels above GWPS (Barr, 2021). Therefore, the selection of remedy phase was terminated, and the site is not in corrective action.

2.4 Key Actions Completed/Problems Encountered

The following key actions were completed for the groundwater monitoring program through 2021:

- Completed semiannual assessment monitoring sampling for each background and downgradient well.
- Determined that lithium was detected at statistically significant levels above background at all downgradient wells.
- Completed an ASD for lithium for the spring monitoring event (Appendix B).
- Updated the background concentrations (Table 2) and GWPS (Table 3) to incorporate an additional two years of sampling data from background wells.

No problems were encountered.

2.5 Key Activities for Upcoming Year

The following key groundwater monitoring program activities are planned for 2022:

- Continue the assessment monitoring program in accordance with the CCR Rule.
- Evaluate fall 2021 monitoring results and prepare an ASD, if appropriate.
- Evaluate analytical results from 2022 monitoring events according to the Statistical Method Selection Certification (Barr, 2017).
- Closure of the CCR unit is scheduled to begin in spring/summer of 2022.

3.0 References

Barr, 2021. 2020 Annual Groundwater Monitoring and Corrective Action Report, Scrubber Pond and Temporary Storage Area. Prepared for Montana Dakota Utilities Company. January 2021.

Barr, 2020. 2019 Annual Groundwater Monitoring and Corrective Action Report, Scrubber Pond and Temporary Storage Area. Prepared for Montana Dakota Utilities Company. January 2020.

Barr, 2019a. 2018 Annual Groundwater Monitoring and Corrective Action Report, Scrubber Pond and Temporary Storage Area. Prepared for Montana Dakota Utilities Company. January 2019.

Barr, 2019b. Assessment of Corrective Measures, Lewis & Clark Station. Prepared for Montana Dakota Utilities Company. August 2019.

Barr, 2018a. 2017 Annual Groundwater Monitoring and Corrective Action Report, Scrubber Pond and Temporary Storage Area. Prepared for Montana Dakota Utilities Company. January 2018.

Barr, 2018b. Groundwater Monitoring System Certification. Prepared for Montana Dakota Utilities Company. November 2018.

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

EPA, 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance. EPA 530/R-09-007. March 2009.

Tables

Table 1
CCR Rule Requirements
Lewis & Clark Station; Sidney, Montana

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	Not applicable in 2021
§ 257.90(e)(5)	Other information specified in § 257.90 through § 257.98	See § 257.95(d)(3) and § 257.95(a) in this Table
§ 257.90(e)(6)	Overview of the current status of groundwater monitoring and corrective action programs	Executive Summary
§ 257.95(d)(3)	Assessment monitoring concentrations, background concentrations, and groundwater protection standards	Table 2, Section 2.2.2 Appendix IV Groundwater Protection Standards, Table 3, Table 4, and Appendix A
§ 257.95(g)(3)(ii)	Demonstrate that a source other than the CCR unit caused the contamination, or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.	Appendix B

Table **2**
Background Concentration Levels (Appendix III)
Lewis & Clark Station; Sidney, Montana

Parameter	Units	Background Concentration Level
Boron	mg/L	2.4
Calcium	mg/L	105
Chloride	mg/L	27
Fluoride	mg/L	0.87
pH	pH units	7.2 – 7.5
Sulfate	mg/L	516
Total Dissolved Solids	mg/L	1,080

Background concentration level based on statistical methods established in 40 CFR 257.93 (f-g).

Table **3**
Groundwater Protection Standards (Appendix IV)
Lewis & Clark Station; Sidney, Montana

Parameter	Units	Groundwater Protection Standard	MCL or RSL	Background Concentration Level
Antimony	µg/L	6	6	5.7
Arsenic	µg/L	10	10	3.4
Barium	µg/L	2000	2000	40.2
Beryllium	µg/L	4	4	0.5
Cadmium	µg/L	5	5	0.9
Chromium	µg/L	100	100	2.3
Cobalt	µg/L	6	6	2.7
Fluoride	mg/L	4	4	0.87
Lead	µg/L	15	15	0.7
Lithium	µg/L	63.1	40	63.1
Mercury	µg/L	2	2	0.2
Molybdenum	µg/L	100	100	29.2
Selenium	µg/L	70.5	50	70.5
Thallium	µg/L	2	2	0.5
Radium, combined (226+228)	pCi/l	5	5	2.5

MCL: Maximum Contaminant Level, as established in 40 CFR 141.62 and 141.66.
RSL: Regional Screening Level (default GWPS), as included in the Phase I revision to 40 CFR 259.95(h) issued on July 30, 2018.
Background concentration level based on statistical methods established in 40 CFR 257.93 (f-g).

Table 4
Groundwater Analytical Data Summary
Lewis & Clark
Montana-Dakota Utilities Company

		Location	MW103	MW103	MW110	MW110	MW111		MW111	MW117	MW117	MW118	MW118	MW119	MW119		MW120	MW120
		Date	3/15/2021	9/14/2021	3/15/2021	9/13/2021	3/16/2021		9/14/2021	3/16/2021	9/14/2021	3/16/2021	9/14/2021	3/15/2021	9/13/2021		3/17/2021	9/13/2021
		Sample Type	N	N	N	N	N	FD	N	N	N	N	N	N	N	FD	N	N
Parameter	Analysis Location	Units																
Appendix III																		
Boron	Lab	mg/l	**0.83**	**1.20**	**0.19**	**0.26**	**6.84**	**5.76**	**9.66**	**6.89**	**9.15**	**1.12**	**1.58**	**0.21**	**0.27**	**0.27**	**8.83**	**13.3**
Calcium	Lab	mg/l	**97.4**	**95.3**	**92.3**	**88.2**	**141**	**142**	**184**	**343**	**348**	**81.4**	**82.9**	**98.6**	**95.6**	**95.9**	**486**	**479**
Chloride	Lab	mg/l	**28.3**	**34.3**	**35.5**	**29.6**	**29.6**	**29.7**	**34.5**	**44.2**	**45.6**	**23.0**	**26.0**	**37.4**	**31.1**	**31.0**	**66.9**	**73.8**
Fluoride	Lab	mg/l	**0.63**	**0.75**	**0.45**	**0.54**	**1.83**	**1.75**	**2.13**	**0.21**	**0.30**	**0.95**	**1.13**	**0.40**	**0.50**	**0.50**	**0.34**	**0.44**
pH	Field	pH units	**7.50**	**7.31**	**7.51**	**7.23**	**7.46**	--	**7.11**	**7.54**	**7.15**	**7.67**	**7.32**	**7.48**	**7.26**	--	**6.88**	**6.66**
Solids, total dissolved	Lab	mg/l	**1040**	**968**	**807**	**723**	**2900**	**2840**	**3680**	**7840**	**7540**	**1110**	**1120**	**838**	**747**	**733**	**7430**	**7400**
Sulfate, as SO4	Lab	mg/l	**314**	**154**	**200**	**203**	**1550**	**1610**	**2170**	**5080**	**4960**	**445**	**426**	**217**	**211**	**200**	**4370**	**4650**
Appendix IV																		
Antimony	Lab	mg/l	**0.0037**	**0.0048**	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U
Arsenic	Lab	mg/l	**0.0026**	**0.0029**	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	**0.0020**	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U
Barium	Lab	mg/l	**0.0262**	**0.0346**	**0.0319**	**0.0350**	**0.0163**	**0.0159**	**0.0269**	**0.0174**	**0.0204**	**0.0181**	**0.0262**	**0.0354**	**0.0380**	**0.0373**	**0.0201**	**0.0270**
Beryllium	Lab	mg/l	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Cadmium	Lab	mg/l	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Chromium	Lab	mg/l	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	**0.0032**	**0.0030**	**0.0035**	**0.0092**	**0.0071**	< 0.002 U	**0.0027**	< 0.002 U	< 0.002 U	< 0.002 U	**0.0024**	**0.0039**
Cobalt	Lab	mg/l	< 0.002 U	**0.0035**	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U
Lead	Lab	mg/l	< 0.0005 U	< 0.0005 U	**0.0005**	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Lithium	Lab	mg/l	**0.052**	**0.054**	**0.037**	**0.040**	**0.158**	**0.162**	**0.194**	**0.110**	**0.115**	**0.068**	**0.082**	**0.039**	**0.044**	**0.044**	**0.120**	**0.135**
Mercury	Lab	mg/l	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U	< 0.0002 U
Molybdenum	Lab	mg/l	**0.0174**	**0.0227**	**0.0033**	**0.0084**	**0.0478**	**0.0468**	**0.0654**	**0.0057**	**0.0056**	**0.0317**	**0.0462**	**0.0038**	**0.0039**	**0.0039**	**0.0020**	**0.0044**
Selenium	Lab	mg/l	**0.0390**	**0.0368**	< 0.005 U	< 0.005 U	**0.0592**	**0.0582**	**0.0565**	**0.0284**	**0.0312**	**0.0641**	**0.0631**	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U
Thallium	Lab	mg/l	**< 0.0005 U**	**< 0.0005 U**	< 0.0005 U	< 0.0005 U	**< 0.0005 U**	**< 0.0005 U**	**< 0.0005 U**	**< 0.0005 U**	**< 0.0005 U**	**< 0.0005 U**	**< 0.0005 U**	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0005 U
Water Levels																		
Depth to water	Field	ft	**11.36**	**10.76**	**9.89**	**9.25**	**8.11**	--	**7.95**	**8.14**	**6.47**	**8.91**	**8.52**	**9.70**	**9.12**	--	**15.39**	**14.64**
Elevation	Calc.	ft amsl	**1915.97**	**1916.57**	**1916.41**	**1917.05**	**1915.09**	**--**	**1915.25**	**1912.2**	**1913.87**	**1915.2**	**1915.59**	**1916.58**	**1917.16**	**--**	**1909.83**	**1910.58**

N Sample Type: Normal
FD Sample Type: Field Duplicate
-- Not analyzed/Not available.
H Recommended sample preservation, extraction or analysis holding time was exceeded.
U The analyte was analyzed for, but was not detected.

Table 5
Summary of Statistical Results
March 2021 Assessment Monitoring
Lewis & Clark Station

	Parameter	Units	GWPS	PL/TL	Analysis Type	MW111	MW117	MW118	MW120
Appendix III Constituents	**Boron**	mg/L	*n/a*	*2.4*	NP PL	**6.84**	**6.89**	1.12	**8.83**
	Calcium	mg/L	*n/a*	*105*	P PL	**141**	**343**	81.4	**486**
	Chloride	mg/L	*n/a*	*27*	P PL	**29.6**	**44.2**	23	**66.9**
	Fluoride	mg/L	*n/a*	*0.87*	NP PL	**1.83**	0.21	**0.95**	0.34
	pH	units	*n/a*	*7.2 - 7.5*	P PL	7.5	7.5	**7.7**	**6.9**
	Sulfate	mg/L	*n/a*	*516*	NP PL	**1550**	**5080**	445	**4370**
	TDS	mg/L	*n/a*	*1080*	NP PL	**2900**	**7840**	**1110**	**7430**
Appendix IV Constituents	**Antimony**	µg/L	6	*5.7*	NP TL	< 1	< 1	< 1	< 1
	Arsenic	µg/L	10	*3.4*	NP TL	< 2	< 2	< 2	< 2
	Barium	µg/L	2000	*40.2*	P TL	16.3	17.4	18.1	20.1
	Beryllium	µg/L	4	*0.5*	NP TL	< 0.5	< 0.5	< 0.5	< 0.5
	Cadmium	µg/L	5	*0.9*	NP TL	< 0.5	< 0.5	< 0.5	< 0.5
	Chromium	µg/L	100	*2.3*	NP TL	3.2	9.2	< 2	2.4
	Cobalt	µg/L	6	*2.7*	NP TL	< 2	< 2	< 2	< 2
	Fluoride	mg/L	4	*0.87*	NP TL	1.83	0.21	0.95	0.34
	Lead	µg/L	15	*0.7*	NP TL	< 0.5	< 0.5	< 0.5	< 0.5
	Lithium	µg/L	63.1	*63.1*	P TL	**158**	**110**	**68**	**120**
	Mercury	µg/L	2	*0.2*	NP TL	< 0.2	< 0.2	< 0.2	< 0.2
	Molybdenum	µg/L	100	*29.2*	NP TL	47.8	5.7	31.7	2
	Selenium	µg/L	70.5	*70.5*	Trend	59.2	28.4	64.1	<5
	Thallium	µg/L	2	*0.5*	NP TL	< 0.5	< 0.5	< 0.5	< 0.5

Notes

-**Pink**: Sample was a statistically significant increase over upgradient background (Appx III to 40 CFR 257) or GWPS (Appx IV).

-Green: Sample was not a statistically significant increase over upgradient background (Appx III) or GWPS (Appx IV).

-pH: two-sided prediction limit; color indicates sample higher or lower than prediction limits.

-Parametric (P) interwell prediction limits (PL, Appx III) or tolerance limits (TL, Appx IV) used if background data satisfied normality test. If not, non-parametric (NP) prediction/tolerance limits of highest background value used.

-Upgradient (background) wells: MW119, MW110, MW103; data through March 2021.

-GWPS comparison used lower confidence limits (LCLs) of the mean, median, or trend line.

-Radium is not included in assessment monitoring program because it was not detected in response to 40 CFR 257.95(b), per 257.95(d)(1).

Table 6
Summary of Statistical Results
September 2021 Assessment Monitoring
Lewis & Clark Station

	Parameter	Units	GWPS	PL/TL	Analysis Type	MW111	MW117	MW118	MW120
Appendix III Constituents	**Boron**	mg/L	*n/a*	*2.4*	NP PL	**9.66**	**9.15**	1.58	**13.3**
	Calcium	mg/L	*n/a*	*105*	P PL	**184**	**348**	82.9	**479**
	Chloride	mg/L	*n/a*	*27*	P PL	**34.5**	**45.6**	26	**73.8**
	Fluoride	mg/L	*n/a*	*0.87*	NP PL	**2.13**	0.3	**1.13**	0.44
	pH	units	*n/a*	*7.2 - 7.5*	P PL	**7.11**	**7.15**	7.32	**6.66**
	Sulfate	mg/L	*n/a*	*516*	NP PL	**2170**	**4960**	426	**4650**
	TDS	mg/L	*n/a*	*1080*	NP PL	**3680**	**7540**	**1120**	**7400**
Appendix IV Constituents	**Antimony**	µg/L	6	*5.7*	NP TL	< 1	< 1	< 1	< 1
	Arsenic	µg/L	10	*3.4*	NP TL	< 2	< 2	2.02	< 2
	Barium	µg/L	2000	*40.2*	P TL	26.9	20.4	26.2	27
	Beryllium	µg/L	4	*0.5*	NP TL	< 0.5	< 0.5	< 0.5	< 0.5
	Cadmium	µg/L	5	*0.9*	NP TL	< 0.5	< 0.5	< 0.5	< 0.5
	Chromium	µg/L	100	*2.3*	NP TL	3.5	7.1	2.7	3.9
	Cobalt	µg/L	6	*2.7*	NP TL	< 2	< 2	< 2	< 2
	Fluoride	mg/L	4	*0.87*	NP TL	2.13	0.3	1.13	0.44
	Lead	µg/L	15	*0.7*	NP TL	< 0.5	< 0.5	< 0.5	< 0.5
	Lithium	µg/L	63.1	*63.1*	P TL	**194**	**115**	**82**	**135**
	Mercury	µg/L	2	*0.2*	NP TL	< 0.2	< 0.2	< 0.2	< 0.2
	Molybdenum	µg/L	100	*29.2*	NP TL	65.4	5.6	46.2	4.4
	Selenium	µg/L	70.5	*70.5*	Trend	56.5	31.2	63.1	< 5
	Thallium	µg/L	2	*0.5*	NP TL	< 0.5	< 0.5	< 0.5	< 0.5

Notes

-**Pink**: Sample was a statistically significant increase over upgradient background (Appx III to 40 CFR 257) or GWPS (Appx IV).

-Green: Sample was not a statistically significant increase over upgradient background (Appx III) or GWPS (Appx IV).

-pH: two-sided prediction limit; color indicates sample higher or lower than prediction limits.

-Parametric (P) interwell prediction limits (PL, Appx III) or tolerance limits (TL, Appx IV) used if background data satisfied normality test. If not, non-parametric (NP) prediction/tolerance limits of highest background value used.

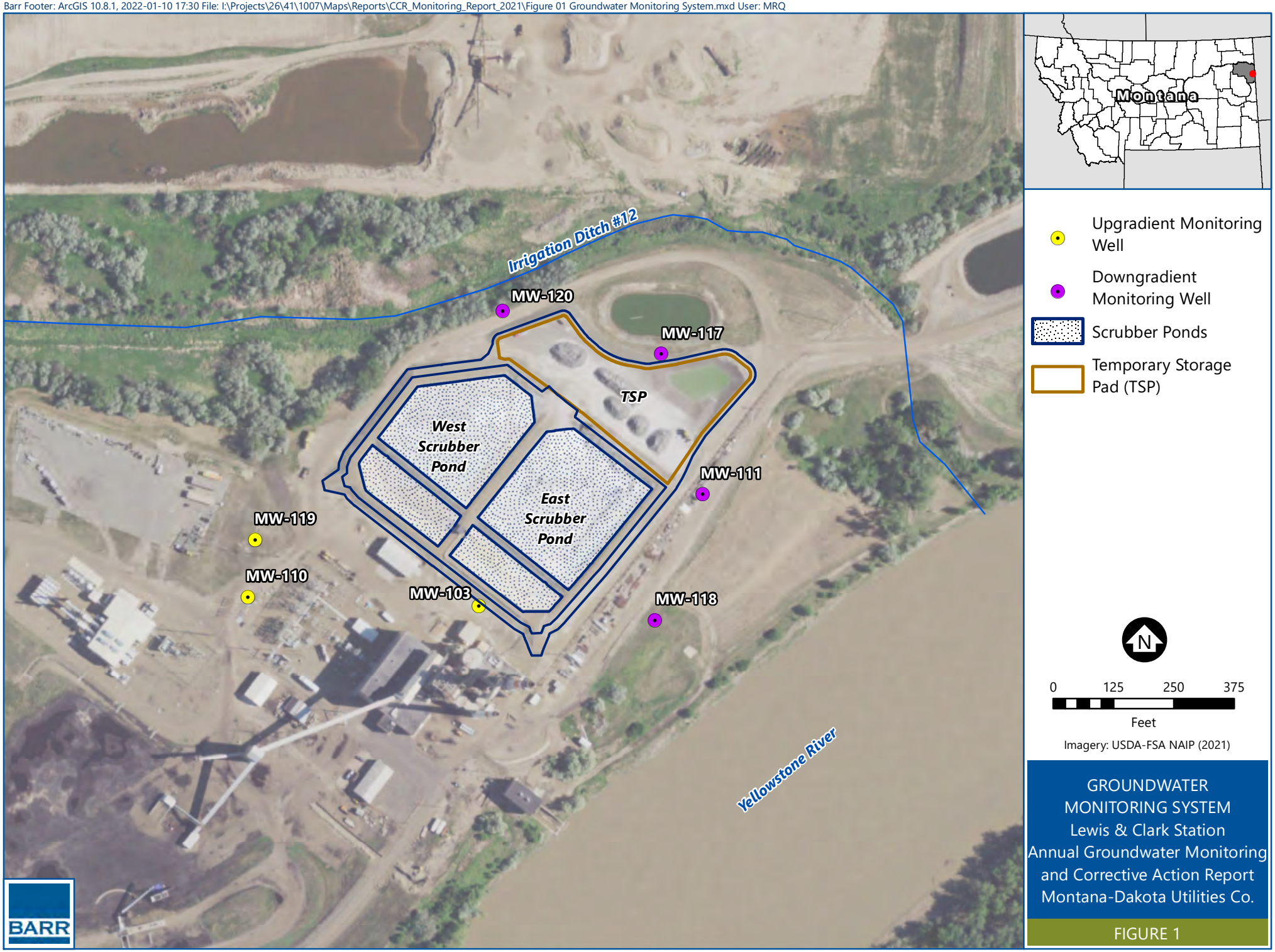
-Upgradient (background) wells: MW119, MW110, MW103; data through March 2021.

-GWPS comparison used lower confidence limits (LCLs) of the mean, median, or trend line.

-Radium is not included in assessment monitoring program because it was not detected in response to 40 CFR 257.95(b), per 257.95(d)(1).

Figures

Barr Footer: ArcGIS 10.8.1, 2022-01-10 17:30 File: I:\Projects\26\41\1007\Maps\Reports\CCR_Monitoring_Report_2021\Figure 01 Groundwater Monitoring System.mxd User: MRQ



BARR

GROUNDWATER MONITORING SYSTEM
Lewis & Clark Station
Annual Groundwater Monitoring and Corrective Action Report
Montana-Dakota Utilities Co.

FIGURE 1

Appendices

Appendix A

Laboratory Reports and Field Sheets

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

APP III

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W465
Work Order #: 82-0562
Account #: 002800
Date Sampled: 16 Mar 21
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: Dup 1

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH	* 7.7	units	0.1	SM4500-H+-B-11	17 Mar 21 18:00	RAA
Fluoride	1.75	mg/l	0.10	SM4500-F-C	18 Mar 21 19:00	CC
Sulfate	1610	mg/l	5.00	ASTM D516-11	19 Mar 21 9:18	SD
Chloride	29.7	mg/l	2.0	SM4500-Cl-E-11	22 Mar 21 8:42	SD
Total Dissolved Solids	2840	mg/l	10	USGS I1750-85	17 Mar 21 16:15	CC
Calcium - Total	142	mg/l	1.0	6010D	18 Mar 21 13:44	MDE
Boron - Total	5.76	mg/l	0.10	6010D	24 Mar 21 10:49	MDE

* Holding time exceeded

CC

Approved by: Claudette K. Carroll 8 Apr 21

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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W466
Work Order #: 82-0562
Account #: 002800
Date Sampled: 16 Mar 21
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: Field Blank

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH	* 6.0	units	0.1	SM4500-H+-B-11	17 Mar 21 18:00	RAA
Fluoride	< 0.1	mg/l	0.10	SM4500-F-C	18 Mar 21 19:00	CC
Sulfate	< 5	mg/l	5.00	ASTM D516-11	19 Mar 21 9:18	SD
Chloride	< 2	mg/l	2.0	SM4500-Cl-E-11	22 Mar 21 8:42	SD
Total Dissolved Solids	< 10	mg/l	10	USGS I1750-85	17 Mar 21 16:15	CC
Calcium - Total	< 1	mg/l	1.0	6010D	18 Mar 21 13:44	MDE
Boron - Total	< 0.1	mg/l	0.10	6010D	24 Mar 21 11:46	MDE

* Holding time exceeded

CC

Approved by: Claudette K. Carroll 8 Apr 21

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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W467
Work Order #: 82-0562
Account #: 002800
Date Sampled: 15 Mar 21 15:30
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: MW103

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.50	units	NA	SM 4500 H+ B	15 Mar 21 15:30	JSM
pH	* 7.8	units	0.1	SM4500-H+-B-11	17 Mar 21 18:00	RAA
Temperature - Field	7.89	Degrees C	NA	SM 2550B	15 Mar 21 15:30	JSM
Conductivity - Field	1316	umhos/cm	1	EPA 120.1	15 Mar 21 15:30	JSM
Fluoride	0.63	mg/l	0.10	SM4500-F-C	18 Mar 21 19:00	CC
Sulfate	314	mg/l	5.00	ASTM D516-11	19 Mar 21 9:18	SD
Chloride	28.3	mg/l	2.0	SM4500-Cl-E-11	22 Mar 21 8:42	SD
Total Dissolved Solids	1040	mg/l	10	USGS I1750-85	17 Mar 21 16:15	CC
Calcium - Total	97.4	mg/l	1.0	6010D	18 Mar 21 13:44	MDE
Boron - Total	0.83	mg/l	0.10	6010D	24 Mar 21 11:46	MDE

* Holding time exceeded

CC

Approved by: Claudette K. Carroll 8 Apr 21

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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W468
Work Order #: 82-0562
Account #: 002800
Date Sampled: 15 Mar 21 12:15
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: MW110

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.51	units	NA	SM 4500 H+ B	15 Mar 21 12:15	JSM
pH	* 7.8	units	0.1	SM4500-H+-B-11	17 Mar 21 18:00	RAA
Temperature - Field	6.23	Degrees C	NA	SM 2550B	15 Mar 21 12:15	JSM
Conductivity - Field	1094	umhos/cm	1	EPA 120.1	15 Mar 21 12:15	JSM
Fluoride	0.45	mg/l	0.10	SM4500-F-C	18 Mar 21 19:00	CC
Sulfate	200	mg/l	5.00	ASTM D516-11	19 Mar 21 9:18	SD
Chloride	35.5	mg/l	2.0	SM4500-Cl-E-11	22 Mar 21 8:42	SD
Total Dissolved Solids	807	mg/l	10	USGS I1750-85	17 Mar 21 16:15	CC
Calcium - Total	92.3	mg/l	1.0	6010D	18 Mar 21 13:44	MDE
Boron - Total	0.19	mg/l	0.10	6010D	24 Mar 21 11:46	MDE

* Holding time exceeded

CC

Approved by: Claudette K. Carroll 8 Apr 21

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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W469
Work Order #: 82-0562
Account #: 002800
Date Sampled: 15 Mar 21 13:45
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: MW119

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.48	units	NA	SM 4500 H+ B	15 Mar 21 13:45	JSM
pH	* 7.8	units	0.1	SM4500-H+-B-11	17 Mar 21 18:00	RAA
Temperature - Field	7.16	Degrees C	NA	SM 2550B	15 Mar 21 13:45	JSM
Conductivity - Field	1143	umhos/cm	1	EPA 120.1	15 Mar 21 13:45	JSM
Fluoride	0.40	mg/l	0.10	SM4500-F-C	18 Mar 21 19:00	CC
Sulfate	217	mg/l	5.00	ASTM D516-11	19 Mar 21 9:18	SD
Chloride	37.4	mg/l	2.0	SM4500-Cl-E-11	22 Mar 21 8:42	SD
Total Dissolved Solids	838	mg/l	10	USGS I1750-85	17 Mar 21 16:15	CC
Calcium - Total	98.6	mg/l	1.0	6010D	18 Mar 21 13:44	MDE
Boron - Total	0.21	mg/l	0.10	6010D	24 Mar 21 11:46	MDE

* Holding time exceeded

Approved by: Claudette K. Carroll CC 8 Apr 21

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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W470
Work Order #: 82-0562
Account #: 002800
Date Sampled: 16 Mar 21 10:53
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: MW111

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.46	units	NA	SM 4500 H+ B	16 Mar 21 10:53	JSM
pH	* 7.7	units	0.1	SM4500-H+-B-11	17 Mar 21 18:00	RAA
Temperature - Field	4.99	Degrees C	NA	SM 2550B	16 Mar 21 10:53	JSM
Conductivity - Field	2951	umhos/cm	1	EPA 120.1	16 Mar 21 10:53	JSM
Fluoride	1.83	mg/l	0.10	SM4500-F-C	18 Mar 21 19:00	CC
Sulfate	1550	mg/l	5.00	ASTM D516-11	19 Mar 21 9:18	SD
Chloride	29.6	mg/l	2.0	SM4500-Cl-E-11	22 Mar 21 8:42	SD
Total Dissolved Solids	2900	mg/l	10	USGS I1750-85	17 Mar 21 16:15	CC
Calcium - Total	141	mg/l	1.0	6010D	18 Mar 21 14:44	MDE
Boron - Total	6.84	mg/l	0.10	6010D	24 Mar 21 11:46	MDE

* Holding time exceeded

Approved by: Claudette K. Carroll CC 8 Apr 21

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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W471
Work Order #: 82-0562
Account #: 002800
Date Sampled: 16 Mar 21 8:57
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: MW117

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.54	units	NA	SM 4500 H+ B	16 Mar 21 8:57	JSM
pH	* 7.7	units	0.1	SM4500-H+-B-11	17 Mar 21 18:00	RAA
Temperature - Field	4.40	Degrees C	NA	SM 2550B	16 Mar 21 8:57	JSM
Conductivity - Field	6806	umhos/cm	1	EPA 120.1	16 Mar 21 8:57	JSM
Fluoride	0.21	mg/l	0.10	SM4500-F-C	18 Mar 21 19:00	CC
Sulfate	5080	mg/l	5.00	ASTM D516-11	19 Mar 21 9:37	SD
Chloride	44.2	mg/l	2.0	SM4500-Cl-E-11	22 Mar 21 9:19	SD
Total Dissolved Solids	7840	mg/l	10	USGS I1750-85	17 Mar 21 16:15	CC
Calcium - Total	343	mg/l	1.0	6010D	18 Mar 21 13:44	MDE
Boron - Total	6.89	mg/l	0.10	6010D	24 Mar 21 11:46	MDE

Total and dissolved chromium have been rechecked.

* Holding time exceeded

Approved by: Claudette K Carrep 1C 8 Apr 21

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
MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W472
Work Order #: 82-0562
Account #: 002800
Date Sampled: 16 Mar 21 12:33
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: MW118

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.67	units	NA	SM 4500 H+ B	16 Mar 21 12:33	JSM
pH	* 7.8	units	0.1	SM4500-H+-B-11	19 Mar 21 17:00	CC
Temperature - Field	4.49	Degrees C	NA	SM 2550B	16 Mar 21 12:33	JSM
Conductivity - Field	1413	umhos/cm	1	EPA 120.1	16 Mar 21 12:33	JSM
Fluoride	0.95	mg/l	0.10	SM4500-F-C	18 Mar 21 19:00	CC
Sulfate	445	mg/l	5.00	ASTM D516-11	19 Mar 21 9:37	SD
Chloride	23.0	mg/l	2.0	SM4500-Cl-E-11	22 Mar 21 9:19	SD
Total Dissolved Solids	1110	mg/l	10	USGS I1750-85	17 Mar 21 16:15	CC
Calcium - Total	81.4	mg/l	1.0	6010D	18 Mar 21 14:44	MDE
Boron - Total	1.12	mg/l	0.10	6010D	24 Mar 21 11:46	MDE

* Holding time exceeded

Approved by: Claudette K. Carroll CC 8 Apr 21

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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W473
Work Order #: 82-0562
Account #: 002800
Date Sampled: 17 Mar 21 8:48
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: MW120

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	6.88	units	NA	SM 4500 H+ B	17 Mar 21 8:48	JSM
pH	* 7.0	units	0.1	SM4500-H+-B-11	19 Mar 21 17:00	CC
Temperature - Field	3.63	Degrees C	NA	SM 2550B	17 Mar 21 8:48	JSM
Conductivity - Field	6343	umhos/cm	1	EPA 120.1	17 Mar 21 8:48	JSM
Fluoride	0.34	mg/l	0.10	SM4500-F-C	18 Mar 21 19:00	CC
Sulfate	4370	mg/l	5.00	ASTM D516-11	19 Mar 21 9:37	SD
Chloride	66.9	mg/l	2.0	SM4500-Cl-E-11	22 Mar 21 9:19	SD
Total Dissolved Solids	7430	mg/l	10	USGS I1750-85	17 Mar 21 16:15	CC
Calcium - Total	486	mg/l	1.0	6010D	18 Mar 21 14:44	MDE
Boron - Total	8.83	mg/l	0.10	6010D	24 Mar 21 11:46	MDE

* Holding time exceeded

CC

Approved by: Claudette K Carrep 8 Apr 21

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

MVTL

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
ACIL

Quality Control Report

Lab IDs: 21-W465 to 21-W473 **Project:** MDU Lewis & Clark **Work Order:** 202182-0562

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 - Total mg/l	0.40 0.40	92 95	80-120 80-120	0.400 2.00	21-W442 21-W474	0.23 6.84	0.62 8.49	98 82	75-125 75-125	0.62 8.49	0.60 8.54	92 85	3.3 0.6	20 20	- - - -	- - - -	< 0.1 < 0.1 < 0.1 < 0.1
Calcium - Total mg/l	100 100	108 108	80-120 80-120	500 500	21W471q 21W476q	343 387	810 855	93 94	75-125 75-125	810 855	810 860	93 95	0.0 0.6	20 20	- - - -	- - - -	< 1 < 1 < 1 < 1
Chloride mg/l	30.0 30.0 30.0 30.0	97 97 97 97	80-120 80-120 80-120 80-120	30.0 30.0	21-W466 21-W477	< 2 11.8	29.9 40.8	100 97	80-120 80-120	29.9 40.8	30.0 40.9	100 97	0.3 0.2	20 20	- - - -	- - - -	< 2 < 2 < 2 < 2
Fluoride mg/l	0.50 0.50	102 102	90-110 90-110	0.500 0.500	21-W477 21-W469	0.53 0.40	1.07 0.93	108 106	80-120 80-120	1.07 0.93	1.09 0.92	112 104	1.9 1.1	20 20	- -	- -	< 0.1
pH units	- -	- -	- -	- -	- -	- -	- -	- -	- -	7.5 7.0	7.5 7.1	- -	0.0 1.4	20 20	- -	- -	-
Sulfate mg/l	100 100	99 100	80-120 80-120	100 200	21-W466 21-W477	< 5 265	94.1 429	94 82	80-120 80-120	94.1 429	96.0 427	96 81	2.0 0.5	20 20	- -	- -	< 5 < 5
Total Dissolved Solids mg/l	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	1240 2840 4040	1210 2780 3970	- - -	2.4 2.1 1.7	20 20 20	- - -	- - -	< 10 < 10

Samples were received on 17 Mar 2021 at 1405.
Temperature upon receipt at the Bismarck laboratory was 1.2°C.
All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
With the exception of pH, all holding times were met.
Approved methodology was followed for all sample analyses.
All acceptance criteria were met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/duplicates unless noted here:

Approved by: C. Crawford
8 Apr 21

Field Datasheet

Groundwater Assessment

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

Company:	**MDU Lewis & Clark**
Event:	**March 2021**
Sample ID:	103
Sampling Personal:	

Weather Conditions: Temp: 45 °F Wind: E @ 5-10 Precip: **Sunny / Partly Cloudy / Cloudy**

WELL INFORMATION

Well Locked?	YES	NO	
Well Labeled?	YES	NO	
Casing Strait?	YES	NO	
Grout Seal Intact?	YES	NO	Not Visible
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	11.36	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:	11.34	ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	NO

Duplicate Sample?	YES	NO
Duplicate Sample ID:	—	

Bottle List:	
1 Liter Raw	~~4 - 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge: 5	Sec.
Recover: 25	Sec.
PSI: 20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
15 Mar 21	1405	**Start of Well Purge**									
	1410	8.99	2267	7.51	0.60	96.3	122.15	11.34	100.0	500.0	Slightly turbid
	1440	8.06	1358	7.50	0.29	69.3	33.19	11.33	100.0	3000.0	Clear
	1500	8.07	1331	7.50	0.17	33.5	12.99	11.33	100.0	2000.0	Clear
	1510	7.89	1320	7.50	0.14	8.0	8.15	11.34	100.0	1000.0	Clear
	1520	7.94	1317	7.50	0.13	-3.2	3.81	11.33	100.0	1000.0	Clear
	1525	7.96	1315	7.50	0.12	-9.3	3.90	11.33	100.0	500.0	Clear
	1530	7.89	1316	7.50	0.11	-11.9	2.45	11.34	100.0	500.0	Clear

Well Stabilized? YES NO

Total Volume Purged: 8500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
15 Mar 21	1530	7.89	1316	7.50			2.45				Clear

Comments:	

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**March 2021**
Sample ID:	110
Sampling Personal:	

Weather Conditions: Temp: 40°F Wind: E @ 5-10 Precip: **Sunny / ~~Partly Cloudy~~ / Cloudy**

WELL INFORMATION

Well Locked?	**YES**	(NO)	
Well Labeled?	(YES)	**NO**	
Casing Strait?	(YES)	**NO**	
Grout Seal Intact?	(YES)	**NO**	**Not Visible**
Repairs Necessary?			
Casing Diameter:	**2"**		
Water Level Before Purge:	9.89	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:	9.98	ft	
Measurement Method:	**Electric Water Level Indicator**		

SAMPLING INFORMATION

Purging Method:	**Bladder**	
Sampling Method:	**Bladder**	
Dedicated Equipment?	**YES**	(NO)

Duplicate Sample?	**YES**	(NO)
Duplicate Sample ID:	—	

Control Settings:	
Purge: 5	Sec.
Recover: 10	Sec.
PSI: 20	

Bottle List:
1 Liter Raw ~~4-1L Nitric~~
500mL Nitric
500mL Nitric (filtered)
250mL Sulfuric

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
15 Mar 21	1110	**Start of Well Purge**									
	1115	6.47	1086	7.47	5.11	201.7	47.22	9.94	100.0	500.0	Clear
	1145	5.92	1094	7.52	2.53	100.2	12.72	9.96	100.0	3000.0	Clear
	1205	6.00	1094	7.51	2.22	116.7	1.98	9.97	100.0	2000.0	Clear
	1210	6.05	1094	7.51	2.22	123.0	1.67	9.97	100.0	500.0	Clear
	1215	6.23	1094	7.51	2.19	122.8	1.82	9.97	100.0	500.0	Clear

Well Stabilized? (YES) NO

Total Volume Purged: 6500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
15 Mar 21	1215	6.23	1094	7.51			1.82				Clear

Comments:	

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**March 2021**
Sample ID:	19
Sampling Personal:	Jay Mayer

Weather Conditions: Temp: 40°F Wind: E @ 5-10 Precip: **Sunny / Partly Cloudy / Cloudy**

WELL INFORMATION

Well Locked?	YES	(NO)	
Well Labeled?	~~YES~~	NO	
Casing Strait?	(YES)	NO	
Grout Seal Intact?	(YES)	NO	Not Visible
Repairs Necessary?			

Casing Diameter:	2"	
Water Level Before Purge:	9.70	ft
Total Depth of Well:	—	ft
Well Volume:	—	liters
Depth to Top of Pump:	—	ft
Water Level After Sample:	9.79	ft
Measurement Method:	Electric Water Level Indicator	

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	(NO)

Duplicate Sample?	YES	(NO)
Duplicate Sample ID:	—	

Bottle List:	
1 Liter Raw	~~4- 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge: 5	Sec.
Recover: 55	Sec.
PSI: 20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
15 Mar 21	1240	**Start of Well Purge**									
	1245	6.82	1126	7.50	2.47	98.3	38.26	9.81	100.0	500.0	Clear
	1315	7.23	1137	7.48	1.51	116.9	13.29	9.79	100.0	3000.0	Clear
	1335	7.04	1142	7.48	1.54	125.2	2.77	9.79	100.0	2000.0	Clear
	1340	7.05	1143	7.48	1.55	125.0	2.90	9.79	100.0	500.0	Clear
	1345	7.16	1143	7.48	1.54	125.8	1.09	9.79	100.0	500.0	Clear

Well Stabilized? (YES) NO Total Volume Purged: 6500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
15 Mar 21	1345	7.16	1143	7.48			1.09				Clear

Comments:	

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	MDU Lewis & Clark
Event:	March 2021
Sample ID:	111
Sampling Personal:	Jeff Clay

Weather Conditions: Temp: 40 °F Wind: N @5-10 Precip: Sunny / Partly Cloudy / (Cloudy)

WELL INFORMATION

Well Locked?	YES	(NO)	
Well Labeled?	(YES)	NO	
Casing Strait?	YES	NO	Grade well
Grout Seal Intact?	YES	NO	(Not Visible)
Repairs Necessary?			

Casing Diameter:	2"	
Water Level Before Purge:	8.11	ft
Total Depth of Well:	—	ft
Well Volume:	—	liters
Depth to Top of Pump:	—	ft
Water Level After Sample:	8.23	ft
Measurement Method:	Electric Water Level Indicator	

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	(NO)

Duplicate Sample?	(YES)	NO
Duplicate Sample ID:	Dup 1	

Bottle List:	
1 Liter Raw	~~1 L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:		
Purge:	5	Sec.
Recover:	55	Sec.
PSI:	20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
16 Mar 21	0928	Start of Well Purge									
	0933	4.87	4095	7.31	2.44	176.3	57.02	8.32	100.0	500.0	Clear
	1003	5.09	3167	7.42	2.06	125.9	60.12	8.21	100.0	3000.0	Clear
	1023	4.98	3000	7.45	2.40	83.5	13.60	8.24	100.0	2000.0	Clear
	1033	4.96	2983	7.45	2.43	79.4	6.90	8.25	100.0	1000.0	clear
	1043	5.01	2965	7.45	2.56	78.3	1.19	8.25	100.0	1000.0	Clear
	1048	5.02	2957	7.45	2.63	78.9	1.23	8.24	100.0	500.0	Clear
	1053	4.99	2951	7.46	2.75	75.3	0.76	8.25	100.0	500.0	Clear

Well Stabilized? (YES) NO

Total Volume Purged: 6500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
16 Mar 21	1053	4.99	2951	7.46	?		0.76				Clear

Comments:	

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**March 2021**
Sample ID:	117
Sampling Personal:	Jenny

Weather Conditions: Temp: 40 °F Wind: N @ 5-10 Precip: **Sunny / Partly Cloudy / Cloudy**

WELL INFORMATION

Well Locked?	YES	NO	
Well Labeled?	YES	NO	
Casing Strait?	YES	NO	
Grout Seal Intact?	YES	NO	Not Visible
Repairs Necessary?			

Casing Diameter:	2"	
Water Level Before Purge:	8.14	ft
Total Depth of Well:	—	ft
Well Volume:	—	liters
Depth to Top of Pump:	9.48	ft
Water Level After Sample:	Below Pump	ft
Measurement Method:	Electric Water Level Indicator	

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	NO

Duplicate Sample?	YES	NO
Duplicate Sample ID:	—	

Control Settings:		
Purge:	~~5~~ 5	Sec.
Recover:	25	Sec.
PSI:	20	

Bottle List:

- 1 Liter Raw ~~4 1L Nitric~~
- 500mL Nitric
- 500mL Nitric (filtered)
- 250mL Sulfuric

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
15 Mar 21	1545	**Start of Well Purge**									
	1550	5.12	6010	7.58	10.03	175.8	42.41	9.01	100.0	500.0	Clear
	1600	4.76	6020	7.47	7.77	151.9	133.72	Below Pump	100.0	1000.0	clear
		Purged	Dry								
16 Mar 21	0852	~~Started~~	Purged for 5min					9.20	~~100.0~~	~~500.0~~	
	0857	4.40	6806	7.54	8.78	132.3	16.39	Below Pump	100.0	500.0	Clear
		—									

Well Stabilized? YES (NO)

Total Volume Purged: 2600.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment
											Clarity, Color, Odor, Ect.
16 Mar 21	0857	4.40	6806	7.54			16.39				Clear

Comments:	

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

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**March 2021**
Sample ID:	11B
Sampling Personal:	Jay May

Weather Conditions: Temp: 40 °F Wind: N @ 5-10 Precip: **Sunny / Partly Cloudy / (Cloudy)**

WELL INFORMATION

Well Locked?	**YES**	(NO)	
Well Labeled?	(YES)	**NO**	
Casing Strait?	(YES)	**NO**	
Grout Seal Intact?	(YES)	**NO**	**Not Visible**
Repairs Necessary?			
Casing Diameter:	**2"**		
Water Level Before Purge:	8.91	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:	8.93	ft	
Measurement Method:	**Electric Water Level Indicator**		

SAMPLING INFORMATION

Purging Method:	**Bladder**	
Sampling Method:	**Bladder**	
Dedicated Equipment?	**YES**	(NO)

Duplicate Sample?	**YES**	(NO)
Duplicate Sample ID:		

Bottle List:	
1 Liter Raw	~~4- 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:		
Purge:	5	Sec.
Recover:	55	Sec.
PSI:	20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
16 Mar 21	1138	**Start of Well Purge**									
	1143	4.30	1506	7.70	4.09	193.8	69.82	8.92	100.0	500.0	Clear
	1213	4.43	1408	7.67	2.85	176.7	5.66	8.93	100.0	3000.0	Clear
	1223	4.57	1410	7.67	2.81	170.6	1.72	8.93	100.0	1000.0	Clear
	1228	4.50	1411	7.67	2.81	166.9	1.38	8.94	100.0	500.0	Clear
	1233	4.49	1413	7.67	2.80	171.1	1.80	8.94	100.0	500.0	Clear

Well Stabilized? (YES) **NO** Total Volume Purged: _____ mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
16 Mar 21	1233	4.49	1413	7.67			1.80				Clear

Comments:	Collected FB @ 1215

Field Datasheet

Groundwater Assessment

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

Company:	**MDU Lewis & Clark**
Event:	**March 2021**
Sample ID:	120
Sampling Personal:	

Weather Conditions: Temp: 40 °F Wind: N @ 5-10 Precip: **Sunny / Partly Cloudy / Cloudy**

WELL INFORMATION

Well Locked?	YES	~~NO~~	
Well Labeled?	~~YES~~	NO	
Casing Strait?	~~YES~~	NO	
Grout Seal Intact?	YES	NO	~~Not Visible~~
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	15.39	ft	
Total Depth of Well:	=	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	15.43	ft	
Water Level After Sample:	Below Pump	ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	NO

Duplicate Sample?	~~YES~~	NO
Duplicate Sample ID:	Dup 1	

Bottle List:	
1 Liter Raw	~~4-1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge: 5	Sec.
Recover: ~~85~~	Sec.
PSI: 20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
16 Mar 21	0837	**Start of Well Purge**									
	0842	5.45	5989	6.87	1.13	137.6	7.49	Below Pump	100.0	500.0	Clear
	0847	5.65	5983	6.85	0.68	119.6	0.41	BP	100.0	500.0	Clear
		Purged	Dry								
17 Mar 21	0843	Purged	well for 5 min					Below Pump			
	0848	3.63	6343	6.88	1.72	214.1	75.32	BP	100.0	500.0	Clear

Well Stabilized? YES ~~NO~~ Total Volume Purged: 1500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
17 Mar 21	0848	3.63	6343	6.88			75.32				Clear

Comments:	

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

Field Datasheet

Surface water Assessment

Company:	**MDU Lewis & Clark**
Event:	**March 2021**
Sample ID:	—
Sampling Personal:	

Weather Conditions: Temp: 40 °F Wind: N @ 5-10 Precip: **Sunny / Partly Cloudy / Cloudy**

Well ID	Date	Time	Casing Diameter	Water Level (ft)		Comments
MW101	16 **Mar 2021**	1605	2"	9.94		
MW105	16 **Mar 2021**	1557	2"	9.40		
MW106	16 **Mar 2021**	1559	2"	9.88		
MW107	16 **Mar 2021**	1607	2"	4.85		
MW108	16 **Mar 2021**	1601	2"	17.15		
MW116	16 **Mar 2021**	1603	2"	14.65		

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

Chain of Custody Record

Project Name:	Event:	Work Order Number:
MDU Lewis & Clark	March 2021	82-0562

Report To:	MDU Lewis & Clark	CC:	Collected By:
Attn:	Todd Peterson		
Address:	400 N. 4th St Bismarck, ND 58501		
Phone:	701-425-2427		
Email:	Todd.Peterson@mdu.com		

Lab Number	Sample ID	Date	Time	Sample Type	1 Liter Raw	500 mL Nitric	500 mL Nitric (filtered)	250 mL Sulfuric	1 Liter Nitric	Temp (°C)	Spec. Cond.	pH	Turbidity (NTU)	Analysis Required
W465	Dup 1	16 Mar 21	NA	GW	X	X	X	X		NA	NA	NA	NA	MDU Lewis & Clark List
W466	Field Blank (FB)	16 Mar 21	NA	GW	X	X	X	X		NA	NA	NA	NA	
W467	MW103	15 Mar 21	1530	GW	X	X	X	X		7.89	1316	7.50	2.45	
W468	MW110	15 Mar 21	1215	GW	X	X	X	X		6.23	1094	7.51	1.82	
W469	MW119	15 Mar 21	1345	GW	X	X	X	X		7.16	1143	7.48	1.09	
W470	MW111	16 Mar 21	1053	GW	X	X	X	X		4.99	2951	7.46	0.76	
W471	MW117	16 Mar 21	0857	GW	X	X	X	X		4.40	6806	7.54	16.39	
W472	MW118	16 Mar 21	1233	GW	X	X	X	X		4.49	1413	7.67	1.80	
W473	MW120	17 Mar 21	0848	GW	X	X	X	X		3.63	6343	6.88	75.32	

Comments:

Relinquished By		Sample Condition		Received By		
Name	Date/Time	Location	Temp (°C)	Name		Date/Time
1	17 Mar 21 1405	~~Log In~~ Walk In #2	1.2 TM562 / TM805			17 mar 21 1405
2						

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
MEMBER ACIL

APP IV

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W465
Work Order #: 82-0562
Account #: 002800
Date Sampled: 16 Mar 21
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: Dup 1

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 21 14:08	MDE
Lithium - Total	0.162	mg/l	0.020	6010D	24 Mar 21 11:18	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	25 Mar 21 15:45	CC
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Barium - Total	0.0159	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Chromium - Total	0.0030	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Lead - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Molybdenum - Total	0.0468	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Selenium - Total	0.0582	mg/l	0.0050	6020B	25 Mar 21 15:45	CC
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC

CC

Approved by: Claudette K. Carroll 8 Apr 21

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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W466
Work Order #: 82-0562
Account #: 002800
Date Sampled: 16 Mar 21
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: Field Blank

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 21 14:08	MDE
Lithium - Total	< 0.02	mg/l	0.020	6010D	24 Mar 21 11:18	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	25 Mar 21 15:45	CC
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Barium - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Chromium - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Lead - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Selenium - Total	< 0.005	mg/l	0.0050	6020B	25 Mar 21 15:45	CC
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC

CC

Approved by: Claudette K. Carroll 8 Apr 21

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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W467
Work Order #: 82-0562
Account #: 002800
Date Sampled: 15 Mar 21 15:30
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: MW103

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 21 14:08	MDE
Lithium - Total	0.052	mg/l	0.020	6010D	24 Mar 21 11:18	MDE
Antimony - Total	0.0037	mg/l	0.0010	6020B	25 Mar 21 15:45	CC
Arsenic - Total	0.0026	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Barium - Total	0.0262	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Chromium - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Lead - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Molybdenum - Total	0.0174	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Selenium - Total	0.0390	mg/l	0.0050	6020B	25 Mar 21 15:45	CC
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC

Approved by: Claudette K. Carroll CC 8 Apr 21

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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W468
Work Order #: 82-0562
Account #: 002800
Date Sampled: 15 Mar 21 12:15
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: MW110

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 21 14:08	MDE
Lithium - Total	0.037	mg/l	0.020	6010D	24 Mar 21 12:18	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	25 Mar 21 15:45	CC
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Barium - Total	0.0319	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Chromium - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Lead - Total	0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Molybdenum - Total	0.0033	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Selenium - Total	< 0.005	mg/l	0.0050	6020B	25 Mar 21 15:45	CC
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC

Approved by: Claudette K Carroll CC 8 Apr 21

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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W469
Work Order #: 82-0562
Account #: 002800
Date Sampled: 15 Mar 21 13:45
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: MW119

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 21 14:08	MDE
Lithium - Total	0.039	mg/l	0.020	6010D	24 Mar 21 12:18	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	25 Mar 21 15:45	CC
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Barium - Total	0.0354	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Chromium - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Lead - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Molybdenum - Total	0.0038	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Selenium - Total	< 0.005	mg/l	0.0050	6020B	25 Mar 21 15:45	CC
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC

Approved by: Claudette K. Carroll 8 Apr 21

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

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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W470
Work Order #: 82-0562
Account #: 002800
Date Sampled: 16 Mar 21 10:53
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: MW111

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 21 14:08	MDE
Lithium - Total	0.158	mg/l	0.020	6010D	24 Mar 21 12:18	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	25 Mar 21 15:45	CC
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Barium - Total	0.0163	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Chromium - Total	0.0032	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Lead - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Molybdenum - Total	0.0478	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Selenium - Total	0.0592	mg/l	0.0050	6020B	25 Mar 21 15:45	CC
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC

Approved by: Claudette K. Carroll 8 Apr 21

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

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
MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W471
Work Order #: 82-0562
Account #: 002800
Date Sampled: 16 Mar 21 8:57
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: MW117

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 21 14:08	MDE
Lithium - Total	0.110	mg/l	0.020	6010D	24 Mar 21 12:18	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	25 Mar 21 15:45	CC
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Barium - Total	0.0174	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Chromium - Total	0.0092	mg/l	0.0020	6020B	29 Mar 21 14:20	CC
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Lead - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Molybdenum - Total	0.0057	mg/l	0.0020	6020B	29 Mar 21 14:20	CC
Selenium - Total	0.0284	mg/l	0.0050	6020B	25 Mar 21 15:45	CC
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC

Total and dissolved chromium have been rechecked.

Approved by: Claudette K. Carroll 8 Apr 21

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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W472
Work Order #: 82-0562
Account #: 002800
Date Sampled: 16 Mar 21 12:33
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark
Sample Description: MW118

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 21 14:08	MDE
Lithium - Total	0.068	mg/l	0.020	6010D	24 Mar 21 12:18	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	25 Mar 21 15:45	CC
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Barium - Total	0.0181	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Chromium - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Lead - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC
Molybdenum - Total	0.0317	mg/l	0.0020	6020B	25 Mar 21 15:45	CC
Selenium - Total	0.0641	mg/l	0.0050	6020B	25 Mar 21 15:45	CC
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	25 Mar 21 15:45	CC

Approved by: Claudette K. Carroll 8 April

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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 31 Mar 21
Lab Number: 21-W473
Work Order #: 82-0562
Account #: 002800
Date Sampled: 17 Mar 21 8:48
Date Received: 17 Mar 21 14:05
Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: MW120

Temp at Receipt: 1.2C

Event and Year: Spring 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 21 14:08	MDE
Lithium - Total	0.120	mg/l	0.020	6010D	24 Mar 21 12:18	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	26 Mar 21 9:43	CC
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	26 Mar 21 9:43	CC
Barium - Total	0.0201	mg/l	0.0020	6020B	26 Mar 21 9:43	CC
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	26 Mar 21 9:43	CC
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	26 Mar 21 9:43	CC
Chromium - Total	0.0024	mg/l	0.0020	6020B	26 Mar 21 9:43	CC
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	26 Mar 21 9:43	CC
Lead - Total	< 0.0005	mg/l	0.0005	6020B	26 Mar 21 9:43	CC
Molybdenum - Total	0.0020	mg/l	0.0020	6020B	26 Mar 21 9:43	CC
Selenium - Total	< 0.005	mg/l	0.0050	6020B	26 Mar 21 9:43	CC
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	26 Mar 21 9:43	CC

CC

Approved by: Claudette K. Carroll 8 Apr 21

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

MVTL

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
ACIL

Quality Control Report

Lab IDs: 21-W465 to 21-W473 **Project:** MDU Lewis & Clark **Work Order:** 202182-0562

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 - Total mg/l	0.1000	106	80-120	0.100	21-W463	< 0.001	0.1044	104	75-125						-	-	< 0.001
	0.1000	103	80-120	0.400	21-W463	< 0.001	0.4106	103	75-125	0.4106	0.4372	109	6.3	20	-	-	< 0.001
				0.400	21-W474	< 0.001	0.4182	105	75-125	0.4182	0.4300	108	2.8	20	-	-	
				0.100	21-W508	< 0.001	0.1006	101	75-125	0.1006	0.0964	96	4.3	20	-	-	
Arsenic - Total mg/l	0.1000	103	80-120	0.100	21-W463	< 0.002	0.1015	102	75-125						-	-	< 0.002
	0.1000	102	80-120	0.400	21-W463	< 0.002	0.3992	100	75-125	0.3992	0.4268	107	6.7	20	-	-	< 0.002
				0.400	21-W474	< 0.002	0.4138	103	75-125	0.4138	0.4274	107	3.2	20	-	-	
				0.100	21-W508	< 0.002	0.0986	99	75-125	0.0986	0.0968	97	1.8	20	-	-	
Barium - Total mg/l	0.1000	101	80-120	0.100	21-W463	0.1066	0.2047	98	75-125						-	-	< 0.002
	0.1000	102	80-120	0.400	21-W463	0.1066	0.4966	98	75-125	0.4966	0.5164	102	3.9	20	-	-	< 0.002
				0.400	21-W474	0.0823	0.4734	98	75-125	0.4734	0.4940	103	4.3	20	-	-	
				0.100	21-W508	0.0094	0.1068	97	75-125	0.1068	0.1032	94	3.4	20	-	-	
Beryllium - Total mg/l	0.1000	100	80-120	0.100	21-W463	< 0.0005	0.1046	105	75-125						-	-	< 0.0005
	0.1000	102	80-120	0.400	21-W463	< 0.0005	0.4064	102	75-125	0.4064	0.4300	108	5.6	20	-	-	< 0.0005
				0.400	21-W474	< 0.0005	0.4422	111	75-125	0.4422	0.4570	114	3.3	20	-	-	
				0.100	21-W508	< 0.0005	0.1066	107	75-125	0.1066	0.1018	102	4.6	20	-	-	
Cadmium - Total mg/l	0.1000	106	80-120	0.100	21-W463	< 0.0005	0.0954	95	75-125						-	-	< 0.0005
	0.1000	105	80-120	0.400	21-W463	< 0.0005	0.3940	98	75-125	0.3940	0.4138	103	4.9	20	-	-	< 0.0005
				0.400	21-W474	< 0.0005	0.4026	101	75-125	0.4026	0.4154	104	3.1	20	-	-	
				0.100	21-W508	< 0.0005	0.0917	92	75-125	0.0917	0.0884	88	3.7	20	-	-	
Chromium - Total mg/l	0.1000	100	80-120	0.100	21-W463	0.0034	0.1077	104	75-125						-	-	< 0.002
	0.1000	102	80-120	0.400	21-W463	0.0034	0.3882	96	75-125	0.3882	0.4112	102	5.8	20	-	-	< 0.002
	0.1000	103	80-120	0.400	21-W474	0.0050	0.4008	99	75-125	0.4008	0.4228	104	5.3	20	-	-	< 0.002
				0.100	21-W508	< 0.002	0.1066	107	75-125	0.1066	0.1036	104	2.9	20	-	-	

MVTL

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
ACIL

Quality Control Report

Lab IDs: 21-W465 to 21-W473 **Project:** MDU Lewis & Clark **Work Order:** 202182-0562

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
Cobalt - Total mg/l	0.1000	102	80-120	0.100	21-W463	< 0.002	0.1026	103	75-125						-	-	< 0.002
	0.1000	104	80-120	0.400	21-W463	< 0.002	0.3832	96	75-125	0.3832	0.4070	102	6.0	20	-	-	< 0.002
				0.400	21-W474	< 0.002	0.3996	100	75-125	0.3996	0.4198	105	4.9	20	-	-	
				0.100	21-W508	< 0.002	0.1050	105	75-125	0.1050	0.1020	102	2.9	20	-	-	
Lead - Total mg/l	0.1000	102	80-120	0.100	21-W463	0.0013	0.0963	95	75-125						-	-	< 0.0005
	0.1000	102	80-120	0.400	21-W463	0.0013	0.3956	99	75-125	0.3956	0.4118	103	4.0	20	-	-	< 0.0005
				0.400	21-W474	< 0.0005	0.3876	97	75-125	0.3876	0.4002	100	3.2	20	-	-	
				0.100	21-W508	< 0.0005	0.0933	93	75-125	0.0933	0.0895	89	4.2	20	-	-	
Lithium - Total mg/l	0.400	108	80-120	0.400	21-W463	0.047	0.493	112	75-125	0.493	0.507	115	2.8	20	-	-	< 0.02
	0.400	105	80-120	0.400	21-W474	0.201	0.647	112	75-125	0.647	0.672	118	3.8	20	-	-	< 0.02
															-	-	< 0.02
															-	-	< 0.02
Mercury - Total mg/l	0.0020	95	85-115	0.100	21-M1496	< 0.01	0.1001	100	70-130						-	-	< 0.0002
				0.002	21-W465	< 0.0002	0.0020	100	70-130	0.0020	0.0019	95	5.1	20	-	-	
				0.002	21-W476	< 0.0002	0.0019	95	70-130	0.0019	0.0019	95	0.0	20	-	-	
				0.002	A10157Q	< 0.0002	0.0021	105	70-130	0.0021	0.0020	100	4.9	20	-	-	
Molybdenum - Total mg/l	0.1000	91	80-120	0.100	21-W463	0.0022	0.1098	108	75-125						-	-	< 0.002
	0.1000	107	80-120	0.400	21-W463	0.0022	0.3874	96	75-125	0.3874	0.4228	105	8.7	20	-	-	< 0.002
	0.1000	105	80-120	0.400	21-W474	0.0423	0.4670	106	75-125	0.4670	0.4834	110	3.5	20	-	-	< 0.002
				0.100	21-W508	< 0.002	0.1100	110	75-125	0.1100	0.1056	106	4.1	20	-	-	
Selenium - Total mg/l	0.1000	110	80-120	0.100	21-W463	< 0.005	0.0902	90	75-125						-	-	< 0.005
	0.1000	100	80-120	0.400	21-W463	< 0.005	0.3760	94	75-125	0.3760	0.4128	103	9.3	20	-	-	< 0.005
				0.400	21-W474	0.0202	0.4120	98	75-125	0.4120	0.4472	107	8.2	20	-	-	
				0.100	21-W508	< 0.005	0.0908	91	75-125	0.0908	0.0872	87	4.0	20	-	-	
Thallium - Total mg/l	0.1000	102	80-120	0.100	21-W463	< 0.0005	0.0940	94	75-125						-	-	< 0.0005
	0.1000	96	80-120	0.400	21-W463	< 0.0005	0.3894	97	75-125	0.3894	0.4058	101	4.1	20	-	-	< 0.0005
				0.400	21-W474	< 0.0005	0.3684	92	75-125	0.3684	0.3838	96	4.1	20	-	-	
				0.100	21-W508	< 0.0005	0.0892	89	75-125	0.0892	0.0856	86	4.1	20	-	-	

MVTL

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
ACIL

Quality Control Report

Lab IDs: 21-W465 to 21-W473 **Project:** MDU Lewis & Clark **Work Order:** 202182-0562

Samples were received on 17 Mar 2021 at 1405.
Temperature upon receipt at the Bismarck laboratory was 1.2°C.
All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
All holding times were met.
Approved methodology was followed for all sample analyses.
All acceptance criteria were met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/duplicates unless noted here:

Approved by: C. Lamb

8 Apr 21

Field Datasheet

Groundwater Assessment

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

Company:	**MDU Lewis & Clark**
Event:	**March 2021**
Sample ID:	103
Sampling Personal:	Jay, Mgr

Weather Conditions: Temp: 45 °F Wind: E @ 5-10 Precip: **Sunny / ~~Partly Cloudy~~ / Cloudy**

WELL INFORMATION

Well Locked?	YES	(NO)	
Well Labeled?	(YES)	NO	
Casing Strait?	(YES)	NO	
Grout Seal Intact?	YES	NO	(Not Visible)
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	11.36	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:	11.34	ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	(NO)

Duplicate Sample?	YES	(NO)
Duplicate Sample ID:	—	

Bottle List:	
1 Liter Raw	~~4- 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:		
Purge:	5	Sec.
Recover:	25	Sec.
PSI:	20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
15 Mar 21	1405	**Start of Well Purge**									
	1410	8.99	2267	7.51	0.60	96.3	122.15	11.34	100.0	500.0	Slightly turbid
	1440	8.06	1358	7.50	0.29	69.3	33.19	11.33	100.0	3000.0	Clear
	1500	8.07	1331	7.50	0.17	33.5	12.99	11.33	100.0	2000.0	Clear
	1510	7.89	1320	7.50	0.14	8.0	8.15	11.34	100.0	1000.0	Clear
	1520	7.94	1317	7.50	0.13	-3.2	3.81	11.33	100.0	1000.0	Clear
	1525	7.96	1315	7.50	0.12	-9.3	3.90	11.33	100.0	500.0	Clear
	1530	7.89	1316	7.50	0.11	-11.9	2.45	11.34	100.0	500.0	Clear

Well Stabilized? (YES) NO

Total Volume Purged: 8500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
15 Mar 21	1530	7.89	1316	7.50			2.45				Clear

Comments:	

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**March 2021**
Sample ID:	110
Sampling Personal:	

Weather Conditions: Temp: 40°F Wind: E @ 5-10 Precip: **Sunny / ~~Partly Cloudy~~ / Cloudy**

WELL INFORMATION

Well Locked?	YES	(NO)	
Well Labeled?	(YES)	NO	
Casing Strait?	(YES)	NO	
Grout Seal Intact?	(YES)	NO	Not Visible
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	9.89	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:	9.98	ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	(NO)

Duplicate Sample?	YES	(NO)
Duplicate Sample ID:	—	

Control Settings:		
Purge:	5	Sec.
Recover:	10	Sec.
PSI:	20	

Bottle List:

- 1 Liter Raw ~~4-1L Nitric~~
- 500mL Nitric
- 500mL Nitric (filtered)
- 250mL Sulfuric

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
15 Mar 21	1110	**Start of Well Purge**									
	1115	6.47	1086	7.47	5.11	201.7	47.22	9.94	100.0	500.0	Clear
	1145	5.92	1094	7.52	2.53	100.2	12.72	9.96	100.0	3000.0	Clear
	1205	6.00	1094	7.51	2.22	116.7	1.98	9.97	100.0	2000.0	Clear
	1210	6.05	1094	7.51	2.22	123.0	1.67	9.97	100.0	500.0	Clear
	1215	6.23	1094	7.51	2.19	122.8	1.82	9.97	100.0	500.0	Clear

Well Stabilized? (YES) NO

Total Volume Purged: 6500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
15 Mar 21	1215	6.23	1094	7.51			1.82				Clear

Comments:	

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**March 2021**
Sample ID:	19
Sampling Personal:	Jay Meyer

Weather Conditions: Temp: 40°F Wind: E @ 5-10 Precip: **Sunny / ~~Partly Cloudy~~ / Cloudy**

WELL INFORMATION

Well Locked?	YES	~~NO~~
Well Labeled?	~~YES~~	NO
Casing Strait?	~~YES~~	NO
Grout Seal Intact?	~~YES~~	NO Not Visible
Repairs Necessary?		

Casing Diameter:	2"	
Water Level Before Purge:	9.70	ft
Total Depth of Well:	—	ft
Well Volume:	—	liters
Depth to Top of Pump:	—	ft
Water Level After Sample:	9.79	ft
Measurement Method:	Electric Water Level Indicator	

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	~~NO~~

Duplicate Sample?	YES	~~NO~~
Duplicate Sample ID:	—	

Bottle List:	
1 Liter Raw	~~4- 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:		
Purge:	5	Sec.
Recover:	55	Sec.
PSI:	20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
15 Mar 21	1240	Start of Well Purge									
	1245	6.82	1126	7.50	2.47	98.3	38.26	9.81	100.0	500.0	Clear
	1315	7.23	1137	7.48	1.51	116.9	13.29	9.79	100.0	3000.0	Clear
	1335	7.04	1142	7.48	1.54	125.2	2.77	9.79	100.0	2000.0	Clear
	1340	7.05	1143	7.48	1.55	125.0	2.90	9.79	100.0	500.0	Clear
	1345	7.16	1143	7.48	1.54	125.8	1.09	9.79	100.0	500.0	Clear

Well Stabilized? YES ~~NO~~ Total Volume Purged: 6500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
15 Mar 21	1345	7.16	1143	7.48			1.09				Clear

Comments:	

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: **MDU Lewis & Clark**

Event: **March 2021**

Sample ID: 111

Sampling Personal: Jay Clay

Weather Conditions: Temp: 40 °F Wind: N @5-10 Precip: **Sunny / Partly Cloudy / (Cloudy)**

WELL INFORMATION

Well Locked?	YES	(NO)	
Well Labeled?	(YES)	NO	
Casing Strait?	YES	NO	Grade well
Grout Seal Intact?	YES	NO	(Not Visible)
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	8.11	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:	8.23	ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	(NO)

Duplicate Sample?	(YES)	NO
Duplicate Sample ID:	Dup 1	

Bottle List:	
1 Liter Raw	~~1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:		
Purge:	5	Sec.
Recover:	55	Sec.
PSI:	20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
16 Mar 21	0928	Start of Well Purge									
	0933	4.87	4045	7.31	3.44	176.3	57.02	8.32	100.0	500.0	Clear
	1003	5.09	3167	7.42	2.06	125.9	60.12	8.21	100.0	3000.0	Clear
	1023	4.98	3000	7.45	2.40	83.5	12.60	8.24	100.0	2000.0	Clear
	1033	4.96	2983	7.45	2.43	79.4	6.90	8.25	100.0	1000.0	Clear
	1043	5.01	2965	7.45	2.56	78.3	1.19	8.25	100.0	1000.0	Clear
	1048	5.02	2957	7.45	2.63	78.9	1.23	8.24	100.0	500.0	Clear
	1053	4.99	2951	7.46	2.75	75.3	0.76	8.25	100.0	500.0	Clear

Well Stabilized? (YES) NO

Total Volume Purged: 8500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment
											Clarity, Color, Odor, Ect.
16 Mar 21	1053	4.99	2951	7.46	7		0.76				Clear

Comments:

Field Datasheet

Groundwater Assessment

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

Company:	**MDU Lewis & Clark**
Event:	**March 2021**
Sample ID:	117
Sampling Personal:	Jeremy

Weather Conditions: Temp: 40 °F Wind: N @ 5-10 Precip: **Sunny / Partly Cloudy / Cloudy**

WELL INFORMATION

Well Locked?	YES	NO	
Well Labeled?	YES	NO	
Casing Strait?	YES	NO	
Grout Seal Intact?	YES	NO	Not Visible
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	8.14	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	9.48	ft	
Water Level After Sample:	Below Pump	ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	NO

Duplicate Sample?	YES	NO
Duplicate Sample ID:	—	

Bottle List:
- 1 Liter Raw ~~4-1L Nitric~~
- 500mL Nitric
- 500mL Nitric (filtered)
- 250mL Sulfuric

Control Settings:		
Purge:	~~5~~ 5	Sec.
Recover:	25	Sec.
PSI:	20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
15 Mar 21	1545	**Start of Well Purge**									
	1550	5.12	6010	7.58	10.03	175.8	42.41	9.01	100.0	500.0	Clear
	1600	4.76	6020	7.47	7.77	151.9	133.72	Below Pump	100.0	1000.0	clear
		Purged	Dry								
16 Mar 21	0852	~~Started~~	Purged for 5min					9.20	~~100.0~~	~~500.0~~	
	0857	4.40	6806	7.54	8.78	132.3	16.39	Below Pump	100.0	500.0	Clear
		—									

Well Stabilized? YES (NO)

Total Volume Purged: 2500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
16 Mar 21	0857	4.40	6806	7.54			16.39				Clear

Comments:	

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**March 2021**
Sample ID:	11B
Sampling Personal:	

Weather Conditions: Temp: 40 °F Wind: N @ 5-10 Precip: **Sunny / Partly Cloudy / (Cloudy)**

WELL INFORMATION

Well Locked?	**YES**	(NO)	
Well Labeled?	(YES)	**NO**	
Casing Strait?	(YES)	**NO**	
Grout Seal Intact?	(YES)	**NO**	**Not Visible**
Repairs Necessary?			
Casing Diameter:	**2"**		
Water Level Before Purge:	8.91	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:	8.93	ft	
Measurement Method:	**Electric Water Level Indicator**		

SAMPLING INFORMATION

Purging Method:	**Bladder**	
Sampling Method:	**Bladder**	
Dedicated Equipment?	**YES**	(NO)

Duplicate Sample?	**YES**	(NO)
Duplicate Sample ID:		

Bottle List:	
1 Liter Raw	~~4- 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:		
Purge:	5	Sec.
Recover:	55	Sec.
PSI:	20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
16 Mar 21	1138	**Start of Well Purge**									
	1143	4.30	1506	7.70	4.09	193.8	69.82	8.92	100.0	500.0	Clear
	1213	4.43	1408	7.67	2.85	176.7	5.66	8.93	100.0	3000.0	clear
	1223	4.57	1410	7.67	2.81	170.6	1.72	8.93	100.0	1000.0	Clear
	1228	4.50	1411	7.67	2.81	166.9	1.38	8.94	100.0	500.0	Clear
	1233	4.49	1413	7.67	2.80	171.1	1.80	8.94	100.0	500.0	Clear

Well Stabilized? (YES) NO Total Volume Purged: _____ mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
16 Mar 21	1233	4.49	1413	7.67			1.80				Clear

Comments:	Collected FB @ 1215

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**March 2021**
Sample ID:	120
Sampling Personal:	

Weather Conditions: Temp: 40 °F Wind: N @ 5-10 Precip: **Sunny / Partly Cloudy / Cloudy**

WELL INFORMATION

Well Locked?	**YES**	~~NO~~	
Well Labeled?	~~YES~~	**NO**	
Casing Strait?	~~YES~~	**NO**	
Grout Seal Intact?	**YES**	**NO**	**Not Visible**
Repairs Necessary?			
Casing Diameter:	**2"**		
Water Level Before Purge:	15.39		ft
Total Depth of Well:			ft
Well Volume:	—		liters
Depth to Top of Pump:	15.43		ft
Water Level After Sample:	Below Purge		ft
Measurement Method:	**Electric Water Level Indicator**		

SAMPLING INFORMATION

Purging Method:	**Bladder**	
Sampling Method:	**Bladder**	
Dedicated Equipment?	**YES**	**NO**

Duplicate Sample?	~~YES~~	**NO**
Duplicate Sample ID:	—	

Bottle List:	
1 Liter Raw	~~4- 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge: 5	Sec.
Recover: 85	Sec.
PSI: 20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
16 Mar 21	0837	**Start of Well Purge**									
	0842	5.45	5989	6.87	1.13	137.6	7.49	Below Pump	100.0	500.0	Clear
	0847	5.65	5983	6.85	0.68	119.6	0.41	BP	100.0	500.0	Clear
		Purged	Dry								
17 Mar 21	0843	Purged	well for	5 min				Below Pump			
	0848	3.63	6343	6.88	1.72	214.1	75.32	BP	100.0	500.0	Clear

Well Stabilized? **YES** (**NO**) Total Volume Purged: 1500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
17 Mar 21	0848	3.63	6343	6.88			75.32				Clear

Comments:	

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

Field Datasheet

Surface water Assessment

Company:	**MDU Lewis & Clark**
Event:	**March 2021**
Sample ID:	—
Sampling Personal:	

Weather Conditions: Temp: 40 °F Wind: N @ 5-10 Precip: **Sunny / Partly Cloudy / Cloudy**

Well ID	Date	Time	Casing Diameter	Water Level (ft)		Comments
MW101	16 **Mar 2021**	1605	2"	9.94		
MW105	16 **Mar 2021**	1557	2"	9.40		
MW106	16 **Mar 2021**	1559	2"	9.88		
MW107	16 **Mar 2021**	1607	2"	4.85		
MW108	16 **Mar 2021**	1601	2"	17.15		
MW116	16 **Mar 2021**	1603	2"	14.65		

MVTL

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

Chain of Custody Record

Project Name:	Event:	Work Order Number:
MDU Lewis & Clark	March 2021	82-0562

Report To:	MDU Lewis & Clark	CC:	Collected By:
Attn:	Todd Peterson		
Address:	400 N. 4th St Bismarck, ND 58501		
Phone:	701-425-2427		
Email:	Todd.Peterson@mdu.com		

Lab Number	Sample ID	Date	Time	Sample Type	1 Liter Raw	500 mL Nitric	500 mL Nitric (filtered)	250 mL Sulfuric	1 Liter Nitric	Temp (°C)	Spec. Cond.	pH	Turbidity (NTU)	Analysis Required
W465	Dup 1	16 Mar 21	NA	GW	X	X	X	X		NA	NA	NA	NA	MDU Lewis & Clark List
W466	Field Blank (FB)	16 Mar 21	NA	GW	X	X	X	X		NA	NA	NA	NA	
W467	MW103	15 Mar 21	1530	GW	X	X	X	X		7.89	1316	7.50	2.45	
W468	MW110	15 Mar 21	1215	GW	X	X	X	X		6.23	1094	7.51	1.82	
W469	MW119	15 Mar 21	1345	GW	X	X	X	X		7.16	1143	7.48	1.09	
W470	MW111	16 Mar 21	1053	GW	X	X	X	X		4.99	2951	7.46	0.76	
W471	MW117	16 Mar 21	0857	GW	X	X	X	X		4.40	6806	7.54	16.39	
W472	MW118	16 Mar 21	1233	GW	X	X	X	X		4.49	1413	7.67	1.80	
W473	MW120	17 Mar 21	0848	GW	X	X	X	X		3.63	6343	6.88	75.32	

Comments:

Relinquished By		Sample Condition		Received By		
Name	Date/Time	Location	Temp (°C)	Name		Date/Time
1	17 Mar 21 1405	~~Log In~~ Walk In #2	1.2 TM562 / TM805			17 mar 21 1405
2						

MINNESOTA VALLEY TESTING LABORATORIES, INC.
1126 North Front 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

APP III

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3474
Work Order #: 82-2512
Account #: 002800
Date Sampled: 13 Sep 21
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: Dup 1

Temp at Receipt: 3.8C

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH	* 7.2	units	0.1	SM4500-H+-B-11	16 Sep 21 17:00	RAA
Fluoride	0.50	mg/l	0.10	SM4500-F-C	16 Sep 21 17:00	RAA
Sulfate	200	mg/l	5.00	ASTM D516-11	17 Sep 21 15:07	EV
Chloride	31.0	mg/l	2.0	SM4500-Cl-E-11	17 Sep 21 9:21	EV
Total Dissolved Solids	733	mg/l	10	USGS I1750-85	17 Sep 21 15:46	AC
Calcium - Total	95.9	mg/l	1.0	6010D	20 Sep 21 11:28	SZ
Boron - Total	0.27	mg/l	0.10	6010D	28 Sep 21 10:46	SZ

* Holding time exceeded

CC
Approved by: Claudette K. Carrep 7OCT21

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

MINNESOTA VALLEY TESTING LABORATORIES, INC.
1126 North Front 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
MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3475
Work Order #: 82-2512
Account #: 002800
Date Sampled: 14 Sep 21
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

PO #: 185967 OP

Temp at Receipt: 3.8C

Project Name: MDU Lewis & Clark

Sample Description: Field Blank (FB)

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH	* 5.7	units	0.1	SM4500-H+-B-11	16 Sep 21 17:00	RAA
Fluoride	< 0.1	mg/l	0.10	SM4500-F-C	16 Sep 21 17:00	RAA
Sulfate	< 5	mg/l	5.00	ASTM D516-11	17 Sep 21 15:07	EV
Chloride	< 2	mg/l	2.0	SM4500-Cl-E-11	17 Sep 21 9:21	EV
Total Dissolved Solids	< 10	mg/l	10	USGS I1750-85	17 Sep 21 15:46	AC
Calcium - Total	< 1	mg/l	1.0	6010D	20 Sep 21 11:28	SZ
Boron - Total	< 0.1	mg/l	0.10	6010D	28 Sep 21 10:46	SZ

* Holding time exceeded

CC

Approved by: Claudette K. Carroll 7OCT21

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
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
MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3476
Work Order #: 82-2512
Account #: 002800
Date Sampled: 14 Sep 21 9:35
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

PO #: 185967 OP

Temp at Receipt: 3.8C

Project Name: MDU Lewis & Clark

Sample Description: MW103

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.31	units	NA	SM 4500 H+ B	14 Sep 21 9:35	JSM
pH	* 7.2	units	0.1	SM4500-H+-B-11	16 Sep 21 17:00	RAA
Temperature - Field	14.8	Degrees C	NA	SM 2550B	14 Sep 21 9:35	JSM
Conductivity - Field	1426	umhos/cm	1	EPA 120.1	14 Sep 21 9:35	JSM
Fluoride	0.75	mg/l	0.10	SM4500-F-C	16 Sep 21 17:00	RAA
Sulfate	154	mg/l	5.00	ASTM D516-11	17 Sep 21 15:07	EV
Chloride	34.3	mg/l	2.0	SM4500-Cl-E-11	17 Sep 21 9:58	EV
Total Dissolved Solids	968	mg/l	10	USGS I1750-85	17 Sep 21 15:46	AC
Calcium - Total	95.3	mg/l	1.0	6010D	20 Sep 21 11:28	SZ
Boron - Total	1.20	mg/l	0.10	6010D	28 Sep 21 10:46	SZ

* Holding time exceeded

Approved by: Claudette K. Carroll CC 7OCT21

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
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
MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3477
Work Order #: 82-2512
Account #: 002800
Date Sampled: 13 Sep 21 11:00
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: MW110

Temp at Receipt: 3.8C

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.23	units	NA	SM 4500 H+ B	13 Sep 21 11:00	JSM
pH	* 7.2	units	0.1	SM4500-H+-B-11	16 Sep 21 17:00	RAA
Temperature - Field	16.4	Degrees C	NA	SM 2550B	13 Sep 21 11:00	JSM
Conductivity - Field	1112	umhos/cm	1	EPA 120.1	13 Sep 21 11:00	JSM
Fluoride	0.54	mg/l	0.10	SM4500-F-C	16 Sep 21 17:00	RAA
Sulfate	203	mg/l	5.00	ASTM D516-11	17 Sep 21 15:07	EV
Chloride	29.6	mg/l	2.0	SM4500-Cl-E-11	17 Sep 21 9:58	EV
Total Dissolved Solids	723	mg/l	10	USGS I1750-85	17 Sep 21 15:46	AC
Calcium - Total	88.2	mg/l	1.0	6010D	20 Sep 21 11:28	SZ
Boron - Total	0.26	mg/l	0.10	6010D	28 Sep 21 10:46	SZ

* Holding time exceeded

Approved by: Claudette K Carrep CC 10CT21

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
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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3478
Work Order #: 82-2512
Account #: 002800
Date Sampled: 13 Sep 21 13:14
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: MW119

Temp at Receipt: 3.8C

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.26	units	NA	SM 4500 H+ B	13 Sep 21 13:14	JSM
pH	* 7.2	units	0.1	SM4500-H+-B-11	16 Sep 21 17:00	RAA
Temperature - Field	17.9	Degrees C	NA	SM 2550B	13 Sep 21 13:14	JSM
Conductivity - Field	1155	umhos/cm	1	EPA 120.1	13 Sep 21 13:14	JSM
Fluoride	0.50	mg/l	0.10	SM4500-F-C	16 Sep 21 17:00	RAA
Sulfate	211	mg/l	5.00	ASTM D516-11	17 Sep 21 15:07	EV
Chloride	31.1	mg/l	2.0	SM4500-Cl-E-11	17 Sep 21 9:58	EV
Total Dissolved Solids	747	mg/l	10	USGS I1750-85	17 Sep 21 15:46	AC
Calcium - Total	95.6	mg/l	1.0	6010D	20 Sep 21 12:28	SZ
Boron - Total	0.27	mg/l	0.10	6010D	28 Sep 21 10:46	SZ

* Holding time exceeded

Approved by: Claudette K. Carroll CC 7OCT21

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
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
MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3479
Work Order #: 82-2512
Account #: 002800
Date Sampled: 14 Sep 21 11:37
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: MW111

Temp at Receipt: 3.8C

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.11	units	NA	SM 4500 H+ B	14 Sep 21 11:37	JSM
pH	* 7.1	units	0.1	SM4500-H+-B-11	16 Sep 21 17:00	RAA
Temperature - Field	15.1	Degrees C	NA	SM 2550B	14 Sep 21 11:37	JSM
Conductivity - Field	3753	umhos/cm	1	EPA 120.1	14 Sep 21 11:37	JSM
Fluoride	2.13	mg/l	0.10	SM4500-F-C	16 Sep 21 17:00	RAA
Sulfate	2170	mg/l	5.00	ASTM D516-11	17 Sep 21 15:07	EV
Chloride	34.5	mg/l	2.0	SM4500-Cl-E-11	17 Sep 21 9:58	EV
Total Dissolved Solids	3680	mg/l	10	USGS I1750-85	17 Sep 21 15:46	AC
Calcium - Total	184	mg/l	1.0	6010D	20 Sep 21 12:28	SZ
Boron - Total	9.66	mg/l	0.10	6010D	28 Sep 21 11:46	SZ

* Holding time exceeded

Approved by: Claudette K. Carroll CC 7OCT21

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
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
MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3480
Work Order #: 82-2512
Account #: 002800
Date Sampled: 14 Sep 21 10:07
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: MW117

Temp at Receipt: 3.8C

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.15	units	NA	SM 4500 H+ B	14 Sep 21 10:07	JSM
pH	* 7.1	units	0.1	SM4500-H+-B-11	16 Sep 21 17:00	RAA
Temperature - Field	14.7	Degrees C	NA	SM 2550B	14 Sep 21 10:07	JSM
Conductivity - Field	6997	umhos/cm	1	EPA 120.1	14 Sep 21 10:07	JSM
Fluoride	0.30	mg/l	0.10	SM4500-F-C	16 Sep 21 17:00	RAA
Sulfate	4960	mg/l	5.00	ASTM D516-11	17 Sep 21 15:07	EV
Chloride	45.6	mg/l	2.0	SM4500-Cl-E-11	17 Sep 21 9:58	EV
Total Dissolved Solids	7540	mg/l	10	USGS I1750-85	17 Sep 21 15:46	AC
Calcium - Total	348	mg/l	1.0	6010D	20 Sep 21 12:28	SZ
Boron - Total	9.15	mg/l	0.10	6010D	28 Sep 21 11:46	SZ

* Holding time exceeded

CC
7OCT21

Approved by: Claudette K. Carroll

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
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
MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3481
Work Order #: 82-2512
Account #: 002800
Date Sampled: 14 Sep 21 12:42
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: MW118

Temp at Receipt: 3.8C

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.32	units	NA	SM 4500 H+ B	14 Sep 21 12:42	JSM
pH	* 7.2	units	0.1	SM4500-H+-B-11	16 Sep 21 17:00	RAA
Temperature - Field	18.0	Degrees C	NA	SM 2550B	14 Sep 21 12:42	JSM
Conductivity - Field	1488	umhos/cm	1	EPA 120.1	14 Sep 21 12:42	JSM
Fluoride	1.13	mg/l	0.10	SM4500-F-C	16 Sep 21 17:00	RAA
Sulfate	426	mg/l	5.00	ASTM D516-11	17 Sep 21 15:07	EV
Chloride	26.0	mg/l	2.0	SM4500-Cl-E-11	17 Sep 21 9:58	EV
Total Dissolved Solids	1120	mg/l	10	USGS I1750-85	17 Sep 21 15:46	AC
Calcium - Total	82.9	mg/l	1.0	6010D	20 Sep 21 12:28	SZ
Boron - Total	1.58	mg/l	0.10	6010D	28 Sep 21 11:46	SZ

* Holding time exceeded

Approved by: Claudette K. Carrol CC 10CT21

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
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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3482
Work Order #: 82-2512
Account #: 002800
Date Sampled: 13 Sep 21 15:35
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: MW120

Temp at Receipt: 3.8C

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	6.66	units	NA	SM 4500 H+ B	13 Sep 21 15:35	JSM
pH	* 6.9	units	0.1	SM4500-H+-B-11	16 Sep 21 17:00	RAA
Temperature - Field	14.7	Degrees C	NA	SM 2550B	13 Sep 21 15:35	JSM
Conductivity - Field	6677	umhos/cm	1	EPA 120.1	13 Sep 21 15:35	JSM
Fluoride	0.44	mg/l	0.10	SM4500-F-C	16 Sep 21 17:00	RAA
Sulfate	4650	mg/l	5.00	ASTM D516-11	20 Sep 21 15:47	EV
Chloride	73.8	mg/l	2.0	SM4500-Cl-E-11	17 Sep 21 9:58	EV
Total Dissolved Solids	7400	mg/l	10	USGS I1750-85	17 Sep 21 15:46	AC
Calcium - Total	479	mg/l	1.0	6010D	20 Sep 21 12:28	SZ
Boron - Total	13.3	mg/l	0.10	6010D	28 Sep 21 11:46	SZ

* Holding time exceeded

Approved by: Claudette K. Carroll CC 10CT21

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

MVTL

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
ACIL

Quality Control Report

Lab IDs: 21-W3474 to 21-W3482 **Project:** MDU Lewis & Clark **Work Order:** 202182-2512

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 - Total mg/l	0.40 0.40	100 98	80-120 80-120	0.400 2.00 0.400 0.400	21-D2919 21-W3451 21-W3474 21-W3481	0.34 2.95 0.27 1.58	0.68 4.76 0.68 1.93	85 91 102 88	75-125 75-125 75-125 75-125	0.68 4.76 0.68 1.93	0.68 4.68 0.66 1.94	85 86 98 90	0.0 1.7 3.0 0.5	20 20 20 20	- - - -	- - - -	< 0.1 < 0.1 < 0.1 < 0.1
Calcium - Total mg/l	100 100	109 106	80-120 80-120	100 100	21-W3468 21-W3487	152 59.6	245 151	93 91	75-125 75-125	245 151	243 152	91 92	0.8 0.7	20 20	- - - -	- - - -	< 1 < 1 < 1 < 1
Chloride mg/l	30.0 30.0 30.0 30.0	93 93 93 93	80-120 80-120 80-120 80-120	30.0 30.0	21-W3469 21-W3489	142 7.6	177 35.4	117 93	80-120 80-120	177 35.4	177 35.3	117 92	0.0 0.3	20 20	- - - -	- - - -	< 2 < 2 < 2 < 2
Fluoride mg/l	0.50	106	90-110	0.500	21-W3479	2.13	2.55	84	80-120	2.55	2.55	84	0.0	20	- -	- -	< 0.1 < 0.1
pH units	- -	- -	- -	- -	- -	- -	- -	- -	- -	7.1 7.9	7.3 8.0	- -	2.8 1.3	20 20	- -	- -	- -
Sulfate mg/l	100 100 100	99 98 102	80-120 80-120 80-120	500 500 2000	21-W3462 21-W3474 21-W3483	417 200 2600	880 714 4370	93 103 88	80-120 80-120 80-120	880 714 4370	879 705 4290	92 101 84	0.1 1.3 1.8	20 20 20	- - -	- - -	< 5 < 5 < 5
Total Dissolved Solids mg/l	-	-	-	-	-	-	-	-	-	4300	4280	-	0.5	20	-	-	< 10

Samples were received in good condition on 16 Sep 2021 at 0745.
Temperature upon receipt at the Bismarck laboratory was 3.8°C.
All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
With the exception of pH, all holding times were met.
Approved methodology was followed for all sample analyses.
All acceptance criteria were met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/duplicates unless noted here:

Approved by: C. Crutcher
7 OCT 21

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**Fall 2021**
Sample ID:	103
Sampling Personal:	JM

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

WELL INFORMATION

Well Locked?	YES	~~NO~~	
Well Labeled?	~~YES~~	NO	
Casing Strait?	~~YES~~	NO	
Grout Seal Intact?	YES	NO	~~Not Visible~~
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	10.76	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:	10.81	ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	~~NO~~

Duplicate Sample?	YES	~~NO~~
Duplicate Sample ID:	—	

Bottle List:	
1 Liter Raw	~~4 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge:	5 Sec.
Recover:	55 Sec.
PSI:	20

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		Clarity, Color, Odor, Ect.
											clear, slightly turbid, turbid
14 Sep 21	0810	**Start of Well Purge**									
	0815	13.13	3018	7.37	0.67	192.7	36.69	10.80	100.0	500.0	Clear
	0845	14.31	1488	7.31	0.34	179.0	19.55	10.80	100.0	3000.0	Clear
	0915	14.43	1442	7.31	0.26	71.6	8.63	10.81	100.0	3000.0	Clear
	0925	14.87	1427	7.31	0.26	31.5	4.86	10.82	100.0	1000.0	Clear
	0930	14.85	1426	7.31	0.26	31.1	4.57	10.82	100.0	500.0	Clear
	0935	14.83	1426	7.31	0.25	30.1	4.02	10.82	100.0	500.0	Clear

Well Stabilized? YES NO Total Volume Purged: 8500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment
											Clarity, Color, Odor, Ect.
14 Sep 21	0935	14.83	1426	7.31			4.02				Clear

Comments:	

Field Datasheet

Groundwater Assessment

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company:	MDU Lewis & Clark
Event:	Fall 2021
Sample ID:	110
Sampling Personal:	JM

Weather Conditions: Temp: 60 °F Wind: N @ 5-10 Precip: Sunny / ~~Partly Cloudy~~ / Cloudy

WELL INFORMATION

Well Locked?	YES	(NO)	
Well Labeled?	(YES)	NO	
Casing Strait?	(YES)	NO	
Grout Seal Intact?	(YES)	NO	Not Visible
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	9.25	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:	9.34	ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	(NO)

Duplicate Sample?	YES	(NO)
Duplicate Sample ID:	—	

Bottle List:	
1 Liter Raw	~~4- 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge: 5	Sec.
Recover: 25	Sec.
PSI: 20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
13 Sept 21	1010	Start of Well Purge									
	1015	16.25	1146	7.18	3.38	225.7	16.52	9.28	100.0	500.0	Clear
	1045	16.18	1113	7.22	2.81	242.5	4.28	9.34	100.0	3000.0	clear
	1050	16.25	1114	7.23	2.82	250.6	3.62	9.35	100.0	500.0	Clear
	1055	16.30	1114	7.23	2.80	252.0	3.51	9.35	100.0	500.0	Clear
	1100	16.38	1112	7.23	2.80	250.9	3.88	9.34	100.0	500.0	Clear

Well Stabilized? (YES) NO

Total Volume Purged: 5000.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
13 Sept 21	1100	16.38	1112	7.23			3.88				Clear

Comments:	

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**Fall 2021**
Sample ID:	119
Sampling Personal:	

Weather Conditions: Temp: 65 °F Wind: N @ 5-10 Precip: **Sunny / Partly Cloudy / Cloudy**

WELL INFORMATION

Well Locked?	YES	(NO)	
Well Labeled?	(YES)	NO	
Casing Strait?	(YES)	NO	
Grout Seal Intact?	(YES)	NO	Not Visible
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	9.12	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:		ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	(NO)

Duplicate Sample?	(YES)	NO
Duplicate Sample ID:	Dup	

Bottle List:	
1 Liter Raw	~~4 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge: 5	Sec.
Recover: 55	Sec.
PSI: 20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
	1139	**Start of Well Purge**									
13 Sep 21	1144	17.07	1153	7.21	0.85	230.3	12.38	9.21	100.0	500.0	Clear
	1214	17.71	1153	7.20	1.07	255.0	19.05	9.20	100.0	3000.0	Clear
	1244	17.94	1150	7.25	1.41	148.9	7.09	9.18	100.0	3000.0	Clear
	1304	18.00	1150	7.26	1.52	126.0	5.01	9.19	100.0	2000.0	Clear
	1309	18.06	1148	7.26	1.52	125.5	4.82	9.18	100.0	500.0	Clear
	1314	17.92	1155	7.26	1.53	123.9	4.78	9.19	100.0	500.0	Clear

Well Stabilized? (YES) NO

Total Volume Purged: 9500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
13 Sep 21	1314	17.92	1155	7.26			4.78				Clear

Comments:	

Field Datasheet

Groundwater Assessment

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

Company:	MDU Lewis & Clark
Event:	Fall 2021
Sample ID:	111
Sampling Personal:	[signature]

Weather Conditions: Temp: 60 °F Wind: N @ 5-10 Precip: Sunny / Partly Cloudy / Cloudy (Partly Cloudy circled)

WELL INFORMATION

Well Locked?	YES	NO (circled)	
Well Labeled?	YES (circled)	NO	
Casing Strait?	YES (circled)	NO	
Grout Seal Intact?	YES	NO	Not Visible (circled)
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	7.95	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:	8.02	ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	NO (circled)
Duplicate Sample?	YES	NO (circled)
Duplicate Sample ID:	—	

Control Settings:		
Purge:	5	Sec.
Recover:	55	Sec.
PSI:	20	

Bottle List:	
1 Liter Raw	4 ~~1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
14 Sept 21	1032	Start of Well Purge									
	1037	14.69	4044	7.03	2.30	268.6	56.07	8.00	100.0	500.0	Clear
	1007	14.71	3806	7.09	1.72	141.4	15.67	8.00	100.0	3000.0	Clear
	1127	14.98	3743	7.11	2.20	77.3	4.20	8.01	100.0	2000.0	Clear
	1132	14.99	3750	7.11	2.30	75.5	2.19	8.01	100.0	500.0	Clear
	1137	15.13	3753	7.11	2.34	73.8	1.97	8.01	100.0	500.0	Clear

Well Stabilized? YES (circled) NO

Total Volume Purged: 6500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
14 Sept 21	1137	15.13	3753	7.11			1.97				Clear

Comments:

Field Datasheet

Groundwater Assessment

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

Company:	MDU Lewis & Clark
Event:	Fall 2021
Sample ID:	117
Sampling Personal:	

Weather Conditions: Temp: 50 °F Wind: N @ 5-10 Precip: Sunny / (Partly Cloudy) / Cloudy

WELL INFORMATION

Well Locked?	YES (NO)	
Well Labeled?	(YES) NO	
Casing Strait?	(YES) NO	
Grout Seal Intact?	(YES) NO	Not Visible
Repairs Necessary?		
Casing Diameter:	2"	
Water Level Before Purge:	6.47	ft
Total Depth of Well:	—	ft
Well Volume:	~~9.7~~	liters
Depth to Top of Pump:	9.45	ft
Water Level After Sample:	Below Pump	ft
Measurement Method:	Electric Water Level Indicator	

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	(NO)

Duplicate Sample?	YES	(NO)
Duplicate Sample ID:	—	

Bottle List:	
1 Liter Raw	~~4-1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge: 5	Sec.
Recover: 55	Sec.
PSI: 20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
13 Sept 21	1557	Start of Well Purge									
	1602	17.38	6967	7.12	6.26	268.8	58.39	6.80	100.0	500.0	Clear
	1612	17.38	6992	7.15	6.79	218.8	48.23	7.42	100.0	1000.0	Clear
	1622	17.36	~~7~~039	7.16	6.78	160.9	24.34	8.20	100.0	1000.0	Clear
	1632	17.50	~~6~~913	7.14	6.61	144.3	19.99	Below Pump	100.0	1000.0	Clear
		Purged	Dry								
	1002	Purged	well for	5min	to	clear	line	7.05	—		
14 Sept 21	1007	14.67	6997	7.15	7.12	261.0	6.68	7.81	100.0	500.0	Clear

Well Stabilized? YES (NO) Total Volume Purged: 4000.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment
											Clarity, Color, Odor, Ect.
14 Sept 21	1007	14.67	~~6997~~	7.15			6.68				Clear

Comments:	Collected Field Blank @ 1005

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**Fall 2021**
Sample ID:	11B
Sampling Personal:	Jay Mayer

Weather Conditions: Temp: 60°F Wind: N @ 5-10 Precip: **Sunny / ~~Partly Cloudy~~ / Cloudy**

WELL INFORMATION

Well Locked?	**YES**	(NO)	
Well Labeled?	(YES)	**NO**	
Casing Strait?	(YES)	**NO**	
Grout Seal Intact?	(YES)	**NO**	**Not Visible**
Repairs Necessary?			
Casing Diameter:	**2"**		
Water Level Before Purge:	8.52	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:	8.63	ft	
Measurement Method:	**Electric Water Level Indicator**		

SAMPLING INFORMATION

Purging Method:	**Bladder**	
Sampling Method:	**Bladder**	
Dedicated Equipment?	**YES**	(NO)

Duplicate Sample?	**YES**	(NO)
Duplicate Sample ID:	—	

Bottle List:	
1 Liter Raw	~~4- 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge: 5	Sec.
Recover: 55	Sec.
PSI: 20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
14 Sept 21	1157	**Start of Well Purge**									
	1202	17.35	1876	7.32	4.26	235.2	98.85	8.63	100.0	500.0	Clear
	1232	17.78	1489	7.33	3.89	109.2	3.51	8.62	100.0	3000.0	Clear
	1237	17.78	1491	7.33	3.86	106.4	3.86	8.63	100.0	500.0	Clear
	1242	18.03	1488	7.32	3.82	100.2	3.29	8.63	100.0	500.0	Clear

Well Stabilized? (YES) NO

Total Volume Purged: 4500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
14 Sept 21	1242	18.03	1488	7.32			3.29				Clear

Comments:	

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**Fall 2021**
Sample ID:	120
Sampling Personal:	JM MW

Weather Conditions: Temp: 60°F Wind: N @ 5-10 Precip: **Sunny / Partly Cloudy / Cloudy**

WELL INFORMATION

Well Locked?	YES	(NO)	
Well Labeled?	~~YES~~	NO	
Casing Strait?	(YES)	NO	
Grout Seal Intact?	YES	NO	(Not Visible)
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	14.64	ft	
Total Depth of Well:	18.82	ft	
Well Volume:	2.6	liters	
Depth to Top of Pump:	17.00	ft	
Water Level After Sample:		ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	(NO)

Duplicate Sample?	YES	(NO)
Duplicate Sample ID:		

Bottle List:	
1 Liter Raw	~~4-1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge: 5	Sec.
Recover: 55	Sec.
PSI: 20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
13 Sept 21	1400	Start of Well Purge									
	1405	15.99	6299	6.76	0.39	185.4	245.6	14.85	100.0	500.0	Slightly Turbid
	1415	15.00	5741	6.67	0.48	-4.8	5481	15.00	100.0	1000.0	Clear
	1445	14.87	5623	6.68	0.37	-109.6	10.32	15.12	100.0	3000.0	Clear
	1515	14.57	6418	6.66	0.39	-118.0	26.66	15.18	100.0	3000.0	Clear
	1520	14.53	6505	6.66	0.39	-138.6	45.89	15.20	100.0	500.0	Clear
	1525	14.77	6530	6.66	0.32	-162.1	3.72	15.21	100.0	500.0	Clear
	1530	15.03	6618	6.66	0.30	-159.7	4.40	15.23	100.0	500.0	Clear
	1535	14.72	6677	6.66	0.30	-153.0	2.23	15.25	100.0	500.0	Clear

Well Stabilized? (YES) NO

Total Volume Purged: 9500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
13 Sept 21	1535	14.72	6677	6.66			2.23				Clear

Comments:	

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

Field Datasheet

Surface water Assessment

Company:	**MDU Lewis & Clark**
Event:	**Fall 2021**
Sample ID:	
Sampling Personal:	

Weather Conditions: Temp: 50 °F Wind: N @ 5-10 Precip: **Sunny / ~~Partly Cloudy~~ / Cloudy**

Well ID	Date	Time	Casing Diameter	Water Level (ft)		Comments
MW101	14 Sept 21	0958	2"	9.36		
MW105		1300	2"	8.92		
MW106		1155	2"	9.63		
MW107		1000	2"	4.60		
MW108		1028	2"	16.02		
MW116		1025	2"	12.91		

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

Chain of Custody Record

Project Name:	Event:	Work Order Number:
MDU Lewis & Clark	Fall 2021	82- 2512

Report To:	MDU Lewis & Clark	CC:	Collected By:
Attn:	Todd Peterson		
Address:	400 N. 4th St Bismarck, ND 58501		
Phone:	701-425-2427		
Email:	Todd.Peterson@mdu.com		

Lab Number	Sample ID	Date	Time	Sample Type	1 Liter Raw	500 mL Nitric	500 mL Nitric (filtered)	250 mL Sulfuric	1 Liter Nitric	Temp (°C)	Spec. Cond.	pH	Turbidity (NTU)	Analysis Required
W3474	Dup 1	13 Sept 21	NA	GW	X	X	X	X		NA	NA	NA	NA	MDU Lewis & Clark List
W3475	Field Blank (FB)	14 Sept 21	NA	GW	X	X	X	X		NA	NA	NA	NA	
W3476	MW103	14 Sept 21	0935	GW	X	X	X	X		14.83	1426	7.31	4.02	
W3477	MW110	13 Sept 21	1100	GW	X	X	X	X		16.38	1112	7.23	3.88	
W3478	MW119	13 Sept 21	1314	GW	X	X	X	X		17.92	1155	7.26	4.78	
W3479	MW111	14 Sept 21	1137	GW	X	X	X	X		15.13	3753	7.11	1.97	
W3480	MW117	14 Sept 21	1007	GW	X	X	X	X		14.67	6997	7.15	6.68	
W3481	MW118	14 Sept 21	1242	GW	X	X	X	X		18.03	1488	7.32	3.29	
W3482	MW120	13 Sept 21	1535	GW	X	X	X	X		14.72	6677	6.66	2.23	

Comments:

Relinquished By		Sample Condition		Received By		
Name	Date/Time	Location	Temp (°C)	Name		Date/Time
1	16 Sept 21 0745	~~Log In~~ Walk In #2	3.8 TM562 / TM805	Emily Adam		16 Sept 21 0745
2						

MINNESOTA VALLEY TESTING LABORATORIES, INC.
1126 North Front 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

APP IV

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3474
Work Order #: 82-2512
Account #: 002800
Date Sampled: 13 Sep 21
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: Dup 1

Temp at Receipt: 3.8C

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	23 Sep 21 11:43	MDE
Lithium - Total	0.044	mg/l	0.020	6010D	27 Sep 21 10:20	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Sep 21 19:03	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	4 Oct 21 15:42	MDE
Barium - Total	0.0373	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	21 Sep 21 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Molybdenum - Total	0.0039	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	4 Oct 21 15:42	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE

Approved by: Claudette K. Carroll CC 7OCT21

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
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
MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3475
Work Order #: 82-2512
Account #: 002800
Date Sampled: 14 Sep 21
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

PO #: 185967 OP

Temp at Receipt: 3.8C

Project Name: MDU Lewis & Clark

Sample Description: Field Blank (FB)

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	23 Sep 21 11:43	MDE
Lithium - Total	< 0.02	mg/l	0.020	6010D	27 Sep 21 10:20	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Sep 21 19:03	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	4 Oct 21 15:42	MDE
Barium - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	21 Sep 21 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	4 Oct 21 15:42	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE

Approved by: Claudette K. Carrep CC 10 OCT 21

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
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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3476
Work Order #: 82-2512
Account #: 002800
Date Sampled: 14 Sep 21 9:35
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: MW103

Temp at Receipt: 3.8C

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	23 Sep 21 11:43	MDE
Lithium - Total	0.054	mg/l	0.020	6010D	27 Sep 21 10:20	MDE
Antimony - Total	0.0048	mg/l	0.0010	6020B	20 Sep 21 19:03	MDE
Arsenic - Total	0.0029	mg/l	0.0020	6020B	4 Oct 21 15:42	MDE
Barium - Total	0.0346	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	21 Sep 21 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Cobalt - Total	0.0035	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Molybdenum - Total	0.0227	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Selenium - Total	0.0368	mg/l	0.0050	6020B	24 Sep 21 12:05	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE

Approved by: Claudette K Carrep CC 7OCT21

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
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
MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3477
Work Order #: 82-2512
Account #: 002800
Date Sampled: 13 Sep 21 11:00
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: MW110

Temp at Receipt: 3.8C

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	23 Sep 21 11:43	MDE
Lithium - Total	0.040	mg/l	0.020	6010D	27 Sep 21 10:20	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Sep 21 19:03	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	4 Oct 21 15:42	MDE
Barium - Total	0.0350	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	21 Sep 21 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Molybdenum - Total	0.0084	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	4 Oct 21 15:42	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE

CC

Approved by: Claudette K. Carroll 10CT21

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
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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3478
Work Order #: 82-2512
Account #: 002800
Date Sampled: 13 Sep 21 13:14
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: MW119

Temp at Receipt: 3.8C

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	23 Sep 21 11:43	MDE
Lithium - Total	0.044	mg/l	0.020	6010D	27 Sep 21 10:20	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Sep 21 19:03	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	4 Oct 21 15:42	MDE
Barium - Total	0.0380	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	21 Sep 21 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Molybdenum - Total	0.0039	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	4 Oct 21 15:42	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE

Approved by: Claudette K. Carroll 7 OCT 21

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
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

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3479
Work Order #: 82-2512
Account #: 002800
Date Sampled: 14 Sep 21 11:37
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

PO #: 185967 OP

Temp at Receipt: 3.8C

Project Name: MDU Lewis & Clark

Sample Description: MW111

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	23 Sep 21 11:43	MDE
Lithium - Total	0.194	mg/l	0.020	6010D	27 Sep 21 10:20	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Sep 21 19:03	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	4 Oct 21 15:42	MDE
Barium - Total	0.0269	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	21 Sep 21 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Chromium - Total	0.0035	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Molybdenum - Total	0.0654	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Selenium - Total	0.0565	mg/l	0.0050	6020B	24 Sep 21 12:05	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE

CC
Approved by: Claudette K Carrep 10 Oct 21

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
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
MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3480
Work Order #: 82-2512
Account #: 002800
Date Sampled: 14 Sep 21 10:07
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: MW117

Temp at Receipt: 3.8C

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	23 Sep 21 11:43	MDE
Lithium - Total	0.115	mg/l	0.020	6010D	27 Sep 21 10:20	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Sep 21 19:03	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	4 Oct 21 15:42	MDE
Barium - Total	0.0204	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	21 Sep 21 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Chromium - Total	0.0071	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Molybdenum - Total	0.0056	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Selenium - Total	0.0312	mg/l	0.0050	6020B	20 Sep 21 19:03	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE

Approved by: Claudette K. Carroll CC 7OCT21

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
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
MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3481
Work Order #: 82-2512
Account #: 002800
Date Sampled: 14 Sep 21 12:42
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: MW118

Temp at Receipt: 3.8C

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	23 Sep 21 11:43	MDE
Lithium - Total	0.082	mg/l	0.020	6010D	27 Sep 21 10:20	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Sep 21 19:03	MDE
Arsenic - Total	0.0020	mg/l	0.0020	6020B	4 Oct 21 15:42	MDE
Barium - Total	0.0262	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	21 Sep 21 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Chromium - Total	0.0027	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Molybdenum - Total	0.0462	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Selenium - Total	0.0631	mg/l	0.0050	6020B	20 Sep 21 19:03	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE

Approved by: Claudette K. Carroll CC 7OCT21

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
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

MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

Todd Peterson
Montana-Dakota Utilities Co.
400 N 4th St
Bismarck ND 58501

Report Date: 6 Oct 21
Lab Number: 21-W3482
Work Order #: 82-2512
Account #: 002800
Date Sampled: 13 Sep 21 15:35
Date Received: 16 Sep 21 7:45
Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

PO #: 185967 OP

Sample Description: MW120

Temp at Receipt: 3.8C

Event and Year: Fall 2021

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	23 Sep 21 11:43	MDE
Lithium - Total	0.135	mg/l	0.020	6010D	27 Sep 21 10:20	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Sep 21 19:03	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	4 Oct 21 15:42	MDE
Barium - Total	0.0270	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	21 Sep 21 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Chromium - Total	0.0039	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE
Molybdenum - Total	0.0044	mg/l	0.0020	6020B	20 Sep 21 19:03	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	4 Oct 21 15:42	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Sep 21 19:03	MDE

Approved by: Claudette K. Carroll CC 7OCT21

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

MVTL

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
ACIL

Quality Control Report

Lab IDs: 21-W3474 to 21-W3482 **Project:** MDU Lewis & Clark **Work Order:** 202182-2512

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 - Total mg/l	0.1000	109	80-120	0.400	21W3474q	< 0.001	0.4654	116	75-125	0.4654	0.4438	111	4.8	20	-	-	< 0.001
Arsenic - Total mg/l	0.1000	104	80-120	0.400	21-W3474	< 0.002	0.4150	104	75-125	0.4150	0.4308	108	3.7	20	-	-	< 0.002
Barium - Total mg/l	0.1000	107	80-120	0.400	21W3474q	0.0373	0.4552	104	75-125	0.4552	0.4554	105	0.0	20	-	-	< 0.002
Beryllium - Total mg/l	0.1000	92	80-120	0.400	21-W3474	< 0.0005	0.3578	89	75-125	0.3578	0.3724	93	4.0	20	-	-	< 0.0005
Cadmium - Total mg/l	0.1000	109	80-120	0.400	21W3474q	< 0.0005	0.4546	114	75-125	0.4546	0.4214	105	7.6	20	-	-	< 0.0005
Chromium - Total mg/l	0.1000	103	80-120	0.400	21W3474q	< 0.002	0.4028	101	75-125	0.4028	0.3966	99	1.6	20	-	-	< 0.002
Cobalt - Total mg/l	0.1000	104	80-120	0.400	21W3474q	< 0.002	0.4002	100	75-125	0.4002	0.3974	99	0.7	20	-	-	< 0.002
Lead - Total mg/l	0.1000	103	80-120	0.400	21W3474q	< 0.0005	0.4090	102	75-125	0.4090	0.4190	105	2.4	20	-	-	< 0.0005
Lithium - Total mg/l	0.400	103	80-120	0.400	21-W3474	0.044	0.441	99	75-125	0.441	0.453	102	2.7	20	- -	- -	< 0.02 < 0.02
Mercury - Total mg/l	0.0020	95	85-115	0.002 0.002 0.002 0.002	21-W3483 21-W3549 21-D2927 A46748	< 0.0002 < 0.0002 < 0.0002 < 0.0002	0.0017 0.0018 0.0016 0.0019	85 90 80 95	70-130 70-130 70-130 70-130	0.0017 0.0018 0.0016 0.0019	0.0017 0.0017 0.0018 0.0020	85 85 90 100	0.0 5.7 11.8 5.1	20 20 20 20	- - - -	- - - -	< 0.0002
Molybdenum - Total mg/l	0.1000	111	80-120	0.400	21W3474q	0.0039	0.4534	112	75-125	0.4534	0.4364	108	3.8	20	-	-	< 0.002
Selenium - Total mg/l	0.1000 0.1000 0.1000	102 89 105	80-120 80-120 80-120	0.400 0.400 0.400	21W3474q 21W3350q 21-W3474	< 0.01 < 0.005 < 0.005	0.4158 0.4082 0.3908	104 102 98	75-125 75-125 75-125	0.4158 0.4082 0.3908	0.4478 0.3984 0.4230	112 100 106	7.4 2.4 7.9	20 20 20	- - -	- - -	< 0.01 < 0.005 < 0.005
Thallium - Total mg/l	0.1000	104	80-120	0.400	21W3474q	< 0.0005	0.4178	104	75-125	0.4178	0.4180	104	0.0	20	-	-	< 0.0005

Samples were received in good condition on 16 Sep 2021 at 0745.
Temperature upon receipt at the Bismarck laboratory was 3.8°C.
All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
With the exception of pH, all holding times were met.
Approved methodology was followed for all sample analyses.
All acceptance criteria were met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/duplicates unless noted here:

Approved by: C. Carlson
7 OCT 21

Field Datasheet

Groundwater Assessment

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

Company:	**MDU Lewis & Clark**
Event:	**Fall 2021**
Sample ID:	103
Sampling Personal:	[signature]

Weather Conditions: Temp: 55 °F Wind: N @ 5-10 Precip: **Sunny / Partly Cloudy / Cloudy** (Partly Cloudy circled)

WELL INFORMATION

Well Locked?	YES	NO (circled)	
Well Labeled?	YES (circled)	NO	
Casing Strait?	YES (circled)	NO	
Grout Seal Intact?	YES	NO	Not Visible (circled)
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	10.76	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:	10.81	ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	NO (circled)
Duplicate Sample?	YES	NO (circled)
Duplicate Sample ID:	—	

Control Settings:		
Purge:	5	Sec.
Recover:	55	Sec.
PSI:	20	

Bottle List:	
1 Liter Raw	~~4-1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
14 Sep 21	0810	Start of Well Purge									
	0815	13.13	3018	7.37	0.67	192.7	36.69	10.80	100.0	500.0	Clear
	0845	14.31	1488	7.31	0.34	179.0	19.55	10.80	100.0	3000.0	Clear
	0915	14.43	1442	7.31	0.28	71.6	8.63	10.81	100.0	3000.0	Clear
	0925	14.87	1427	7.31	0.26	31.5	4.86	10.82	100.0	1000.0	Clear
	0930	14.85	1426	7.31	0.26	31.1	4.57	10.82	100.0	500.0	Clear
	0935	14.83	1426	7.31	0.25	30.1	4.02	10.82	100.0	500.0	Clear

Well Stabilized? YES (circled) NO Total Volume Purged: 8500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
14 Sep 21	0935	14.83	1426	7.31			4.02				Clear

Comments:	

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

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**Fall 2021**
Sample ID:	110
Sampling Personal:	Jay May

Weather Conditions: Temp: 60 °F Wind: N @ 5-10 Precip: **Sunny / ~~Partly Cloudy~~ / Cloudy**

WELL INFORMATION

Well Locked?	**YES**	(NO)	
Well Labeled?	(YES)	**NO**	
Casing Strait?	(YES)	**NO**	
Grout Seal Intact?	(YES)	**NO**	**Not Visible**
Repairs Necessary?			
Casing Diameter:	**2"**		
Water Level Before Purge:	9.25	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:	9.34	ft	
Measurement Method:	**Electric Water Level Indicator**		

SAMPLING INFORMATION

Purging Method:	**Bladder**	
Sampling Method:	**Bladder**	
Dedicated Equipment?	**YES**	(NO)

Duplicate Sample?	**YES**	(NO)
Duplicate Sample ID:	—	

Bottle List:	
1 Liter Raw	~~4- 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge: 5	Sec.
Recover: 25	Sec.
PSI: 20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
13 Sept 21	1010	**Start of Well Purge**									
	1015	16.25	1146	7.18	3.38	225.7	16.52	9.28	100.0	500.0	Clear
	1045	16.18	1113	7.22	2.81	242.5	4.28	9.34	100.0	3000.0	clear
	1050	16.25	1114	7.23	2.82	250.6	3.62	9.35	100.0	500.0	Clear
	1055	16.30	1114	7.23	2.80	252.0	3.51	9.35	100.0	500.0	Clear
	1100	16.38	1112	7.23	2.80	250.9	3.88	9.34	100.0	500.0	Clear

Well Stabilized? (YES) **NO** Total Volume Purged: 5000.0 mL

Sample Date	**Time**	**Temp. (°C)**	**Spec. Cond.**	**pH**			**Turbidity (NTU)**				**Appearance or Comment** Clarity, Color, Odor, Ect.
13 Sept 21	1100	16.38	1112	7.23			3.88				Clear

Comments:	

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**Fall 2021**
Sample ID:	119
Sampling Personal:	

Weather Conditions: Temp: 65 °F Wind: N @ 5-10 Precip: **Sunny / Partly Cloudy / Cloudy**

WELL INFORMATION

Well Locked?	YES	(NO)	
Well Labeled?	(YES)	NO	
Casing Strait?	(YES)	NO	
Grout Seal Intact?	(YES)	NO	**Not Visible**
Repairs Necessary?			
Casing Diameter:	**2"**		
Water Level Before Purge:	9.12	ft	
Total Depth of Well:	—	ft	
Well Volume:	—	liters	
Depth to Top of Pump:	—	ft	
Water Level After Sample:		ft	
Measurement Method:	**Electric Water Level Indicator**		

SAMPLING INFORMATION

Purging Method:	**Bladder**	
Sampling Method:	**Bladder**	
Dedicated Equipment?	YES	(NO)

Duplicate Sample?	(YES)	NO
Duplicate Sample ID:	Dup 1	

Bottle List:	
1 Liter Raw	~~4 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge: 5	Sec.
Recover: 55	Sec.
PSI: 20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
	1139	**Start of Well Purge**									
13 Sept 21	1144	17.07	1153	7.21	0.85	230.3	12.38	9.21	100.0	500.0	Clear
	1214	17.71	1153	7.20	1.07	255.0	19.05	9.20	100.0	3000.0	Clear
	1244	17.94	1150	7.25	1.41	148.9	7.09	9.18	100.0	3000.0	Clear
	1304	18.00	1150	7.26	1.52	126.0	5.01	9.19	100.0	2000.0	Clear
	1309	18.06	1148	7.26	1.52	125.5	4.82	9.18	100.0	500.0	Clear
	1314	17.92	1155	7.26	1.53	123.9	4.78	9.19	100.0	500.0	Clear

Well Stabilized? (YES) NO

Total Volume Purged: 9500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
13 Sept 21	1314	17.92	1155	7.26			4.78				Clear

Comments:	

Field Datasheet

Groundwater Assessment

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Company:	**MDU Lewis & Clark**
Event:	**Fall 2021**
Sample ID:	11
Sampling Personal:	[illegible signature]

Weather Conditions: Temp: 60 °F Wind: N @ 5-10 Precip: **Sunny / Partly Cloudy / Cloudy** (Partly Cloudy circled)

WELL INFORMATION

Well Locked?	YES	NO (circled)	
Well Labeled?	YES (circled)	NO	
Casing Strait?	YES (circled)	NO	
Grout Seal Intact?	YES	NO	Not Visible (circled)
Repairs Necessary?			

Casing Diameter:	2"	
Water Level Before Purge:	7.95	ft
Total Depth of Well:	—	ft
Well Volume:	—	liters
Depth to Top of Pump:	—	ft
Water Level After Sample:	8.02	ft
Measurement Method:	**Electric Water Level Indicator**	

SAMPLING INFORMATION

Purging Method:	**Bladder**	
Sampling Method:	**Bladder**	
Dedicated Equipment?	YES	NO (circled)

Control Settings:		
Purge:	5	Sec.
Recover:	55	Sec.
PSI:	20	

Duplicate Sample?	YES	NO (circled)
Duplicate Sample ID:	—	

Bottle List:	
1 Liter Raw	4 ~~1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
14 Sept 21	1032	**Start of Well Purge**									
	1037	14.69	4044	7.03	2.30	268.6	56.07	8.00	100.0	500.0	Clear
	1007	14.71	3806	7.09	1.72	141.4	15.67	8.00	100.0	3000.0	Clear
	1127	14.98	3743	7.11	2.20	77.3	4.20	8.01	100.0	2000.0	Clear
	1132	14.99	3750	7.11	2.30	75.5	2.19	8.01	100.0	500.0	Clear
	1137	15.13	3753	7.11	2.34	73.8	1.97	8.01	100.0	500.0	Clear

Well Stabilized? YES (circled) NO Total Volume Purged: 6500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
14 Sept 21	1137	15.13	3753	7.11			1.97				Clear

Comments:

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**Fall 2021**
Sample ID:	117
Sampling Personal:	

Weather Conditions: Temp: 50 °F Wind: N @ 5-10 Precip: **Sunny / (Partly Cloudy) / Cloudy**

WELL INFORMATION

Well Locked?	YES	(NO)	
Well Labeled?	(YES)	NO	
Casing Strait?	(YES)	NO	
Grout Seal Intact?	(YES)	NO	Not Visible
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	6.47	ft	
Total Depth of Well:	—	ft	
Well Volume:	~~9.7~~	liters	
Depth to Top of Pump:	9.45	ft	
Water Level After Sample:	Below Pump	ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	(NO)

Duplicate Sample?	YES	(NO)
Duplicate Sample ID:	—	

Bottle List:	
1 Liter Raw	~~4-1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:		
Purge:	5	Sec.
Recover:	55	Sec.
PSI:	20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
13 Sept 21	1557	**Start of Well Purge**									
	1602	17.38	6967	7.12	6.26	268.8	58.39	6.80	100.0	500.0	Clear
	1612	17.38	6992	7.15	6.79	218.8	48.23	7.42	100.0	1000.0	Clear
	1622	17.36	~~7~~039	7.16	6.78	160.9	24.34	8.20	100.0	1000.0	Clear
	1632	17.50	~~7~~013	7.14	6.61	144.3	19.99	Below Pump	100.0	1000.0	Clear
		Purged	Dry								
	1002	Purged	wait for	5min	to	clear	line	7.05	—		
14 Sept 21	1007	14.67	6997	7.15	7.12	261.0	6.68	7.81	100.0	500.0	Clear

Well Stabilized? YES (NO)

Total Volume Purged: 4000.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment
											Clarity, Color, Odor, Ect.
14 Sept 21	1007	14.67	~~7~~997	7.15			6.68				Clear

Comments:	Collected Field Blank @ 1005

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**Fall 2021**
Sample ID:	11B
Sampling Personal:	Jay May

Weather Conditions: Temp: 60°F Wind: N @ 5-10 Precip: **Sunny / ~~Partly Cloudy~~ / Cloudy**

WELL INFORMATION

Well Locked?	YES	(NO)
Well Labeled?	(YES)	NO
Casing Strait?	(YES)	NO
Grout Seal Intact?	(YES)	NO **Not Visible**
Repairs Necessary?		
Casing Diameter:	2"	
Water Level Before Purge:	8.52	ft
Total Depth of Well:	—	ft
Well Volume:	—	liters
Depth to Top of Pump:	—	ft
Water Level After Sample:	8.63	ft
Measurement Method:	**Electric Water Level Indicator**	

SAMPLING INFORMATION

Purging Method:	**Bladder**	
Sampling Method:	**Bladder**	
Dedicated Equipment?	**YES**	(NO)

Duplicate Sample?	**YES**	(NO)
Duplicate Sample ID:	—	

Bottle List:	
1 Liter Raw	~~4- 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:		
Purge:	5	Sec.
Recover:	55	Sec.
PSI:	20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
14 Sept 21	1157	**Start of Well Purge**									
	1202	17.35	1876	7.32	4.26	235.2	98.85	8.63	100.0	500.0	Clear
	1232	17.78	1489	7.33	3.89	109.2	3.51	8.62	100.0	3000.0	Clear
	1237	17.78	1491	7.33	3.86	106.4	3.86	8.63	100.0	500.0	Clear
	1242	18.03	1488	7.32	3.82	100.2	3.29	8.63	100.0	500.0	Clear

Well Stabilized? (YES) NO

Total Volume Purged: 4500.0 mL

Sample Date	**Time**	**Temp. (°C)**	**Spec. Cond.**	**pH**			**Turbidity (NTU)**				**Appearance or Comment** Clarity, Color, Odor, Ect.
14 Sept 21	1242	18.03	1488	7.32			3.29				Clear

Comments:	

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	**MDU Lewis & Clark**
Event:	**Fall 2021**
Sample ID:	120
Sampling Personal:	JM JMy

Weather Conditions: Temp: 60°F Wind: N @ 5-10 Precip: **Sunny / Partly Cloudy / Cloudy**

WELL INFORMATION

Well Locked?	YES	(NO)	
Well Labeled?	~~YES~~	NO	
Casing Strait?	(YES)	NO	
Grout Seal Intact?	YES	NO	(Not Visible)
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	14.64	ft	
Total Depth of Well:	18.82	ft	
Well Volume:	2.6	liters	
Depth to Top of Pump:	17.00	ft	
Water Level After Sample:		ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	(NO)

Duplicate Sample?	YES	(NO)
Duplicate Sample ID:		

Bottle List:	
1 Liter Raw	~~4 1L Nitric~~
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge: 5	Sec.
Recover: 55	Sec.
PSI: 20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	**Time**	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
13 Sept 21	1400	**Start of Well Purge**									
	1405	15.99	6299	6.76	0.39	185.4	245.6	14.85	100.0	500.0	Slightly Turbid
	1415	15.00	5741	6.67	0.48	-4.8	54.81	15.00	100.0	1000.0	Clear
	1445	14.87	5623	6.68	0.37	-109.6	10.32	15.12	100.0	3000.0	Clear
	1515	14.57	6418	6.66	0.39	-118.0	26.66	15.18	100.0	3000.0	Clear
	1520	14.53	6505	6.66	0.39	-138.6	45.89	15.20	100.0	500.0	Clear
	1525	14.77	6530	6.66	0.32	-162.1	3.72	15.21	100.0	500.0	Clear
	1530	15.03	6618	6.66	0.30	-159.7	4.40	15.23	100.0	500.0	Clear
	1535	14.72	6677	6.66	0.30	-153.0	2.23	15.25	100.0	500.0	Clear

Well Stabilized? (YES) NO

Total Volume Purged: 9500.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment Clarity, Color, Odor, Ect.
13 Sept 21	1535	14.72	6677	6.66			2.23				Clear

Comments:	

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

Field Datasheet

Surface water Assessment

Company:	**MDU Lewis & Clark**
Event:	**Fall 2021**
Sample ID:	
Sampling Personal:	Jeremy Meyer

Weather Conditions: Temp: 50 °F Wind: N @ 5-10 Precip: **Sunny / ~~Partly Cloudy~~ / Cloudy**

Well ID	Date	Time	Casing Diameter	Water Level (ft)		Comments
MW101	14 Sept 21	0958	2"	9.36		
MW105		1300	2"	8.92		
MW106		1155	2"	9.63		
MW107		1000	2"	4.60		
MW108		1028	2"	16.02		
MW116		1025	2"	12.91		

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

Chain of Custody Record

Project Name:	Event:	Work Order Number:
MDU Lewis & Clark	Fall 2021	82-2512

Report To:	MDU Lewis & Clark	CC:	Collected By:
Attn:	Todd Peterson		
Address:	400 N. 4th St Bismarck, ND 58501		
Phone:	701-425-2427		
Email:	Todd.Peterson@mdu.com		

Lab Number	Sample ID	Date	Time	Sample Type	1 Liter Raw	500 mL Nitric	500 mL Nitric (filtered)	250 mL Sulfuric	1 Liter Nitric	Temp (°C)	Spec. Cond.	pH	Turbidity (NTU)	Analysis Required
W3474	Dup 1	13 Sept 21	NA	GW	X	X	X	X		NA	NA	NA	NA	MDU Lewis & Clark List
W3475	Field Blank (FB)	14 Sept 21	NA	GW	X	X	X	X		NA	NA	NA	NA	
W3476	MW103	14 Sept 21	0935	GW	X	X	X	X		14.83	1426	7.31	4.02	
W3477	MW110	13 Sept 21	1100	GW	X	X	X	X		16.38	1112	7.23	3.88	
W3478	MW119	13 Sept 21	1314	GW	X	X	X	X		17.92	1155	7.26	4.78	
W3479	MW111	14 Sept 21	1137	GW	X	X	X	X		15.13	3753	7.11	1.97	
W3480	MW117	14 Sept 21	1007	GW	X	X	X	X		14.67	6997	7.15	6.68	
W3481	MW118	14 Sept 21	1242	GW	X	X	X	X		18.03	1488	7.32	3.29	
W3482	MW120	13 Sept 21	1535	GW	X	X	X	X		14.72	6677	6.66	2.23	

Comments:

Relinquished By		Sample Condition		Received By		
Name	Date/Time	Location	Temp (°C)	Name		Date/Time
1	16 Sept 21 0745	~~Log In~~ Walk In #2	3.8 TM562 / TM805	Emily Adam		16 Sept 21 0745
2						

Appendix B

Alternative Source Demonstration – Scrubber Ponds

Alternative Source Demonstration (ASD) for Lithium, Spring 2021

Lewis & Clark Station

Prepared for
Montana-Dakota Utilities Co.

January 2022

234 West Century Avenue
Bismarck, ND 58503
701.255.5460
www.barr.com

Alternative Source Demonstration (ASD) for Lithium, Spring 2021
Lewis & Clark Station

January 2022

Contents

List of Tables

List of Figures

List of Appendices

Certifications

I hereby certify that the written demonstration provided herein, supported by the data in the referenced documents, is accurate and consistent with our review of the groundwater and other data collected to date, as required under the CCR Rule (§257.95(g)(3)(ii)). Based on this review I have determined that a source other than the CCR unit regulated under the CCR Rule at the Site caused the statistically significant increases over the applicable groundwater protection standards (GWPS) for lithium in wells that are downgradient from that unit.

Paul Swenson, P.E.
PE #: 12805PE

01/31/2022
Date

1 Introduction

Montana-Dakota Utilities Co. (MDU) operates a coal-fired electrical generation plant at the Lewis & Clark Station (Site) near Sidney, Montana. Operation of the plant results in coal combustion residuals (CCR) as a by-product. Management of CCR at the Site is subject to regulation under 40 CFR Part 257, Disposal of Coal Combustion Residuals From Electric Utilities (the CCR Rule).

Since the 1970s, CCR has been managed at the Site at various CCR management facilities. In particular:

- In 1975, two unlined surface impoundments were constructed on the Site. Based on available historical data, it appears that construction of the ponds involved excavating materials down to the Ft. Union Formation (Barr, 2016; Barr, 2019b), meaning that the sides of the surface impoundments were likely in direct contact with the aquifer. These surface impoundments were closed before the CCR Rule was promulgated, and therefore are not regulated under the CCR Rule.
- In 1993, clay-lined scrubber ponds were constructed generally in the footprint of the unlined surface impoundments, described above, with base elevations that were higher than the base elevations of the former surface impoundments. Once these scrubber ponds became operational, MDU started placing solid materials from them on top of a temporary storage pad (TSP) at the Site. In particular, the TSP stored flue-gas desulfurization (FGD) solids (excavated from the scrubber ponds) where it drained prior to loading and hauling for off-site disposal. The locations of these scrubber ponds and former TSP are shown on Figure 1. These ponds were in existence on the effective date of the CCR Rule. Throughout this report, they are referred to as the "Scrubber Ponds."
- In 1998, the TSP was retrofitted with a geomembrane liner.
- In 2018, the Scrubber Ponds were retrofitted with a composite liner with a small lateral expansion of each pond to the northeast, with base elevations that were higher than the original 1993 construction.
- In 2020, the lined TSP was closed using the closure-by-removal method after the Alternative Source Demonstration (ASD), Temporary Storage Pad, Lewis & Clark Station (Barr, 2020a) was completed. The current TSP is not regulated by the CCR Rule.

The currently regulated CCR unit is the Scrubber Ponds, a single, multi-unit CCR surface impoundment. The closed TSP is a former regulated CCR unit.

1.1 Purpose

Detection monitoring conducted as required by the CCR Rule documented statistically significant increases (SSIs) over background levels for appendix III parameters. In accordance with the CCR Rule, assessment monitoring was undertaken at the Site, which identified concentrations of lithium in

downgradient wells that potentially result in SSIs over background levels for the spring 2021 monitoring event. According to the CCR Rule, Section § 257.94(e)(2):

> *The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.*

This report provides written documentation of an Alternative Source Demonstration (ASD) supporting continuation of assessment monitoring in accordance with § 257.95(g)(3)(ii) of the CCR Rule.

An ASD was prepared in January 2021 (Appendix C of the 2020 Annual Groundwater Monitoring and Corrective Action Report (Barr, 2021)), ending the selection of remedy phase of remediation activities for the Site. Data collected during the spring 2021 assessment monitoring event in March 2021 (Table 1) have been reviewed and an SSI for lithium has been identified. It has been determined that the ASD analysis conducted in 2021 continues to provide a rationale for a source other than the CCR unit causing the exceedance of GWPS in downgradient wells.

Exceedances of GWPS were identified at the following monitoring wells downgradient of the Scrubber Ponds during the spring 2021 semi-annual assessment monitoring event completed between March 15 and March 17, 2021:

- MW111 – lithium
- MW117 – lithium
- MW118 – lithium
- MW120 – lithium

Table 1 Summary of Measured Lithium Concentrations Compared to Groundwater Protection Standards

Sampling Event	Monitoring Well	Lithium (mg/L)	Lithium GWPS
Assessment Monitoring – 2021 #1 (Spring)	MW111	0.158	0.0631*
	MW117	0.110	
	MW118	0.068	
	MW120	0.120	
Assessment Monitoring – 2020 #2 (Fall)	MW111	0.227	0.0678
	MW117	0.135	
	MW118	0.095	
	MW120	0.135	
Assessment Monitoring – 2020 #1 (Spring)	MW111	0.190	0.0678
	MW117	0.130	
	MW118	0.085	
	MW120	0.145	

*GWPS for lithium updated in Spring 2021 with collection of new upgradient monitoring data.
Additional assessment monitoring lithium concentrations are included in the 2018 and 2019 Annual Groundwater Monitoring and Corrective Action Reports (Barr, 2019a, 2020b).

1.2 Scope of Work

As part of the ASD, site data were evaluated to determine whether the regulated CCR unit caused the SSIs over background levels for lithium in downgradient monitoring wells. As part of this evaluation, two hypotheses were developed and then tested with lines of evidence based on site data to determine if those hypotheses were valid. The evidence confirms that the SSIs were caused by a natural variation in groundwater quality rather than the Scrubber Ponds. As a result, it was determined an alternative source exists for the SSIs and resulting exceedances of the GWPS for lithium under the CCR Rule (§ 257.95(g)(3)(ii)).

1.3 Regulatory Framework

As noted above, the Scrubber Ponds are currently in assessment monitoring. Baseline groundwater monitoring was completed in 2017, as documented in the 2017 Annual Groundwater Monitoring and Corrective Action Report, Scrubber Pond and Temporary Storage Area (Barr, 2018). A detection monitoring program began on October 17, 2017, and continued until April 14, 2018 (Barr, 2019a). SSIs over background levels were determined for certain constituents listed in appendix III to the CCR Rule (§ 257.95(a)) in 2018 (total dissolved solids (TDS), fluoride, boron, calcium, chloride, pH, and sulfate). In response to these SSIs, an assessment monitoring program was initiated on April 15, 2018. This program continued through 2021.

On January 2, 2019, it was determined that the initial assessment monitoring and resample events resulted in detections of lithium at statistically significant levels above applicable GWPS. An assessment of corrective measures (ACM) was initiated on April 2, 2019, and completed on August 29, 2019 (Barr,

2019b). An ASD ended the selection of remedy phase of remedial actions required by the CCR Rule on January 31, 2021 (Barr, 2021). The Site is currently in assessment monitoring.

1.4 Description of the Monitoring Well System

The groundwater monitoring system is a multi-unit groundwater monitoring system, as provided in § 257.91(d), meaning that both the Scrubber Ponds and the TSP are monitored by a single groundwater monitoring system. The monitoring well system around the CCR unit consists of three hydraulically upgradient wells (MW-103, MW-110, and MW-119) and four downgradient wells (MW-111, MW-117, MW-118, and MW-120) as shown on Figure 1.

The geological strata at the Site consists of fine- and coarse-grained unconsolidated alluvial sediments overlying bedrock (Ft. Union Formation). The upgradient wells are screened in primarily coarse-grained sediments. The downgradient monitoring wells are located hydraulically downgradient of the CCR unit along the waste boundary, are spaced approximately 500 feet (or less) apart, and are screened in primarily fine-grained sediments. The number, spacing, and hydraulic positions of the monitoring wells comply with requirements outlined in § 257.91(a-c) of the CCR Rule.

1.5 Groundwater Standards

Once assessment monitoring is triggered for a CCR unit, § 257.95(d)(2) requires that GWPS be established for appendix IV constituents detected in groundwater. GWPS are defined as the higher of the Maximum Contaminant Level (MCL) or default GWPS, and the background concentration level for the detected constituent based on statistical methods established in § 257.93(f-g). Based on § 257.95(h)(2) and the July 30, 2018, Phase 1 CCR Rule revision, a final GWPS was established for the appendix IV constituents detected in groundwater.

The Phase 1 revision to the CCR Rule included a default lithium groundwater protection standard of 40 µg/L (0.04 mg/L) on July 30, 2018. The laboratory analyzing Site groundwater samples lowered its lithium reporting limit from 0.1 mg/L to 0.04 mg/L starting in July 2018, and then subsequently to 0.02 mg/L. Previous lithium data from the Site, which were mostly below detection at higher limits, were removed from the baseline groundwater dataset, and additional data were collected. As a result of these changes, the lithium GWPS has been updated twice as additional upgradient samples have been collected and analyzed.

2 ASD Hypotheses

The hypotheses and corresponding determinations supporting the ASD are summarized below.

2.1 Hypothesis No. 1: Natural Variation

More naturally occurring lithium is present in the fine-grained sediments than in coarse-grained sediments. As a result, groundwater in zones of fine-grained sediments will typically have higher lithium concentrations than groundwater in zones of coarse-grained sediments. The upgradient wells at the Site are screened in primarily coarse-grained sediments and downgradient wells at the Site are screened in primarily fine-grained sediments. Therefore, due to the natural variability between sediments in which upgradient and downgradient wells are screened at the Site, it is possible that the observed downgradient lithium concentrations are due to natural variation in lithium content in the sediments.

2.1.1 Variation in Solids Concentration with Sediment Type within the Aquifer Matrix

To test hypothesis No. 1, a total of eight Site sediment samples (see Table 2) from five different borings were sent to Pace Inter-Mountain Laboratories (Pace) in Sheridan, Wyoming. The sediment samples were crushed in a mill and analyzed for total lithium (Total Metals) using EPA's *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition,* methods 3050 and 6010. Logs for the five borings are presented in Appendix A.

Both samples from boring SB-3 were judged to be relatively well graded. As such, the samples were sieved using a no. 230 sieve. The fraction retained on the sieve is sand and gravel (coarse-grained sediments) and the fraction passing the sieve is silt and clay (fine-grained sediments). Both fractions were crushed and analyzed for lithium. The remaining samples were determined to be more homogenous and, therefore, did not require sieving.

Analytical results for the sediment samples are summarized in Table 2. The lithium concentrations for fine-grained sediments (clay and silt) ranged from 11.5 milligrams per kilogram (mg/kg) to 22.7 mg/kg, with an average concentration of 16.1 mg/kg. In the coarse-grained sediments (sand and gravel), the concentrations ranged from 4.0 mg/kg to 6.9 mg/kg, with an average concentration of 5.4 mg/kg. The results indicate that the average lithium concentration in the fine-grained sediments is more than three times the average lithium solids concentration in the coarse-grained sediments. The laboratory report for the analysis of the sediment samples is presented in Appendix B.

Table 2 Lithium Solids Concentration by Sample Material Type

Texture	Sample ID	Sample Depth within Boring (ft)	Lithium Result (mg/kg)
Fine	SB-2	2 to 5	11.5
Fine	SB-3	3.5 to 10.5	13.6
Fine	SB-3	10.5 to 15	14.2
Fine	T-2	23.5 to 30	18.1
Fine	T-13	3.5 to 10	16.2
Fine	T-13	15 to 20	22.7
		Fine Average	**16.1**
		Fine Range	**11.5 to 22.7**
Coarse	SB-2	10 to 20	4.9
Coarse	SB-3	3.5 to 10.5	5.8
Coarse	SB-3	10.5 to 15	6.9
Coarse	T-1	19 to 23	4.0
		Coarse Average	**5.4**
		Coarse Range	**4.0 to 6.9**

2.1.2 Variation in Lithium Mobility with Sediment Type

The sediment analysis presented above confirmed that fine-grained sediments at the Site have more lithium within the solid matrix than coarse-grained sediments. Leach tests, which simulate what the lithium concentrations would be in groundwater, were done on sediment samples from areas at the Site that have not been affected by the CCR unit to estimate how much naturally occurring lithium could be mobilized from the solid matrix to groundwater.

Ten additional borings (T-14 through T-23) and associated temporary wells were installed across the Site, scattered upgradient and side gradient of the CCR unit to obtain samples for this evaluation. Borings T-14 through T-22 were located in areas that are not hydraulically downgradient from any of the current or former CCR units (Figure 2). It was subsequently determined that boring location T-23 may have been affected by historical (pre-CCR Rule) Site activities not associated with any CCR units so the analytical results for the sample from boring T-23 were not carried forward in the evaluation. Logs for these borings are presented in Appendix A.

Pace analyzed sediment samples from these borings by a saturated paste extract procedure (SPE Method; Pace SOP S-SATPASTE-1.1). Samples that had dried and hardened were crushed using a mortar and pestle; however, rock fragments larger than #10 mesh (2 mm) were removed from the samples for the SPE Method analyses.

Analytical results for samples classified as fine-grained or coarse-grained from borings T-14 through T-22 are summarized in Table 3. The laboratory report for the analyses is presented in Appendix B. The lithium concentrations leached from the fine-grained material in the liquid extract ranged from 0.02 to 0.14 mg/L,

with an average of 0.06 mg/L. The lithium concentrations leached from the coarse-grained material in the liquid extract ranged from 0.02 to 0.06 mg/L, with an average of 0.03 mg/L. These results indicate that in areas that could not have been influenced by the CCR units (existing and closed) the fine-grained sediments release more lithium to groundwater, and with greater variation, than coarse-grained sediments. The results also indicate that the average SPE leachate lithium concentration from fine-grained sediments was approximately twice the average leachate lithium concentration from the coarse-grained sediments.

Table 3 Summary Saturated Paste Extracts for Lithium

Sediment Type	Boring ID	Sample Depth within Boring (ft)	Sediment Type (field-estimated composition in boring logs)	Lithium Result (mg/L)
Fine	T-14	5-7	>95% fines	0.03
Fine	T-14	7-10	>90% fines	0.04
Fine	T-14	10-13	>90% fines	0.03
Fine	T-15	14.25-17.5	100% fines	0.04
Fine	T-16	11-13	100% fines	0.02
Fine	T-17	10.75-15	100% fines	0.07
Fine	T-18	12.5-14.5	100% fines	0.14
Fine	T-20	5.5-8.25	100% fines	0.02
Fine	T-21	13.75-15	100% fines	0.08
Fine	T-22	3.5-10	100% fines	0.03
Fine	T-22	10-15	100% fines	0.10
Fine	T-22	15-20	100% fines	0.10
			Fine Average	**0.06**
			Fine Range	**0.02 to 0.14**

Sediment Type	Boring ID	Sample Depth within Boring (ft)	Sediment Type (field-estimated composition in boring logs)	Lithium Result (mg/L)
Coarse	T-15	5-10	Poorly graded sand with silt and gravel (20% gravel, 70% sand, 10% fines)	0.03
Coarse	T-15	10-14.25	Poorly graded sand with silt and gravel (20% gravel, 70% sand, 10% fines)	0.02
Coarse	T-16	3-11	Poorly graded sand with silt and gravel (20% gravel, 70% sand, 10% fines)	0.03
Coarse	T-17	5-10.75	Well graded sand with silt (5% gravel, 85% sand, 10% fines)	0.02
Coarse	T-18	5-10	Well graded sand with silt and gravel (15% gravel, 75% sand, 10% fines)	0.03
Coarse	T-18	10-12.5	Well graded sand with silt and gravel	0.02
Coarse	T-19	3.5-5	Poorly graded sand with silt and gravel (20% gravel, 70% sand, 10% fines)	0.06
Coarse	T-19	5-10	Poorly graded sand with silt and gravel (20% gravel, 70% sand, 10% fines)	0.02
Coarse	T-19	10-14.5	Poorly graded sand with silt and gravel (20% gravel, 70% sand, 10% fines)	0.02
Coarse	T-21	5-13.75	Poorly graded sand with silt and gravel (15% gravel, 70% sand, 15% fines)	0.05
			Coarse Average	**0.03**
			Coarse Range	**0.02 to 0.06**

Temporary wells were installed in borings T-14 through T-22 to facilitate collection of groundwater samples. The groundwater samples were analyzed for lithium at Minnesota Valley Testing Laboratories. As can be seen on Figure 2, the lithium concentrations detected in the samples from temporary wells T-20 and T-22, which were completed in fine-grained sediments, were 1.6 to 2.3 times the lithium concentrations in the samples collected from temporary wells completed in coarse-grained sediments. These analytical results for the groundwater samples corroborate the results of the leach testing. Field sampling forms and the laboratory report for the analyses of the groundwater samples are presented in Appendix B.

2.1.3 Statistical Upper Limit of Natural Variability

As shown above, fine-grained sediments at the Site have generally higher lithium content than coarse-grained sediments at the Site. As a result, higher lithium concentrations can be leached from fine-grained sediments than from coarse-grained sediments at that Site. The lithium GWPS (0.0631 mg/L) was established by calculating the parametric upper prediction limit for background lithium concentrations measured in groundwater samples from the upgradient wells in the CCR monitoring network, consistent with the CCR Rule. Well logs (Appendix A) show that upgradient wells are screened in primarily coarse-grained soils while downgradient wells are screened in primarily fine-grained soils. Therefore, the effect of

the geologic variability at the Site on naturally occurring lithium concentrations in groundwater is not captured in the existing GWPS determination.

To understand an upper limit of lithium concentration in groundwater that might result from natural variability, the fine-grained sediment leaching data presented in Table 3 was used to calculate an interwell prediction limit of 0.16 mg/L (Figure 3), which is more than 2.5 times the established GWPS. This upper limit of natural variability more accurately represents potential downgradient background concentrations.

2.1.4 Conclusions

The analytical data confirm that more naturally occurring lithium is present in fine-grained sediments than in coarse-grained sediments at the Site and that more lithium is mobilized to the liquid phase from the fine-grained sediments than from the coarse-grained sediments. As a result of the natural variation in lithium content, groundwater in zones of fine-grained sediments will contain more lithium than groundwater in zones of coarse-grained sediments. The average lithium concentration in SPE leachate, intended to simulate groundwater conditions, from fine-grained sediments is approximately twice the concentration in leachate from coarse-grained sediments.

The upgradient wells in the CCR monitoring network are screened in predominantly coarse-grained sediments whereas the downgradient wells are screened in predominantly fine-grained sediments (Figure 2).

Finally, statistical evaluation of lithium concentrations obtained from the analyses of SPE leachate resulted in an interwell prediction limit that more than 2.5 times the GWPS. Therefore, based on these geologic relationships, elevated concentrations of lithium in downgradient wells are lower than the upper limit of natural variability for the Site, and exceedances of the GWPS in these wells are the result of natural variation in groundwater quality.

2.2 Hypothesis No. 2: Carbonaceous Zone

Naturally occurring carbonaceous zones within the aquifer matrix, which typically exhibit elevated lithium concentrations, are present in fine-grained sediments within or near the screened intervals of downgradient wells in the CCR monitoring network. As a result, it is possible that the GWPS based on upgradient wells is not representative of the background lithium concentrations in downgradient wells.

2.2.1 Lithium Concentrations within Carbonaceous Material

Carbonaceous materials are defined herein to include lignite or other types of coal, or other organic materials, that are inferred to contain visually significant amounts of carbon. To determine if the carbonaceous material could be contributing to the elevated downgradient groundwater concentrations, eight samples of carbonaceous material were extracted from available sediment cores (obtained from previous Site investigations) and subjected to the SPE leachate extraction analysis. Logs for the borings associated with these sediment cores are presented in Appendix A.

SPE leachate analyses of carbonaceous samples for lithium shown in Table 4 identified concentrations ranging from 0.06 to 0.13 mg/L, with an average concentration of 0.09 mg/L. The average lithium concentration in the carbonaceous material SPE leachate, intended to simulate groundwater conditions, is 1.5 times the average concentration from fine-grained samples and three times the average concentration from coarse-grained samples. The laboratory report for the analyses of carbonaceous material samples is presented in Appendix B.

Table 4 Summary of SPEs for Lithium in Carbonaceous Materials

Boring ID	Sample Depth within Boring (ft)	Lithium Result (mg/L)
SB-2	20.5-21	0.11
T-2	22.5-23.5	0.07
T-3	30-32.5	0.13
T-5	10-15	0.09
T-6	19.5-20	0.08
T-17	10.75-15	0.10
T-18	12.5-14.5	0.09
T-22	10-15	0.06
	average	**0.09**
	range	**0.06 to 0.13**

2.2.2 Carbonaceous Material Location Compared to Downgradient Wells

Carbonaceous material was identified in the MW-111 boring log (Appendix A) at a depth of approximately 3 feet below the well screen. Common industry practice is to backfill any over-drilled depth below the well screen using filter pack sand. This backfill below the well screen would allow transfer of groundwater from the carbonaceous zone to the well screen during sampling, likely affecting water quality.

The boring logs for the remaining downgradient wells did not identify carbonaceous material, though the older Site wells provide little detail on the materials encountered during well construction. Since carbonaceous zones can be thin, these zones could be present in the downgradient wells even though they were not noted on the well logs. While downgradient CCR monitoring network wells MW-117, MW-118, and MW-120 do not document carbonaceous material at the well locations, additional borings surrounding these downgradient wells provided evidence of carbonaceous zones (Figure 2). Table 5 provides the maximum and most recent lithium concentrations measured in downgradient wells and the approximate distances from the downgradient wells to the nearest boring in which carbonaceous material was identified. Measured lithium concentrations tended to be higher in groundwater where a downgradient carbonaceous zone was identified closer to the well, with the highest lithium concentration correlating to well MW-111 where carbonaceous material was documented within the boring (Appendix B).

Table 5 Carbonaceous Zone Correlation to Downgradient Groundwater Concentrations

Downgradient CCR Well	Maximum Measured Lithium Concentration in Groundwater* (mg/L)	Spring 2021 Lithium Concentration in Groundwater (mg/L)	Distance to Closest Boring with Documented Carbonaceous Material (ft)
MW-111	0.227	0.158	within boring
MW-120	0.175	0.120	125
MW-117	0.155	0.110	160
MW-118	0.102	0.068	280

*Maximum lithium concentration measured in assessment monitoring groundwater samples.

By inference from the information presented above, elevated concentrations of lithium in MW-111 are attributable to the presence of carbonaceous materials within the well boring. The site investigation boring logs document that carbonaceous material is present at the distances shown in Table 5 from each downgradient well. Based on the information in Table 5 there appears to be a relationship between groundwater lithium concentrations and distance to the nearest documented location of carbonaceous material, although carbonaceous material may be closer to the wells than documented by the borings.

Since the average lithium concentration SPE leachate analyses is about 1.5 times the average for fine-grained materials, it would be anticipated that lithium in groundwater samples that are influenced by carbonaceous materials would be much higher. It is apparent that carbonaceous materials in the downgradient monitoring zone have a significant impact on lithium concentrations in these wells and the regulated CCR unit is not the cause of elevated concentrations.

2.2.3 Conclusion

The average lithium concentration in the carbonaceous material SPE leachate is greater than the average concentrations in leachate from fine-grained or coarse-grained sediment samples. The locations where carbonaceous material was identified in boring logs also appear to correlate with the elevated lithium concentrations in CCR monitoring network wells. For instance, monitoring well MW-111 has the highest lithium concentrations and is the only downgradient well with carbonaceous material documented in the well's boring log. These data show that the presence of carbonaceous material in the aquifer matrix contributes to elevated lithium in downgradient groundwater.

3 Conclusion

The analysis summarized in this report supports a demonstration, consistent with requirements of § 257.95(g)(3)(ii) of the CCR Rule, that the presence of concentrations of lithium at statistically significant levels above the GWPS are attributable to sources other than the CCR unit. The following hypotheses were proven to support this determination:

- **Hypothesis No. 1**: Due to the natural variability between sediments in which upgradient and downgradient wells are screened, the observed downgradient concentrations are due to the natural variation in lithium content of the sediments.
- **Hypothesis No. 2**: The GWPS based on upgradient wells is not representative of the background lithium concentrations in downgradient wells due to naturally occurring carbonaceous zones within the aquifer matrix present in fine-grained sediments within or near the screened intervals of the downgradient wells.

Taken individually or together, the lines of evidence presented above provide adequate documentation and support that an alternative source is responsible for the presence of lithium at statistically significant concentrations above the GWPS and there does not appear to be a release from the Scrubber Ponds.

4 References

Barr Engineering Co., 2016. Evaluation of Existing Surface Impoundment Liner, West and East Scrubber Ponds. Prepared for Montana-Dakota Utilities, September 2016.

Barr Engineering Co., 2018. 2017 Annual Groundwater Monitoring and Corrective Action Report, Scrubber Pond and Temporary Storage Area. Prepared for Montana Dakota Utilities, January 2018.

Barr Engineering Co., 2019a. 2018 Annual Groundwater Monitoring and Corrective Action Report, Scrubber Pond and Temporary Storage Area, Lewis & Clark Station. Prepared for Montana Dakota Utilities, January 2019.

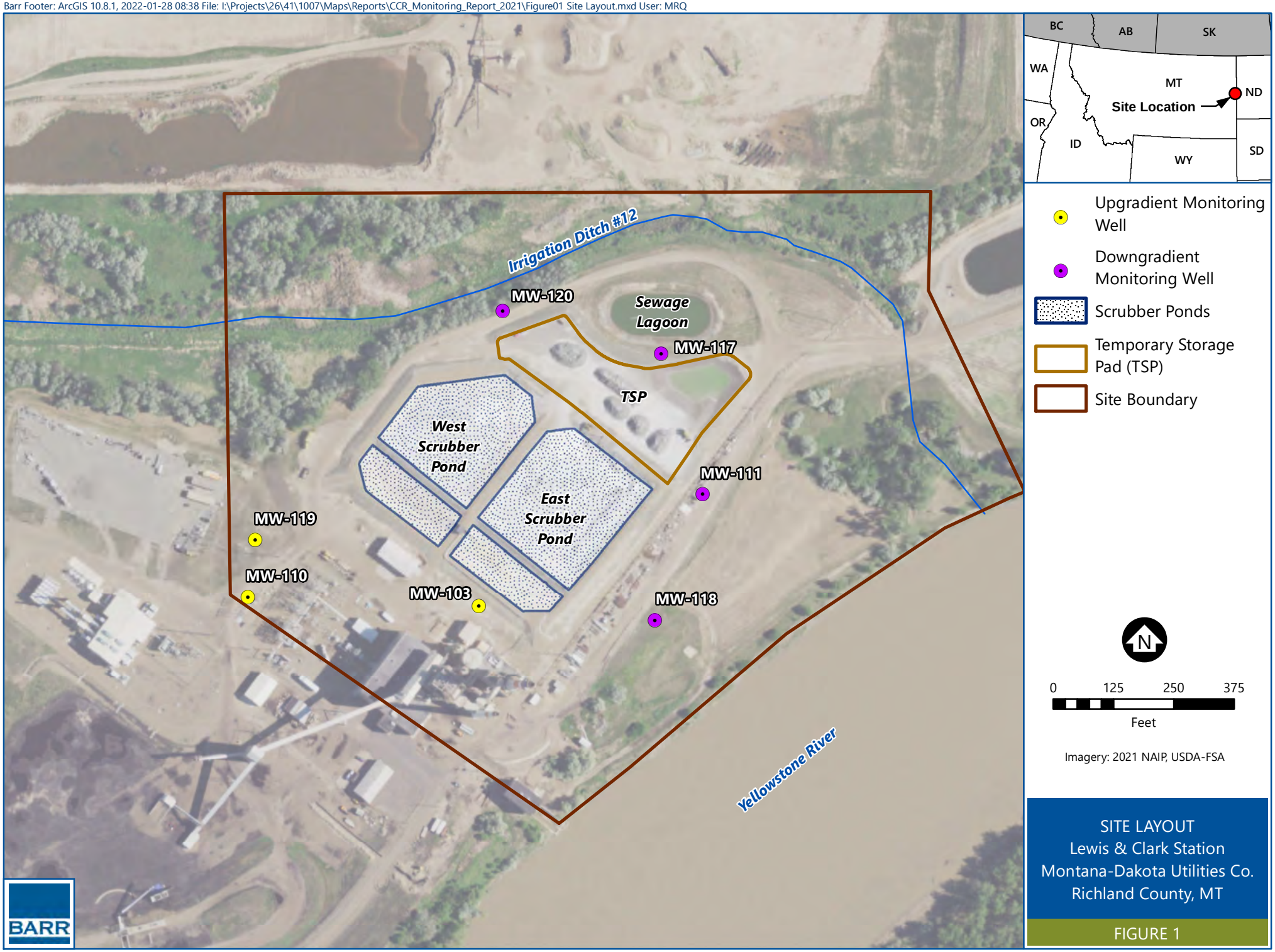
Barr Engineering Co., 2019b. Assessment of Corrective Measures, Lewis & Clark Station. Prepared for Montana-Dakota Utilities, August 2019.

Barr Engineering Co., 2020a. Alternative Source Demonstration, Temporary Storage Pad, Lewis & Clark Station. Prepared for Montana Dakota Utilities, November 2020.

Barr Engineering Co., 2020b. 2019 Annual Groundwater Monitoring and Corrective Action Report, Scrubber Pond and Temporary Storage Area, Lewis & Clark Station. Prepared for Montana Dakota Utilities, January 2020.

Barr Engineering Co., 2021. 2020 Annual Groundwater Monitoring and Corrective Action Report, Scrubber Pond and Temporary Storage Area, Lewis & Clark Station. Prepared for Montana Dakota Utilities, January 2021.

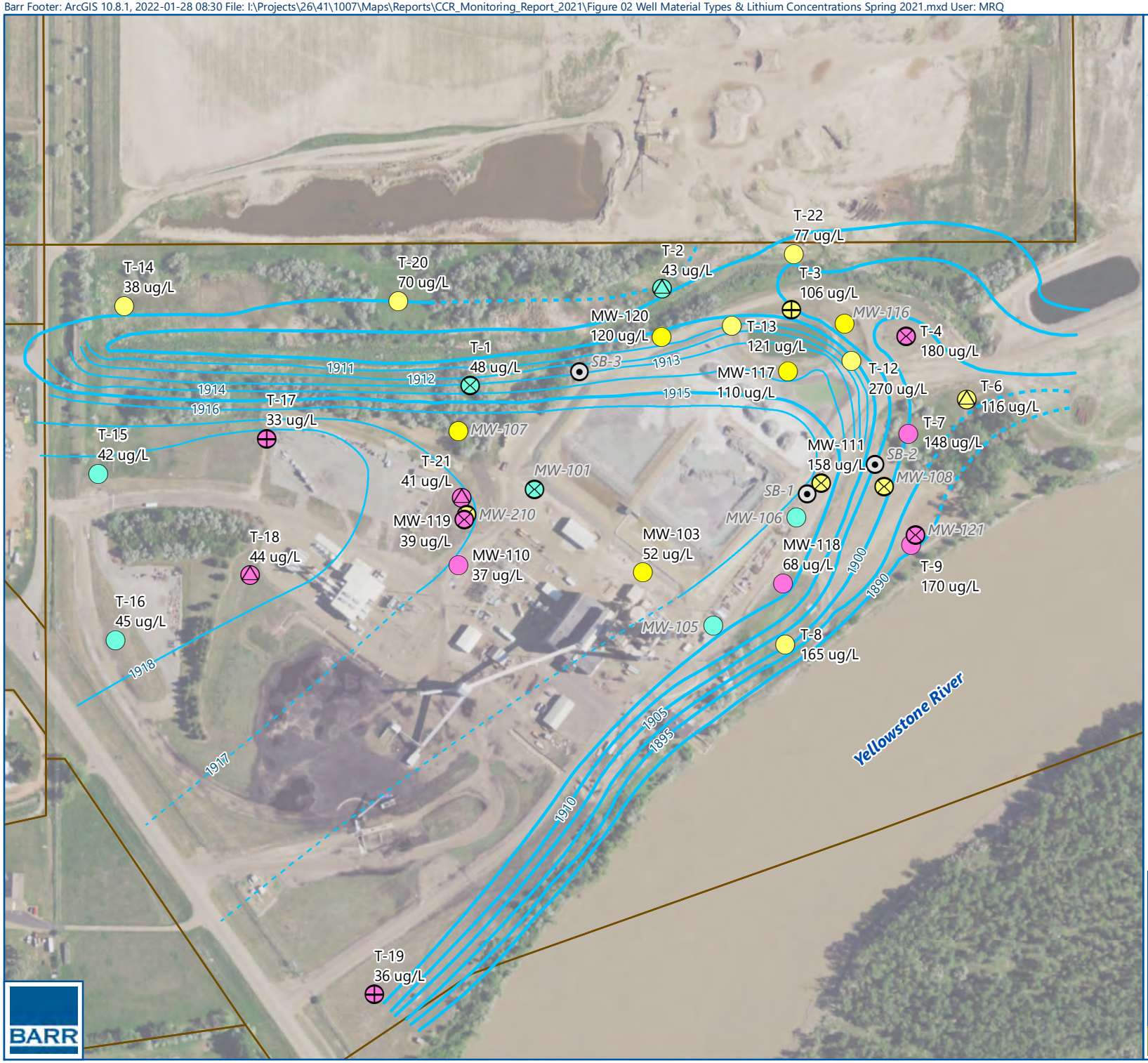
Figures



SITE LAYOUT
Lewis & Clark Station
Montana-Dakota Utilities Co.
Richland County, MT

FIGURE 1

Barr Footer: ArcGIS 10.8.1, 2022-01-28 08:30 File: I:\Projects\26\41\1007\Maps\Reports\CCR_Monitoring_Report_2021\Figure 02 Well Material Types & Lithium Concentrations Spring 2021.mxd User: MRQ



Soil Boring Location

Groundwater Contour (dashed where inferred)

Parcel Boundary

Material Type within Well Screen

- Coarse Material
- Fine Material
- Mixed Material

Carbonaceous Material Presence

- Above Well Screen
- In Well Screen
- Below Well Screen

Note:
Temporary well lithium samples were collected in January 2019 (T-1 through T-13) and April 2020 (T-14 through T-23). CCR monitoring well system lithium samples were collected in March 2021. Additional monitoring wells were not sampled for lithium and were used only to develop contours and evaluate flow direction.

N

0 175 350 525
Feet

Imagery: 2021 NAIP, USDA-FSA

WELL MATERIAL TYPES AND LITHIUM CONCENTRATIONS SPRING 2021

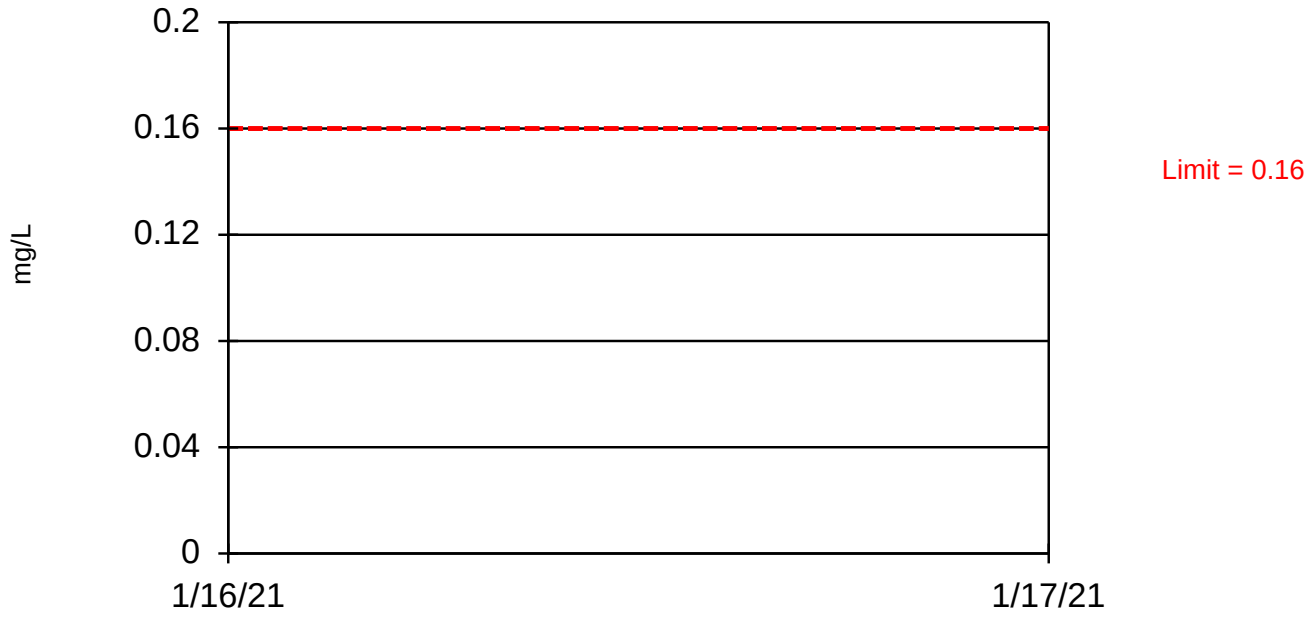
Lewis & Clark Station
Montana-Dakota Utilities Co.
Richland County, MT

FIGURE 2

BARR

Lithium - Fine

Interwell Parametric Prediction Limit



Background Data Summary: Mean=0.05833, Std. Dev.=0.03904, n=12. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8638, critical = 0.859. Kappa = 2.525 (c=15, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.003506. Individual comparison alpha = 0.0008776. Assumes 4 future values.

Lewis & Clark Station Client: Barr Engineering Company Data: LCLileaching

LITHIUM UPPER LIMIT OF NATURAL VARIABILITY
Lewis & Clark Station
Montana-Dakota Utilities Co.
Richland County, MT

FIGURE 3

Appendices

Appendix A

Site Boring Logs

LOG OF BORING

BRAUN ENGINEERING TESTING

PROJECT: W86-007 SOIL BORINGS
Fly Ash Sludge Lagoons
MDU Lewis & Clark Station
Sidney, MT

BORING: ST-103W

LOCATION: Middle of SW side of lagoons, see N.C.C. drawing

DATE: 1/21/86

SCALE: 1"=4'

(See Report and Standard Plates for evaluation and descriptive terminology.)

Elev.	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	BPF	WL	Tests or Notes
23.2						qp
22.7	.5		GRAVEL surfacing			
		CL	SILTY CLAY, low to medium plasticity, dark brown to grayish brown, moist, very stiff (fine alluvium)	21		4+
19.7	3½	CL	SANDY CLAY, low plasticity, brown, moist, rather stiff (fine alluvium)	10		2
16.7	6½	GW-GM	SANDY GRAVEL, fine to medium grained, a little silt, wet to waterbearing, loose to dense (coarse alluvium)	17		
				5		
				57		
08.2	15	ML	SANDY SILT, nonplastic, light gray, moist, very dense (siltstone)	52		1 3/4
06.2	17	CH	FAT CLAY, high plasticity, light gray, moist, hard (claystone)			
02.7	20½			38		4+

Water level down 10.1' with 19' of hollow-stem auger in the ground

Water level down 9.3' immediately after withdrawal of auger

2" PVC monitoring well installed to a depth of 19', see sketch

Form No. 603 (R 2-89)

WELL LOG REPORT

File No. _____

State law requires that the Bureau's copy be filed by the water well driller within 60 days after completion of the well.

1. WELL OWNER Name MDU Lewis & Clark Sta

2. CURRENT MAILING ADDRESS 400 North 4th, Bismarck, ND 58501

3. WELL LOCATION SE ¼ NW ¼ SW ¼ Section 9
Township 22 N☒ Range 59 E☒ County Richland
Govn't Lot _____, or Lot _____, Block _____
Subdivision Name _____
Tract Number _____

4. PROPOSED USE: Domestic ☐ Stock ☐ Irrigation ☐
Other☒ specify Monitoring

5. TYPE OF WORK: Hollowstem Auger X
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

6. DIMENSIONS: Diameter of Hole
Dia. 8 in. from 0 ft. to 18 ft.
Dia. _____ in. from _____ ft. to _____ ft.
Dia. _____ in. from _____ ft. to _____ ft.

7. CONSTRUCTION DETAILS:
Casing; Steel Dia. _____ from _____ ft. to _____ ft.
Threaded ☐ Welded ☐ Dia. _____ from _____ ft. to _____ ft.
Type _____ Wall Thickness _____
Casing; Plastic Dia. 2 from +1.8 ft. to 8 ft.
Weight SDR-21 Dia. _____ from _____ ft. to _____ ft.
PERFORMATIONS: Yes ☐ No☒
Type of perforator used _____
Size of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
SCREENS: Yes☒ No ☐
Manufacturer's Name Timco PVC
Type _____ Model No. _____
Dia. 2 Slot size #10 from 8 ft. to 15 ft.
Dia. _____ Slot size _____ from _____ ft. to _____ ft.
GRAVEL PACKED: Yes No☒ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.
GROUTED: To what depth? 7 ft.
Material used in grouting 263# bentonite chips

8. WELL HEAD COMPLETION:
Pitless Adapter ☐ Yes ☒ No

9. PUMP (if installed)
Manufacturer's name _____
Type _____ Model No. _____ HP. _____

10. WELL TEST DATA
The information requested in this section is required for all wells. All depth measurements shall be from the top of the well casing.
All wells under 100 gpm must be tested for a minimum of one hour and provide the following information:
a) Air _____ Pump _____ Bailer _____
b) Static water level immediately before testing _____ ft. If flowing; closed-in pressure _____ psi. _____ gpm.
Flow controlled by: _____ valve, _____ reducers, _____ other, (specify) _____.
c) Depth at which pump is set for test _____
d) The pumping rate: _____ gpm.
e) Pumping water level _____ ft. at _____ hrs. after pumping began.
f) Duration of test: Pumping time _____ hrs.
g) Recovery time _____ hrs.
h) Recovery water level _____ ft. at _____ hrs. after pumping stopped.

Wells intended to yield 100 gpm or more shall be tested for a period of 8 hours or more. The test shall follow the development of the well, and shall be conducted continuously at a constant discharge at least as great as the intended appropriation. In addition to the above information, water level data shall be collected and recorded on the Department's "Aquifer Test Data" form.

NOTE: All wells shall be equipped with an access port ½ inch minimum or a pressure gauge that will indicate the shut-in pressure of a flowing well. Removable caps are acceptable as access ports.

11. WAS WELL PLUGGED OR ABANDONED? ____ Yes ☒ No
If yes, how? _____

12. WELL LOG #3, 110

Depth (ft.) From	To	Formation
0	0.3	Silt, sandy w/gravel, dark brown
0.3	1	Silt, sandy w/gravel, reddish brown
1	4	Silt, sandy w/gravel & cobbles, medium brown
4	14	Gravel, fine to coarse, w/cobbles, abt 30% sand, med. brown
14	18	Silt, Light blue, Bedrock

ATTACH ADDITIONAL SHEETS IF NECESSARY

13. DATE COMPLETED 8/28/91

14. DRILLER/CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

1 Dec 91
Date

Water Supply Inc
Firm Name

2501 Twin City Dr
Address

Mandan, ND 58554
Signature

License No. 296/004

MONTANA DEPARTMENT OF NATURAL RESOURCES & CONSERVATION

DNRC

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is complied electronically from the contents of the Ground-Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Plot this site on a topographic map
View scanned well log (7/28/2010 8:48:11 AM)

Site Name: MDU
GWIC Id: 190701
DNRC Water Right:

Section 1: Well Owner

Owner Name
MDU
Mailing Address

City	State	Zip Code
SIDNEY	MT	59270

Section 2: Location

Township	Range	Section	Quarter Sections
22N	59E	9	SW¼ NE¼ SW¼

County
RICHLAND

Geocode

Latitude	Longitude	Geomethod	Datum
47.679047	104.157232	TRS-SEC	NAD83

Altitude	Method	Datum	Date

Addition **Block** **Lot**

Section 3: Proposed Use of Water

MONITORING (1)

Section 4: Type of Work

Drilling Method:

Section 5: Well Completion Date

Date well completed: Thursday, May 03, 2001

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	18	8

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	8	2				PVC-SCHED40

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
8	18	2			.01 SLOT

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	6	3/8 BENTONITE CHIPS	
6	18	10/20 SAND	

Section 7: Well Test Data

Total Depth: 18
Static Water Level:
Water Temperature:

Unknown Test Method *

Yield _ gpm.
Pumping water level _ feet.
Time of recovery _ hours.
Recovery water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	5	BLACK SILTY CLAY
5	21	TAN/ YELLOW SILT CLAY
21	22	COAL
22	25	SILTY CLAY SAND STRINGERS

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: HANSEN ENVIRONMENTAL DRILLING
License No: WWC-230
Date Completed: 5/3/2001

LOG OF WELL MW-117

BARR

SHEET 1 OF 1

Project:Lewis and Clark Station
Project No.:26411007.00 PH1-014
Location:Sidney, Montana
Coordinates:UTM 13N N:2248510.70m, E:3584876.38m
Datum:NAVD88

Surface Elevation:1917.5 ft
Drilling Method:Hollow Stem Auger
Sampling Method:Split Spoon
Completion Depth:19.0 ft

Top of Casing Elev.:1920.3 ft
Unique Well No.:

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	MAJOR UNIT	WELL OR PIEZOMETER CONSTRUCTION DETAIL	Elevation, feet
0.0			CL		TOPSOIL - SANDY CLAY (CL): fine grained; brown; frozen.			1917.5
			CL/ML		FILL - SILTY CLAY (CL/ML): yellow; moist; medium to high plasticity; strong HCl reaction; 0% gravel, 5% sand, 95% fines, orange staining.	Fill	PRO. CASING Diameter: 6" Type: Steel Interval: Surface + 3'	
2.5								1915.0
			CL/ML		SILTY CLAY TO CLAY (CL/ML): light yellow brown - to olive yellow; moist to wet; low to medium plasticity; 0% gravel, 0% sand, 100% fines, hard to very hard, black oxidation spots, trace orange oxidation, rusty oxidation on fracture boundaries, very fine grain sand.	Alluvium	RISER CASING Diameter: 2" Type: Sch 40 PVC Interval:	
5.0 ▽								1912.5 ▽
							GROUT Type: Concrete Interval: 0-1' bgs	
7.5								1910.0
							SEAL Type: Bentonite chips Interval: 1-4.5' bgs	
10.0							SANDPACK Type: 20/40 Interval: 4.5-10' bgs	1907.5
			CL		CLAY (CL): gray; dry to moist; high plasticity; strong HCl reaction; 0% gravel, 0% sand, 100% fines, very hard, Fort Union Formation, black oxidation spots, rusty oxidation on fracture boundaries, occurance of silty clay, low to high plasticity. 13': Dry, no oxidation, non-plastic.	Fort Union	SCREEN Diameter: 2" Type: No. 10 Sch 40 Interval: PVC 5-10' bgs	
12.5								1905.0
15.0								1902.5
17.5								1900.0
					End of well 19.0 feet			
20.0								

Date Boring Started: 2/20/16
Date Boring Completed: 2/21/16
Logged By: DJZ
Drilling Contractor: Terracon
Drill Rig: CME-55

Remarks:

Additional data may have been collected in the field which is not included on this log.
Weather: 25°F, overcast

O:\GINT\PROJECTS\26411007 MDU LEWIS AND CLARK STATION\26411007.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

LOG OF WELL MW-118

BARR

Project:Lewis and Clark Station
Project No.:26411007.00 PH1-014
Location:Sidney, Montana
Coordinates:UTM 13N N:2247960.01m, E:3584863.71m
Datum:NAVD88

Surface Elevation:1921.1 ft
Drilling Method:Hollow Stem Auger
Sampling Method:Split Spoon
Completion Depth:12.0 ft

Top of Casing Elev.:1924.1 ft
Unique Well No.:

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	MAJOR UNIT	WELL OR PIEZOMETER CONSTRUCTION DETAIL	Elevation, feet
0.0			CL		TOPSOIL - SANDY CLAY (CL): dark olive gray; frozen.	Fill		
					SAND WITH GRAVEL (SW): very dark grayish brown; dry to wet; 25% gravel, 75% sand, 0% fines, fine-to-medium-grained subangular sand; subangular gravel with some cobbles, well graded.		PRO. CASING Diameter: 6" Type: Steel Interval: Surface + 3'	1920.0
2.5							RISER CASING Diameter: 2" Type: Sch 40 PVC Interval:	1917.5
5.0			SW			Alluvium	GROUT Type: Concrete Interval: 0-1' bgs	1915.0
7.5					8': Medium/coarse grained, subangular sand with small to large subangular cobbles and gravels.		SEAL Type: Bentonite chips Interval: 1-5' bgs	1912.5
10.0					Rusty brown water at contact.		SANDPACK Type: 20/40 Interval: 5-12' bgs	1910.0
			ML		SILT (ML): very pale brown; moist; low plasticity; some brown layers within.	Fort Union	SCREEN Diameter: 2" Type: No. 10 Sch 40 Interval: PVC 6-11' bgs	
			CL		CLAY (CL): gray; moist; very hard, homogenous, Fort Union Formation, non-plastic.			
12.5					End of well 12.0 feet			
15.0								
17.5								
20.0								

Date Boring Started: 2/21/16
Date Boring Completed: 2/22/16
Logged By: DJZ
Drilling Contractor: Terracon
Drill Rig: CME-55

Remarks:

Additional data may have been collected in the field which is not included on this log.
Weather: 20°F, fog

O:\GINT\PROJECTS\26411007 MDU LEWIS AND CLARK STATION\26411007.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

LOG OF WELL MW-119

BARR

Project:Lewis and Clark Station
Project No.:26411007.00 PH1-014
Location:Sidney, Montana
Coordinates:UTM 13N N:2248125.79m, E:3584035.03m
Datum:NAVD88

Surface Elevation:1923.3 ft
Drilling Method:Hollow Stem Auger
Sampling Method:Split Spoon
Completion Depth:16.0 ft

Top of Casing Elev.:1926.3 ft
Unique Well No.:

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	MAJOR UNIT	WELL OR PIEZOMETER CONSTRUCTION DETAIL	Elevation, feet
0.0					TOPSOIL - SANDY CLAY MIX: black; dry; less than 1".			1922.5
2.5			GW		FILL - GRAVEL WITH SAND (GW): pinkish gray; dry to wet; 50% gravel, 50% sand, 0% fines, well graded, large to small subrounded gravel and cobbles, fine to coarse grained subangular sand, no HCL reaction.	Fill	PRO. CASING Diameter: 6" Type: Steel Interval: Surface + 3'	1920.0
5.0			SW		SAND WITH GRAVEL (SW): pinkish gray; moist to wet; 40% gravel, 55% sand, 5% fines, well graded fine to coarse grained sand, large to small subrounded gravel and cobbles.	Alluvium	RISER CASING Diameter: 2" Type: Sch 40 PCV Interval: GROUT Type: Neat Cement Interval: 3-5' bgs	1917.5
7.5					7': Some orange/black oxidation in sand.		SEAL Type: Bentonite chips Interval: 5-7' bgs	1915.0
10.0					10': Some heaving sand.		SANDPACK Type: 20/40 Interval: 7-16' bgs	1912.5
12.5							SCREEN Diameter: 2" Type: No. 10 Sch 40 Interval: PVC 9-14' bgs	1910.0
15.0			ML		SILT (ML): gray; moist; 0% gravel, 0% sand, 100% fines, very hard, non-plastic, low HCL reaction.	Fort Union		1907.5
					15.75: Lignite lense.			
					End of well 16.0 feet			
17.5								
20.0								

Date Boring Started: 2/18/16
Date Boring Completed: 2/18/16
Logged By: DJZ
Drilling Contractor: Terracon
Drill Rig: CME-55

Remarks:

Additional data may have been collected in the field which is not included on this log.
Weather: 35°F, overcast

O:\GINT\PROJECTS\26411007 MDU LEWIS AND CLARK STATION\26411007.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

LOG OF WELL MW-120

BARR

Project:	Lewis and Clark Station	Surface Elevation: 1919.0 ft	Top of Casing Elev.: 1922.0 ft
Project No.:	26411007.00 PH1-014	Drilling Method: Hollow Stem Auger	
Location:	Sidney, Montana	Sampling Method: Split Spoon	
Coordinates:	UTM 13N N:m, E:m	Completion Depth: 16.0 ft	
Datum:	NAVD88		

Depth, feet	Sample Type & Recovery	Sample No.	Blows/6in.	ENVIRONMENTAL DATA	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL	Elevation, feet
0.0					CL-CH		CLAY FILL (CL-CH): yellowish brown (10YR 5/4); frozen; hard; roots.		
			7-9-14-18.	**G/S/F:**0%/ 0%/ 100% **G/S/F:**15%/ 60%/ 25%	SP-SC		SAND W/ GRAVEL (SP-SC): brown (10YR 4/3); moist; very fine grained sand, subround gravels, large to small.	PRO. CASING Diameter: **6"** Type: **Steel** Interval: **Surface + 3'**	1917.5
2.5			8-12-13-10.	**G/S/F:**5%/ 70%/ 25% **G/S/F:**0%/ 5%/ 95%			CLAY (CL-CH): light yellowish brown (2.5Y /4); moist to wet; hard; crumbly, areas of CLAYSTONE within.	RISER CASING Diameter: **2"** Type: **Sch 40 PCV** Interval:	1915.0
5.0			5-6-7-11.	**G/S/F:**15%/ 15%/ 80%			At 5': 4" FAT CLAY (CH), brown (10YR 4/3), hard Increasing sand and gravels within claystone. Mostly fine grained sand, smal gravels, subround.		
			2-4-3-0.	**G/S/F:**5%/ 20%/ 75%			At 6-7.5': Mix of fat clay and claystone w/ sand/gravel within w/ little silt pockets.	GROUT Type: **Cement** Interval: **0-1.5' bgs**	1912.5
7.5			1-2-3-0.	**G/S/F:**10%/ 20%/ 70%	CL-CH		At 7.5': Transitions to SANDY CLAY (CL/CH), high plasticity with very fine to coarse grained sand within, subround to subangular. Trace gravels, small to large. Rusty red oxidation spots and fractures. Few black manganese oxidation spots. Few white precipitate veins/spots.	SEAL Type: **Bentonite chips** Interval: **1.5-9' bgs**	1910.0
10.0			1-3-4-4.	**G/S/F:**5%/ 20%/ 75%				SANDPACK Type: **10/20** Interval: **9-16' bgs**	
			1-2-2-0.	**G/S/F:**10%/ 20%/ 70%			At 11': Color change to dark grayish brown (10YR 4/2), softer. At 12': Sample, wet.	SCREEN Diameter: **2"** Type: **No. 12 Sch 40 PVC** Interval: **11-16' bgs**	1907.5
12.5			1-3-3-0.	**G/S/F:**10%/ 20%/ 70%					
15.0			1-2-3-4.	**G/S/F:**0%/ 0%/ 100%	CL-ML		SILTY CLAY/CLAYEY SILT (CL-ML): light gray/gray; wet; soft; with trace black roots and rusty orange oxidations stains.		1905.0
							End of well 16.0 feet		
17.5									
20.0									

Date Boring Started:	1/29/18
Date Boring Completed:	1/29/18
Logged By:	DJZ
Drilling Contractor:	SK Geotechnical
Drill Rig:	

Remarks: After 15 min., water level was at 12.9 ft bgs. After 40 min., water level was at 12.6 ft bgs.

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

O:\GINT\PROJECTS\26411007 MDU LEWIS AND CLARK STATION\26411007.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

LOG OF BORING MW-121

BARR

SHEET 1 OF 1

Project: Lewis and Clark Station
Project No.: 26411007.14 Boundary Well
Location: Sidney, Montana
Coordinates: UTM 13N N:17326179m, E:1848702m
Datum:

Surface Elevation: 1902.4 ft
Drilling Method: Hollow Stem Auger
Sampling Method:
Completion Depth: 14.0 ft

Top of Casing Elev.: 1904.6 ft

Depth, feet	Sample No.	Blows/6in.	ENVIRONMENTAL DATA	USCS	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0	1	W-2-3-3.	**G/S/F:**0%/ 5%/ 95%	CL	CLAY (CL): dark grayish brown (10YR 4/2); moist to wet; roots; thin fine grained sand laminations.	
				SM	SILTY SAND (SM): olive brown (2.5Y 4/3); moist to wet; roots; fine grained sand within; few sandy lenses.	
2.5	2	1-1-4-6.	**G/S/F:**0%/ 60%/ 40%	SP	SAND (SP): fine grained sand; trace fines, loose; light olive brown (2.5Y 5/3); moist.	1900.0
5.0	3	2-2-3-3.	**G/S/F:**0%/ 90%/ 10%			1897.5
	4	1-3-3-.	**G/S/F:**0%/ 90%/ 10%		At 5.75 ft, 2 in lens silty clay, mottled w/ rusty orange oxidation spots. At 5.95 ft and 6.25 ft, 2 in silt lens w/ fine grained sand and mottled w/ rusty orange oxidation spots.	
7.5	5	1-5-4-.	**G/S/F:**0%/ 95%/ 5%		At 8 ft, trace fine grained orange terracotta fragments.	1895.0
					At 9 ft, saturated.	
10.0	6	W-3-5-3.	**G/S/F:**0%/ 90%/ 10%			1892.5
	7	2-2-3-.	**G/S/F:**0%/ 90%/ 10% **G/S/F:**90%/ 10%/ 0%		At 11 ft, trace fragments of lignite coal.	
12.5				GP	GRAVEL (GP): fine to coarse grained; subrounded; trace fine to coarse grained sand.	1890.0
	8	1-1-1-.	**G/S/F:**0%/ 0%/ 100%	CL-CH	CLAY [FORT UNION FORMATION] (CL-CH): very dark gray; wet; soft; high plasticity.	
15.0					End of boring 14.0 feet	
17.5						
20.0						

WELL OR PIEZOMETER CONSTRUCTION DETAIL

- 6" steel protop: +3 to 2 ft bgs
- concrete: 0 to 2 ft bgs
- bentonite seal: 2 to 6 ft bgs
- 2" PVC schedule 40 riser: +2.5 to 8 ft bgs
- 10/20 silica sand filter pack: 6 to 13 ft bgs
- 2" #10 schedule 40 PVC screen: 8 to 13 ft bgs

Date Boring Started: 9/26/19 2:45 pm
Date Boring Completed: 9/26/19 4:00 pm
Logged By: DJZ
Drilling Contractor: S&K Geotechnical
Drill Rig:

Remarks: Dashed line indicates an inferred contact depth.
Water level measured at time of drilling.

PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methane Corrected; G/S/F = Gravel/Sand/Fines
Additional data may have been collected in the field which is not included on this log.

M:\GINT\PROJECTS\26411007 MDU LEWIS AND CLARK STATION\26411007.14.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING SB-2

DRAFT

Project:	GeoProbe Investigation	Surface Elevation:	1914.4 ft
Project No.:	26411007.10	Drilling Method:	GeoProbe Direct-Push
Location:	Lewis & Clark Station, Sidney, MT	Sampling Method:	GeoProbe
Coordinates:	N 2,248,187.2 ft E 3,585,135.6 ft	Completion Depth:	25.0 ft
Datum:	NAVD88		

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0			CL		CLAY (CL): dark brown; frozen; with roots; 0% gravel, 0% sand, 100% fines.	
			CL		SILTY CLAY (CL): dark yellowish brown; moist; with roots, trace fine grained sand lenses within; weak HCl reaction; 0% gravel, 1% sand, 99% fines.	1910
5						
			SP		SAND (SP): fine grained; light gray/tan; moist to wet; subrounded; few areas with silty sand mix within; 0% gravel, 90% sand, 10% fines.	1905
10						
						1900
15						
						1895
20			CL-CH		CLAY (CL-CH): Fort Union Formation; gray; moist; lean to fat; high plasticity; 0% gravel, 5% sand, 95% fines, red oxidation staining on veins/fractures.	
					LIGNITE COAL: black; dry.	
			CL-CH		CLAY (CL-CH): gray & tan; moist; hard; lean to fat; 0% gravel, 5% sand, 95% fines, red oxidation staining on veins/fractures, with few mottles, with black organics within.	1890
25					End of boring 25.0 feet	

Date Boring Started:	1/31/19 9:55 am
Date Boring Completed:	1/31/19 10:15 am
Logged By:	DJZ
Drilling Contractor:	AET
Drill Rig:	6620 DT

Remarks: Log is duplicate of MW-108
Cave: 24.45' bgs before abandoning borehole

Weather: 15°F, overcast, windy

Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING SB-3

DRAFT

Project:	GeoProbe Investigation	Surface Elevation:	1925.2 ft
Project No.:	26411007.10	Drilling Method:	GeoProbe Direct-Push
Location:	Lewis & Clark Station, Sidney, MT	Sampling Method:	GeoProbe
Coordinates:	N 2,248,493.0 ft E 3,584,337.9 ft	Completion Depth:	20.0 ft
Datum:	NAVD88		

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0					FILL: push through road, no recovery.	1925
			CL		FILL - CLAY (CL): dark grayish brown; moist; with trace fine-medium grained sand mix within; high plasticity; 0% gravel, 5% sand, 95% fines.	
5			SC		CLAYEY SAND (SC): mostly fine grained with trace medium and coarse grained; subrounded; with few subrounded gravels; 10% gravel, 55% sand, 35% fines.	1920
			SP		9.5': SAND (SP): 3-inch lens of fine grained; tan; moist to wet.	
10 ▽						▽ 1915
			CL		SANDY CLAY (CL): dark gray; moist to wet; with fine to coarse sand and few gravels within, trace roots.	
15			SM		SILTY SAND (SM): fine grained with few medium and coarse grained; grayish brown; saturated; with trace to few small subrounded gravels within; 10% gravel, 60% sand, 30% fines.	1910
			ML		SANDY SILT (ML): very fine to fine grained; light olive brown; wet to saturated; mottled.	
			CL-CH		LEAN TO FAT CLAY (CL-CH): olive yellow; moist; with golden brown mottles, trace manganese oxidation stains; medium plasticity.	
20					End of boring 20.0 feet	

Date Boring Started:	1/31/19 2:05 pm
Date Boring Completed:	1/31/19 2:25 pm
Logged By:	DJZ
Drilling Contractor:	AET
Drill Rig:	6620 DT

Remarks: WL: 10.20' bgs, not allowed to equilibrate

Weather: 25°F, clear/sunny, windy

Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-1

DRAFT

Project: GeoProbe Investigation
Project No.: 26411007.10
Location: Lewis & Clark Station, Sidney, MT
Coordinates: N 2,248,474.2 ft E 3,584,051.4 ft
Datum: NAVD88

Surface Elevation: 1914.6 ft
Drilling Method: GeoProbe Direct-Push
Sampling Method: GeoProbe
Completion Depth: 25.0 ft

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0			SC		CLAYEY SAND (SC): fine grained few medium and coarse grained; subrounded; very dark grayish brown; frozen; with few small subrounded gravels; 10% gravel, 50% sand, 40% fines.	
			CL		SILTY CLAY (CL): dark grayish brown; moist; 0% gravel, 0% sand, 100% fines.	1910
5			CL-CH		CLAY (CL-CH): dark grayish brown; moist; mottled with orange/red and gray; high plasticity; 0% gravel, 0% sand, 100% fines.	
					8.5': color change to gray and dark gray.	
					9.0': wet, fragments of black organics and lignite coal within.	1905
10						
					13': color change to grayish brown with mottles.	
15			CL		CLAY WITH SAND (CL): fine to medium grained; grayish brown; subrounded to subangular; wet to moist; 0% gravel, 25% sand, 75% fines.	1900
20			SW		SAND (SW): fine to coarse grained; wet; subrounded to subangular; well graded with gravels at contact.	1895
			CL-CH		CLAY (CL-CH): Fort Union Formation; gray; moist; silt laminations as fractures within.	1890
25					End of boring 25.0 feet	

Date Boring Started: 1/31/19 3:10 pm
Date Boring Completed: 1/31/19 4:20 pm
Logged By: DJZ
Drilling Contractor: AET
Drill Rig: 6620 DT

Remarks: WL: 0.99' bgs

Weather: 25°F, partly cloudy, windy

Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-2

DRAFT

Project: GeoProbe Investigation
Project No.: 26411007.10
Location: Lewis & Clark Station, Sidney, MT
Coordinates: N 2,248,725.2 ft E 3,584,548.7 ft
Datum: NAVD88

Surface Elevation: 1911.9 ft
Drilling Method: GeoProbe Direct-Push
Sampling Method: GeoProbe
Completion Depth: 30.0 ft

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0			OL		CLAY WITH ORGANICS (OL): dark grayish brown; frozen; roots; medium plasticity; 0% gravel, 0% sand, 100% fines.	1910
5			CL		LEAN CLAY (CL): gray; moist to wet; soft; rusty/oxidized mottles; high plasticity; 0% gravel, 1% sand, 99% fines. 8': Darker gray with black organics, soft.	1905
10			CL-CH		CLAY (CL-CH): gray; moist to wet; soft; mottled with rusty golden spots; high plasticity; 0% gravel, 0% sand, 100% fines.	1900
15			SM		SILTY SAND (SM): very fine to fine grained; grayish brown; trace medium to coarse grained sand; 0% gravel, 60% sand, 40% fines.	1895
			CL-CH		CLAY (CL-CH): grayish brown; moist to wet; trace medium grained sand, mottled with gray spots; high plasticity.	
			SM		SILTY SAND (SM): very fine to fine grained; grayish brown; trace medium to coarse grained sand; 0% gravel, 60% sand, 40% fines.	
20			SW		WELL GRADED SAND (SW): fine to coarse grained; subrounded to subangular; small to large gravels, subrounded to subangular.	1890
			CL-CH		CLAY (CL-CH): olive brown; wet; soft; fragments of wood/roots within.	
					LIGNITE: black; wet; horizontal layering.	
			CH		CLAY (CH): Fort Union Formation; gray to dark gray; moist; hard.	
25			CL-CH		CLAY (CL-CH): gray; moist; hard; 0% gravel, 5% sand, 95% fines, breaks on fine grained sand veins, horizontal and paper thin, possible silt laminations with fine sand.	1885
30					End of boring 30.0 feet	

Date Boring Started: 2/1/19 8:40 am
Date Boring Completed: 2/1/19 12:30 pm
Logged By: DJZ
Drilling Contractor: AET
Drill Rig: 6620 DT

Remarks: Artesian conditions once rods removed, no temp well installed, borehole sealed with bentonite chips, pipes were used to verify that no bridging occured.

Weather: 25°F, partly cloudy

Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-3

DRAFT

Project: GeoProbe Investigation
Project No.: 26411007.10
Location: Lewis & Clark Station, Sidney, MT
Coordinates: N 2,248,671.5 ft E 3,584,884.7 ft
Datum: NAVD88

Surface Elevation: 1915.0 ft
Drilling Method: GeoProbe Direct-Push
Sampling Method: GeoProbe
Completion Depth: 32.5 ft

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0			CL		LEAN CLAY (CL): brown; frozen to moist; lenses of silt, roots, few mottles; high plasticity; weak HCl reaction; 0% gravel, 0% sand, 100% fines.	
5						1910
			ML		SILT (ML): brown; moist to wet; soft; 0% gravel, 0% sand, 100% fines.	
			CL		SILTY CLAY (CL): brown; moist to wet; few gray mottles and thin gray silt laminations, trace orange medium to coarse grained sand; 0% gravel, 1% sand, 99% fines.	
10			CH		FAT CLAY (CH): pale brown; moist; frequent gray mottles; high plasticity; 0% gravel, 0% sand, 100% fines.	1905
15			ML		SANDY SILT (ML): very fine grained; light olive brown; wet; soft; no HCl reaction; 0% gravel, 35% sand, 65% fines.	1900
20			SM		SILTY SAND (SM): very fine to fine grained; light olive brown; wet to saturated; very soft; trace gravels; 2% gravel, 60% sand, 38% fines.	1895
			SP		SAND (SP): fine grained with trace medium to coarse grained; brown; wet; subrounded; trace small subrounded gravels.	
25			CL		CLAY TO SILTY CLAY (CL): light olive brown; moist; hard; gray mottles, black organic lenses with fragments of lignite and roots; medium plasticity; 0% gravel, 5% sand, 95% fines.	1890
30			CH		FAT CLAY (CH): Fort Union Formation; gray; moist; hard; black organics and fragments of lignite; lignite at bottom of sample, 32.5'.	1885
					End of boring 32.5 feet	

Date Boring Started: 1/1/19 10:40 am
Date Boring Completed: 2/1/19 3:00 pm
Logged By: DJZ
Drilling Contractor: AET
Drill Rig: 6620 DT

Remarks: WL: 11.93' bgs, temp well removed prior to advancing past 20'.

Weather: -5°F, clear/sunny, windy

Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-5

DRAFT

Project: GeoProbe Investigation
Project No.: 26411007.10
Location: Lewis & Clark Station, Sidney, MT
Coordinates: N 2,248,649.6 ft E 3,585,434.0 ft
Datum: NAVD88

Surface Elevation: 1912.8 ft
Drilling Method: GeoProbe Direct-Push
Sampling Method: GeoProbe
Completion Depth: 20.0 ft

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0			CL		FILL - CLAY (CL): grayish brown; frozen to moist; varying amounts of sand and gravels, fine to coarse grained, subrounded; weak HCl reaction; 15% gravel, 15% sand, 70% fines.	1910
5			ML		SILT (ML): brown; moist to wet; soft; fine grained silty sand lenses, areas of gray and rusty mottles; weak HCl reaction; 0% gravel, 10% sand, 90% fines.	1905
10			SP		SAND (SP): fine grained; brown; wet.	
			ML-CL		SILTY CLAY & CLAYEY SILT (ML-CL): brown; wet; areas of gray and rusty mottles; weak HCl reaction.	1900
15			ML		SILT (ML): dark grayish brown; wet; soft; 0% gravel, 0% sand, 100% fines.	1895
			CH		FAT CLAY (CH): Fort Union Formation; gray; wet; soft; high plasticity; 0% gravel, 0% sand, 100% fines.	
20					End of boring 20.0 feet	

Date Boring Started: 1/30/19 1:10 pm
Date Boring Completed: 1/30/19 1:35 pm
Logged By: DJZ
Drilling Contractor: AET
Drill Rig: 6620 DT

Remarks: WL: 14.36' bgs

Weather: 5°F, clear/sunny, windy

Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-6

DRAFT

Project: GeoProbe Investigation
Project No.: 26411007.10
Location: Lewis & Clark Station, Sidney, MT
Coordinates: N 2,248,437.8 ft E 3,585,340.5 ft
Datum: NAVD88

Surface Elevation: 1916.8 ft
Drilling Method: GeoProbe Direct-Push
Sampling Method: GeoProbe
Completion Depth: 20.0 ft

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0			CL		LEAN CLAY (CL): brown; frozen to moist; few subrounded gravels and few subrounded to subangular sands; 10% gravel, 5% sand, 85% fines.	1915
5			CL		SILTY CLAY (CL): brown; moist; trace subrounded gravels, few fine grained clayey sand lenses, loose; 5% gravel, 20% sand, 75% fines.	1910
10			ML		SILT (ML): brown; wet; areas of clay/clayey silt within; 0% gravel, 0% sand, 100% fines.	1905
15			SP		SAND (SP): fine grained; tan; wet; loose; 0% gravel, 90% sand, 10% fines.	
			SM		CLAYEY SAND (SM): fine grained; brown; wet; loose to soft; 0% gravel, 65% sand, 35% fines.	1900
▽			CH		FAT CLAY (CH): Fort Union Formation; light olive brown to dark yellow; wet; hard; 2% gravel, 0% sand, 98% fines, trace gravel or mudstone at 18'. ▽	
20			CH		CARBONACEOUS CLAY (CH): black; moist; hard; lignite within.	
					End of boring 20.0 feet	

Date Boring Started: 1/30/19 2:20 pm
Date Boring Completed: 1/30/19 2:40 pm
Logged By: DJZ
Drilling Contractor: AET
Drill Rig: 6620 DT

Remarks: WL: 17.52' bgs

Weather: 5°F, cloudy, windy

Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-13

DRAFT

Project: GeoProbe Investigation
Project No.: 26411007.10
Location: Lewis & Clark Station, Sidney, MT
Coordinates: N 2,248,629.2 ft E 3,584,730.4 ft
Datum: NAVD88

Surface Elevation: 1916.9 ft
Drilling Method: GeoProbe Direct-Push
Sampling Method: GeoProbe
Completion Depth: 22.5 ft

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0			CL-CH		CLAY (CL-CH): brown; frozen; few fine to coarse sand and gravel, subrounded; 10% gravel, 10% sand, 80% fines.	1915
			GP		GRAVELLY LENS (GP).	
5			ML-CL		SILT WITH CLAY (ML-CL): light yellowish brown; wet; interbedded silt and clay lenses with rusty mottles.	1910
10			ML-CL		SILTY CLAY (ML-CL): light yellowish brown to light gray; moist to wet; hard; mottles, trace coal; 0% gravel, 0% sand, 100% fines.	1905
15			CL-CH		LEAN TO FAT CLAY (CL-CH): Fort Union Formation; gray; moist to wet; frequent fine silt laminations.	1900
20					17.5'-22.5': water bearing silt lenses throughout.	1895
					End of boring 22.5 feet	

Date Boring Started: 1/30/19 9:15 am
Date Boring Completed: 1/30/19 10:15 am
Logged By: DJZ
Drilling Contractor: AET
Drill Rig: 6620 DT

Remarks: WL: 8.77' bgs

Weather: -5°F, clear/sunny, windy

Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-14

DRAFT

Project: Supplemental ASD
Project No.: 26411007.15
Location: Lewis and Clark Station, Sidney, MT
Coordinates: N 2,248,679.6 ft E 3,583,153.0 ft
Datum: NAVD88

Surface Elevation: 1917.1 ft
Drilling Method: Geoprobe Direct-Push
Sampling Method: Geoprobe
Completion Depth: 13.5 ft

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			OL		TOPSOIL (OL): black; frozen; roots, clayey mix; 0% gravel, 0% sand, 100% fines.	
			CL-CH		LEAN TO FAT CLAY (CL-CH): very dark gray; frozen to moist; soft; roots, organics; 0% gravel, 0% sand, 100% fines.	1915.0
2.5		1				
						1912.5
5.0			CH		FAT CLAY (CH): dark grayish brown to gray; moist to wet; dense to hard; 0% gravel, 2% sand, 98% fines.	
						1910.0
7.5		2			LEAN TO FAT CLAY (CL-CH): gray; moist to wet; brown mottles, very dark gray soft/soggy areas within, trace subrounded fine to coarse sand, trace subrounded gravels, trace scoria/terracotta; 3% gravel, 4% sand, 93% fines.	
			CL-CH			1907.5
10.0						
		3				1905.0
12.5			CL		LEAN CLAY (CL): Fort Union Formation; gray; wet to saturated; brown mottles, trace subrounded sand and gravel within; 3% gravel, 3% sand, 94% fines, refusal at 13' bgs on claystone rock or cemented clay.	
					End of boring 13.5 feet	1902.5
15.0						
						1900.0
17.5						
						1897.5
20.0						

Date Boring Started: 4/7/20 8:35 am
Date Boring Completed: 4/7/20 9:05 am
Logged By: DJZ
Drilling Contractor: AET
Drill Rig:

Remarks: Refusal at 13.5' bgs - dense.
Driller commented that 2-5' bgs was very soft (no push) - no recovery
Temp well screen 3.5-13.5' bgs.
Water at surface visible in bore hole/well.

Additional data may have been collected in the field which is not included on this log.

\\EDI-CAD\CAD\GINT\PROJECTS\26411007 MDU LEWIS AND CLARK STATION\26411007.15_SUPPLEMENTAL ASD.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-15

DRAFT

Project:	Supplemental ASD	Surface Elevation:	1923.6 ft
Project No.:	26411007.15	Drilling Method:	Geoprobe Direct-Push
Location:	Lewis and Clark Station, Sidney, MT	Sampling Method:	Geoprobe
Coordinates:	N 2,248,244.4 ft E 3,583,085.3 ft	Completion Depth:	17.5 ft
Datum:	NAVD88		

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			OL		TOPSOIL (OL): dark brown; moist; roots, trace fine clayey sand.	
			CL-CH		LEAN TO FAT CLAY (CL-CH): brown; moist; few fine to coarse sand, subrounded to subangular, few areas of rusty oxidiation spots/veins, trace subrounded gravels; 1% gravel, 6% sand, 93% fines.	1922.5
2.5		1				1920.0
5.0			SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM): wet; cobble fragments, fine to medium sand. POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM): wet to saturated; loose; subrounded to subangular; few well-graded areas within, mostly fine to medium sand with few coarse sand, little subrounded to subangular gravels; 20% gravel, 70% sand, 10% fines, fines are dark brown to black colored.	1917.5
7.5		2				1915.0
10.0			SP-SM			1912.5
12.5		3				1910.0
15.0			CH		FAT CLAY (CH): Fort Union Formation; gray; moist; hard; thin silt laminations; 0% gravel, 0% sand, 100% fines, 2.5' push with 4' of recovery due to swelling.	1907.5
17.5		4			End of boring 17.5 feet	1905.0
20.0						

Date Boring Started:	4/6/20 9:50 am
Date Boring Completed:	4/6/20 10:30 am
Logged By:	DJZ
Drilling Contractor:	AET
Drill Rig:	

Remarks: Temp well screen 1.5-11.5' bgs.
Sand collapsed on screen.

Additional data may have been collected in the field which is not included on this log.

\\EDI-CAD\CAD\GINT\PROJECTS\26411007 MDU LEWIS AND CLARK STATION\26411007.15_SUPPLEMENTAL ASD.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-16

DRAFT

Project: Supplemental ASD
Project No.: 26411007.15
Location: Lewis and Clark Station, Sidney, MT
Coordinates: N 2,247,812.4 ft E 3,583,130.0 ft
Datum: NAVD88

Surface Elevation: 1927.2 ft
Drilling Method: Geoprobe Direct-Push
Sampling Method: Geoprobe
Completion Depth: 13.0 ft

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			OL		TOPSOIL (OL): black; moist; roots, clayey mix.	
			CL-CH		LEAN TO FAT CLAY (CL-CH): dark grayish brown to brown; moist; soft; roots, trace fine sand within; 0% gravel, 3% sand, 97% fines.	1925.0
2.5		1				
			SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM): moist to wet; loose; subrounded to subangular; mostly fine grained sand with few medium to coarse grained, little subrounded to subangualr gravels, few black organic laminations/stains within sand; 20% gravel, 70% sand, 10% fines, mostly fine grained sand from 4-6'.	1922.5
5.0						
		2				1920.0
7.5						
						1917.5
10.0						
		3	CH		FAT CLAY (CH): Fort Union Formation; light yellowish brown to light olive brown; moist; hard; few silty areas/silt laminations.	1915.0
12.5					End of boring 13.0 feet	
						1912.5
15.0						
						1910.0
17.5						
						1907.5
20.0						

Date Boring Started: 4/6/20 11:20 am
Date Boring Completed: 4/6/20 12:10 pm
Logged By: DJZ
Drilling Contractor: AET
Drill Rig:

Remarks: Refusal at 13' bgs, attempted second boring from offset location. Both pushes refused at 13' bgs.
Temp well screen 8-13' bgs, expendable point used.
Sand collapsed on screen.

Additional data may have been collected in the field which is not included on this log.

\\EDI-CAD\CAD\GINT\PROJECTS\26411007 MDU LEWIS AND CLARK STATION\26411007.15_SUPPLEMENTAL ASD.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-17

DRAFT

Project:	Supplemental ASD	Surface Elevation:	1922.5 ft
Project No.:	26411007.15	Drilling Method:	Geoprobe Direct-Push
Location:	Lewis and Clark Station, Sidney, MT	Sampling Method:	Geoprobe
Coordinates:	N 2,248,336.3 ft E 3,583,522.5 ft	Completion Depth:	15.0 ft
Datum:	NAVD88		

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			OL		TOPSOIL (OL): black; moist; roots, clayey mix, trace gravel.	1922.5
					POORLY GRADED SILTY SAND (SM): brown; moist to wet; subrounded to subangular; mostly fine grained sand with few medium to coarse grained sand, trace gravels; 4% gravel, 80% sand, 16% fines.	
2.5		1	SM			1920.0
5.0					WELL GRADED SAND WITH SILT (SW-SM): fine to coarse grained; wet; loose; subrounded to subangular; trace gravels with more gravels at bottom of contact; 4% gravel, 86% sand, 10% fines.	1917.5
7.5		2	SW-SM			1915.0
10.0						1912.5
					FAT CLAY (CH): Fort Union Formation; gray; moist; silt laminations, few 1" lignite coal lenses/fragments and carbonaceous zones within; 0% gravel, 0% sand, 100% fines.	
12.5		5	CH			1910.0
15.0					End of boring 15.0 feet	1907.5
17.5						1905.0
20.0						

Date Boring Started:	4/6/20 2:50 pm
Date Boring Completed:	4/6/20 3:30 pm
Logged By:	DJZ
Drilling Contractor:	AET
Drill Rig:	

Remarks: Temp well screen 5-10' bgs, expendable point used.
Sand collapsed on screen.

Additional data may have been collected in the field which is not included on this log.

\\EDI-CAD\CAD\GINT\PROJECTS\26411007 MDU LEWIS AND CLARK STATION\26411007.15_SUPPLEMENTAL ASD.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-18

DRAFT

Project: Supplemental ASD
Project No.: 26411007.15
Location: Lewis and Clark Station, Sidney, MT
Coordinates: N 2,247,982.1 ft E 3,583,479.1 ft
Datum: NAVD88

Surface Elevation: 1923.1 ft
Drilling Method: Geoprobe Direct-Push
Sampling Method: Geoprobe
Completion Depth: 14.5 ft

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0					FILL; SANDY LEAN CLAY (CL): black to very dark brown; moist; subrounded to subangular; roots, fine to coarse sand and trace gravels within, trace fragments of black coal within; 5% gravel, 30% sand, 65% fines.	1922.5
2.5		1	CL			1920.0
5.0					WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM): fine to coarse grained; wet to saturated; loose; subrounded to subangular; little gravels; 15% gravel, 75% sand, 10% fines, some areas near top of interval are poorly graded, less fines at 11-12.5'.	1917.5
7.5		2	SW-SM			1915.0
10.0						1912.5
12.5		3	CH		FAT CLAY (CH): Fort Union Formation; gray; moist; hard to dense; thin silt laminations within; 0% gravel, 0% sand, 100% fines, 1" lignite coal lense at 14'.	1910.0
15.0					End of boring 14.5 feet	1907.5
17.5						1905.0
20.0						

Date Boring Started: 4/6/20 1:10 pm
Date Boring Completed: 4/6/20 1:55 pm
Logged By: DJZ
Drilling Contractor: AET
Drill Rig:

Remarks: No recovery & refusal at 10-14.5' bgs, attempted second boring from offset location which hit refusal at 14.5' bgs.
Temp well screen 3.5-13.5' bgs, expendable point used.
Sand collapsed on screen.

Additional data may have been collected in the field which is not included on this log.

\\EDI-CAD\CAD\GINT\PROJECTS\26411007 MDU LEWIS AND CLARK STATION\26411007.15_SUPPLEMENTAL ASD.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-19

DRAFT

Project: Supplemental ASD
Project No.: 26411007.15
Location: Lewis and Clark Station, Sidney, MT
Coordinates: N 2,246,894.0 ft E 3,583,802.3 ft
Datum: NAVD88

Surface Elevation: 1923.8 ft
Drilling Method: Geoprobe Direct-Push
Sampling Method: Geoprobe
Completion Depth: 12.5 ft

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			OL		TOPSOIL (OL): dark brown; moist; roots, clayey mix with silt.	
			CL		SILTY CLAY (CL): brown; moist to wet; soft; roots; 0% gravel, 0% sand, 100% fines.	1922.5
2.5		1				
			SP-SM		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM): fine grained; moist to wet; subrounded to subangular; few medium to coarse grained sand and little gravels within; 20% gravel, 70% sand, 10% fines, low moisture at 3.5-9', wet at 9', more gravelly at 3.5-8',few areas with more fines within, increase in gravels at bottom contact, few well graded sand areas at 10-14'.	1920.0
5.0						1917.5
7.5		2				
10.0						1915.0
12.5		3				1912.5
						1910.0
			CH		FAT CLAY (CH): Fort Union Formation; gray; moist; hard to dense; silt laminations, trave organics/lignite coal fragments within; 0% gravel, 0% sand, 100% fines.	
15.0					End of boring 12.5 feet	
						1907.5
17.5						
						1905.0
20.0						

Date Boring Started: 4/6/20 5:20 pm
Date Boring Completed: 4/6/20 6:00 pm
Logged By: DJZ
Drilling Contractor: AET
Drill Rig:

Remarks: No recovery 5-10' bgs, completed second boring from offset location.
Temp well screen 9-14' bgs, expendable point used.
Sand collapsed on screen.

Additional data may have been collected in the field which is not included on this log.

\\EDI-CAD\CAD\GINT\PROJECTS\26411007 MDU LEWIS AND CLARK STATION\26411007.15_SUPPLEMENTAL ASD.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-20

DRAFT

Project: Supplemental ASD
Project No.: 26411007.15
Location: Lewis and Clark Station, Sidney, MT
Coordinates: N 2,248,692.1 ft E 3,583,864.1 ft
Datum: NAVD88

Surface Elevation: 1920.7 ft
Drilling Method: Geoprobe Direct-Push
Sampling Method: Geoprobe
Completion Depth: 15.0 ft

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			OL		TOPSOIL (OL): dark grayish brown; moist; roots, clayey mix.	
			CL		SANDY LEAN CLAY (CL): fine to coarse grained; brown; moist; subrounded to subangular; trace gravels within; 5% gravel, 20% sand, 75% fines.	1920.0
2.5		1				1917.5
			CL-SC		POORLY GRADED SAND AND CLAY (CL-SC): fine grained; brown; moist; subrounded to subangular; few medium to coarse grained sand, few gravels; 10% gravel, 45% sand, 45% fines.	
5.0						
			CH		FAT CLAY (CH): light yellowish brown; moist; hard to dense; occasional brown and gray mottles, few black organic lenses/stains; 0% gravel, 0% sand, 100% fines.	1915.0
7.5		2				1912.5
			ML		SANDY SILT (ML): light olive yellow; wet to saturated; very fine grained sand within; 0% gravel, 40% sand, 60% fines, near liquid limit, sand and silt ratio varies with depth.	
10.0		3				1910.0
12.5		4				1907.5
15.0					End of boring 15.0 feet	1905.0
17.5						1902.5
20.0						

Date Boring Started: 4/7/20 10:00 am
Date Boring Completed: 4/7/20 10:30 am
Logged By: DJZ
Drilling Contractor: AET
Drill Rig:

Remarks: Refusal at 15' bgs.
Temp well screen 5-15' bgs.

Additional data may have been collected in the field which is not included on this log.

\\EDI-CAD\CAD\GINT\PROJECTS\26411007 MDU LEWIS AND CLARK STATION\26411007.15_SUPPLEMENTAL ASD.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-21

DRAFT

Project:	Supplemental ASD	Surface Elevation:	1923.8 ft
Project No.:	26411007.15	Drilling Method:	Geoprobe Direct-Push
Location:	Lewis and Clark Station, Sidney, MT	Sampling Method:	Geoprobe
Coordinates:	N 2,248,182.0 ft E 3,584,028.4 ft	Completion Depth:	15.0 ft
Datum:	NAVD88		

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			OL		TOPSOIL (OL): black; moist; roots, clayey mix, trace sand and gravel.	
			SP-SM		POORLY GRADED SAND WITH SILT AND GRAVELS (SP-SM): fine grained; moist to wet; subrounded to subangular; few medium to coarse grained sand within, few to little gravels, some silty areas within; 15% gravel, 70% sand, 15% fines, wet at 5', possibly well graded at 5-10' observed in second geoprobe push.	1922.5
2.5		1				1920.0
5.0						1917.5
7.5		2				1915.0
10.0						1912.5
12.5		3				1910.0
			CH		FAT CLAY (CH): Fort Union Formation; gray; moist; hard to dense; silt laminations, trace lignite fragments/black organics within; 0% gravel, 0% sand, 100% fines.	
15.0					End of boring 15.0 feet	1907.5
17.5						1905.0
20.0						

Date Boring Started:	4/6/20 3:55 pm
Date Boring Completed:	4/6/20 4:45 pm
Logged By:	DJZ
Drilling Contractor:	AET
Drill Rig:	

Remarks: Temp well screen 4-14' bgs, expendable point used.
Second boring completed for additional sample recovery.

Additional data may have been collected in the field which is not included on this log.

\\EDI-CAD\CAD\GINT\PROJECTS\26411007 MDU LEWIS AND CLARK STATION\26411007.15_SUPPLEMENTAL ASD.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-22

DRAFT

Project:	Supplemental ASD	Surface Elevation:	1912.6 ft
Project No.:	26411007.15	Drilling Method:	Geoprobe Direct-Push
Location:	Lewis and Clark Station, Sidney, MT	Sampling Method:	Geoprobe
Coordinates:	N 2,248,814.6 ft E 3,584,890.5 ft	Completion Depth:	20.0 ft
Datum:	NAVD88		

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0					FILL; SANDY LEAN CLAY (CL): very dark gray to dark brown; moist; sand and gravel at surface - mixed within clay fill below surface; 10% gravel, 40% sand, 50% fines.	
		1	CL			1910
					FAT CLAY (CH): moist to wet; dense; hard and softer areas within, black oragnics and roots within; 0% gravel, 0% sand, 100% fines.	
5						
		2			8-9'; olive brown; more silty and saturated.	1905
					9-12.5'; same as 3.5-8' but harder, soft at 12.5'; high plasticity.	
10			CH			
		3			12.5-14.5'; gray/dark gray to black; black organic/peat area with roots and shell fragments.	1900
					14.5-15.5'; fine sand within the fat clay.	
15					15.5-20'; dark gray; wet, soft; high plasticity.	
		4				1895
20					End of boring 20.0 feet	

Date Boring Started:	4/7/20 11:35 am
Date Boring Completed:	4/6/20 10:05 am
Logged By:	DJZ
Drilling Contractor:	AET
Drill Rig:	

Remarks: Temp well screen 3.5-18.5' bgs.

Additional data may have been collected in the field which is not included on this log.

Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
Telephone: 701-255-5460

LOG OF BORING T-23

DRAFT

Project: Supplemental ASD
Project No.: 26411007.15
Location: Lewis and Clark Station, Sidney, MT
Coordinates: N 2,248,816.0 ft E 3,585,392.7 ft
Datum: NAVD88

Surface Elevation: 1917.9 ft
Drilling Method: Geoprobe Direct-Push
Sampling Method: Geoprobe
Completion Depth: 15.0 ft

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			OL		TOPSOIL (OL): dark brown; moist; roots, clay with fine sand within.	1917.5
2.5		1	CL		SANDY LEAN CLAY (CL): very fine to fine grained; brown; moist; subangular to subrounded; trace medium to coarse sand, trace gravels; 4% gravel, 21% sand, 75% fines.	1915.0
5.0			ML		SANDY SILT (ML): pale olive to light yellowish brown; moist to wet; 0% gravel, 40% sand, 60% fines. 4.5-5.5'; dry/low moisure with areas of rusty oxidation stains thoughout.	1912.5
7.5		2			6.5-8'; wet to saturated; gray mottles.	1910.0
10.0					9.5-13.5'; areas of lean clay and silt laminations, trace siltstone fragments, dense/hard drilling.	1907.5
12.5		3				1905.0
15.0			CH		FAT CLAY (CH): olive yellow to light yellowish brown; moist; very hard to dense; mottled, with black organics or manganese oxidation stains; 0% gravel, 0% sand, 100% fines. End of boring 15.0 feet	1902.5
17.5						1900.0
20.0						

Date Boring Started: 4/7/20 1:10 pm
Date Boring Completed: 4/7/20 1:30 pm
Logged By: DJZ
Drilling Contractor: AET
Drill Rig:

Remarks: Refusal at 15' bgs with very tough drilling from 10-15' bgs.
Temp well screen 5-15' bgs.
Borehole dry after temp well installed.

Additional data may have been collected in the field which is not included on this log.

\\EDI-CAD\CAD\GINT\PROJECTS\26411007 MDU LEWIS AND CLARK STATION\26411007.15_SUPPLEMENTAL ASD.GPJ BARRLIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

Appendix B

Analytical Results

Pace Analytical® Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Date: 1/30/2020

CLIENT: Barr Engineering
Project: 26411007
Lab Order: S1912224

CASE NARRATIVE

Report ID: S1912224002
(Replaces S1912224001)

Samples SB-2, T-1, T-13 and T-2 were received on December 12, 2019.

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 Pace Analytical (Formerly Inter-Mountain Laboratories) except as indicated in this case narrative.

Qualifiers by sample

S1912224-001 - SPLP/Lithium - Holding times for preparation or analysis exceeded
S1912224-001 - SPLP/Selenium - Holding times for preparation or analysis exceeded
S1912224-001 - Total Metals-3050/6010/Lithium - Holding times for preparation or analysis exceeded
S1912224-001 - Total Metals-3050/6010/Selenium - Holding times for preparation or analysis exceeded
S1912224-002 - SPLP/Lithium - Holding times for preparation or analysis exceeded
S1912224-002 - SPLP/Selenium - Holding times for preparation or analysis exceeded
S1912224-002 - Total Metals-3050/6010/Lithium - Holding times for preparation or analysis exceeded
S1912224-002 - Total Metals-3050/6010/Selenium - Holding times for preparation or analysis exceeded
S1912224-003 - SPLP/Lithium - Holding times for preparation or analysis exceeded
S1912224-003 - SPLP/Selenium - Holding times for preparation or analysis exceeded
S1912224-003 - Total Metals-3050/6010/Lithium - Holding times for preparation or analysis exceeded
S1912224-003 - Total Metals-3050/6010/Selenium - Holding times for preparation or analysis exceeded
S1912224-004 - SPLP/Lithium - Holding times for preparation or analysis exceeded
S1912224-004 - SPLP/Selenium - Holding times for preparation or analysis exceeded
S1912224-004 - Total Metals-3050/6010/Lithium - Holding times for preparation or analysis exceeded
S1912224-004 - Total Metals-3050/6010/Selenium - Holding times for preparation or analysis exceeded
S1912224-005 - SPLP/Lithium - Holding times for preparation or analysis exceeded
S1912224-005 - SPLP/Selenium - Holding times for preparation or analysis exceeded
S1912224-005 - Total Metals-3050/6010/Lithium - Holding times for preparation or analysis exceeded
S1912224-005 - Total Metals-3050/6010/Selenium - Holding times for preparation or analysis exceeded
S1912224-006 - SPLP/Lithium - Holding times for preparation or analysis exceeded
S1912224-006 - SPLP/Selenium - Holding times for preparation or analysis exceeded
S1912224-006 - Total Metals-3050/6010/Lithium - Holding times for preparation or analysis exceeded
S1912224-006 - Total Metals-3050/6010/Selenium - Holding times for preparation or analysis exceeded

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 1/30/2020
Report ID: S1912224002
(Replaces S1912224001)
Work Order: S1912224
Collection Date: 1/31/2019 10:00:00 AM
Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

Project: 26411007
Lab ID: S1912224-001
Client Sample ID: SB-2
Depths: 2 - 5 Feet

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Total Metals-3050/6010						
Lithium	11.5	0.2	H	mg/Kg	01/27/2020 1835 DG	EPA 6010C
Selenium	ND	1.3	H	mg/Kg	01/27/2020 1835 DG	EPA 6010C
SPLP						
Lithium	ND	0.01	H	mg/L	01/09/2020 1249 DG	EPA 200.7
Selenium	ND	0.2	H	mg/L	01/09/2020 1249 DG	EPA 200.7

These results apply only to the samples tested.

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
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
X	Matrix Effect

RL - Reporting Limit

C	Calculated Value
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analysis reported under the reporting limit

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 1/30/2020
Report ID: S1912224002
(Replaces S1912224001)
Work Order: S1912224
Collection Date: 1/31/2019 10:05:00 AM
Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

Project: 26411007
Lab ID: S1912224-002
Client Sample ID: SB-2
Depths: 10 - 20 Feet

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Total Metals-3050/6010						
Lithium	4.9	0.2	H	mg/Kg	01/27/2020 1837 DG	EPA 6010C
Selenium	ND	1.3	H	mg/Kg	01/27/2020 1837 DG	EPA 6010C
SPLP						
Lithium	ND	0.01	H	mg/L	01/09/2020 1252 DG	EPA 200.7
Selenium	ND	0.2	H	mg/L	01/09/2020 1252 DG	EPA 200.7

These results apply only to the samples tested.

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
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
X	Matrix Effect

RL - Reporting Limit

C	Calculated Value
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analysis reported under the reporting limit

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 1/30/2020
Report ID: S1912224002
(Replaces S1912224001)
Work Order: S1912224
Collection Date: 1/31/2019 3:20:00 PM
Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

Project: 26411007
Lab ID: S1912224-003
Client Sample ID: T-1
Depths: 19 - 23 Feet

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Total Metals-3050/6010						
Lithium	4.0	0.2	H	mg/Kg	01/27/2020 1839 DG	EPA 6010C
Selenium	ND	1.3	H	mg/Kg	01/27/2020 1839 DG	EPA 6010C
SPLP						
Lithium	ND	0.01	H	mg/L	01/09/2020 1254 DG	EPA 200.7
Selenium	ND	0.2	H	mg/L	01/09/2020 1254 DG	EPA 200.7

These results apply only to the samples tested.

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
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
X	Matrix Effect

RL - Reporting Limit

C	Calculated Value
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analysis reported under the reporting limit

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 1/30/2020
Report ID: S1912224002
(Replaces S1912224001)
Work Order: S1912224
Collection Date: 2/1/2019 12:15:00 PM
Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

Project: 26411007
Lab ID: S1912224-004
Client Sample ID: T-2
Depths: 23.5 - 30 Feet

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Total Metals-3050/6010						
Lithium	18.1	0.2	H	mg/Kg	01/27/2020 1844 DG	EPA 6010C
Selenium	ND	1.3	H	mg/Kg	01/27/2020 1844 DG	EPA 6010C
SPLP						
Lithium	0.02	0.01	H	mg/L	01/09/2020 1256 DG	EPA 200.7
Selenium	ND	0.2	H	mg/L	01/09/2020 1256 DG	EPA 200.7

These results apply only to the samples tested.

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
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
X	Matrix Effect

RL - Reporting Limit

C	Calculated Value
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analysis reported under the reporting limit

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 1/30/2020
Report ID: S1912224002
(Replaces S1912224001)
Work Order: S1912224
Collection Date: 1/30/2019 9:20:00 AM
Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

Project: 26411007
Lab ID: S1912224-005
Client Sample ID: T-13
Depths: 3.5 - 10 Feet

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Total Metals-3050/6010						
Lithium	16.2	0.2	H	mg/Kg	01/27/2020 1856 DG	EPA 6010C
Selenium	ND	1.3	H	mg/Kg	01/27/2020 1856 DG	EPA 6010C
SPLP						
Lithium	ND	0.01	H	mg/L	01/09/2020 1305 DG	EPA 200.7
Selenium	ND	0.2	H	mg/L	01/09/2020 1305 DG	EPA 200.7

These results apply only to the samples tested.

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
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
X	Matrix Effect

RL - Reporting Limit

C	Calculated Value
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analysis reported under the reporting limit

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 1/30/2020
Report ID: S1912224002
(Replaces S1912224001)
Work Order: S1912224
Collection Date: 1/30/2019 10:10:00 AM
Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

Project: 26411007
Lab ID: S1912224-006
Client Sample ID: T-13
Depths: 15 - 20 Feet

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Total Metals-3050/6010						
Lithium	22.7	0.2	H	mg/Kg	01/27/2020 1902 DG	EPA 6010C
Selenium	ND	1.3	H	mg/Kg	01/27/2020 1902 DG	EPA 6010C
SPLP						
Lithium	0.02	0.01	H	mg/L	01/09/2020 1307 DG	EPA 200.7
Selenium	ND	0.2	H	mg/L	01/09/2020 1307 DG	EPA 200.7

These results apply only to the samples tested.

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
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
X	Matrix Effect

RL - Reporting Limit

C	Calculated Value
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analysis reported under the reporting limit

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

ANALYTICAL QC SUMMARY REPORT

CLIENT: Barr Engineering
Work Order: S1912224
Project: 26411007

Date: 1/30/2020
Report ID: S1912224002
(Replaces S1912224001)

EPA 1312 Sample Type **MBLK** Units: mg/L

SPLP BLK (01/09/20 13:09) RunNo: 175360

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Lithium	ND	0.01					
Selenium	ND	0.2					

EPA 1312 Sample Type **DUP** Units: mg/L

S1912224-004AD (01/09/20 12:58) RunNo: 175360

Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
Lithium	0.03	0.01	0.02	54.8		20	HR
Selenium	ND	0.2	ND			20	H

Total (3050) Metals by ICP - 6010C Sample Type **MBLK** Units: mg/Kg

MB-17055 (01/27/20 17:49) RunNo: 175797 PrepDate: 01/24/20 14:09 BatchID 17055

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Lithium	ND	0.2					
Selenium	ND	1.3					

Total (3050) Metals by ICP - 6010C Sample Type **LCS** Units: mg/Kg

LCS-17055 (01/27/20 17:56) RunNo: 175797 PrepDate: 01/24/20 14:09 BatchID 17055

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Lithium	121	0.2	125		97.1	80 - 120	
Selenium	86.9	1.3	100		86.9	80 - 120	

Total (3050) Metals by ICP - 6010C Sample Type **MS** Units: mg/Kg

S1912224-004AS (01/27/20 18:51) RunNo: 175797 PrepDate: 01/24/20 7:55 BatchID 17055

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Lithium	136	0.2	125	18.1	94.0	75 - 125	H
Selenium	90.5	1.3	100	ND	90.5	75 - 125	H

Total (3050) Metals by ICP - 6010C Sample Type **MSD** Units: mg/Kg

S1912224-004AMSD (01/27/20 18:53) RunNo: 175797 PrepDate: 01/24/20 7:55 BatchID 17055

Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Lithium	132	0.2	136	2.55	91.3	20	H
Selenium	88.8	1.3	90.5	1.88	88.8	20	H

Total (3050) Metals by ICP - 6010C Sample Type **DUP** Units: mg/Kg

S1912224-003AD (01/27/20 18:42) RunNo: 175797 PrepDate: 01/24/20 7:55 BatchID 17055

Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
Lithium	4.1	0.2	4.0	0.415		20	H
Selenium	ND	1.3	ND			20	H

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
G	Analyzed at IML Gillette laboratory
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

Barr Engineering Co. Chain of Custody

BARR ☐ Ann Arbor ☒ Bismarck ☐ Duluth ☐ Grand Rapids ☐ Hibbing ☐ Jefferson City ☐ Minneapolis ☐ Salt Lake City

Sample Origination State: ☐ KS ☐ MO ☐ UT ☐ MI ☐ ND ☐ WI ☐ MN ☐ SD Other: MT

COC Number: 58192

COC 1 of 1

REPORT TO	INVOICE TO
Company: Barr Engineering Co	Company: Barr Engineering Co
Address: Bismarck ND	Address: Bismarck ND
Name: Scott Korom	Name: Scott Korom
email: skorom@barr.com	email: skorom@barr.com
Copy to: datamgt@barr.com	P.O.
Project Name: Confidential Lease	Barr Project No: 26411007.1

#	Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y/N	Total Number Of Containers	Analysis Requested: Water	Soil: 1 Gallon Bag	Soil: % Solids
1.	SB-2 (2-5')	2	5	ft	01/31/2019	1000	S	N	1	S1912224-001	1	
2.	SB-2 (10-20')	10	20	ft	01/31/2019	1005	S	N	1	-002	1	
3.	T-1 (~~18~~ 19 DJZ -23')	~~18~~ 19 DJZ	23	ft	01/31/2019	1520	S	N	1	-003	1	
4.	T-2 (23.5-30')	23.5	30	ft	02/01/2019	1215	S	N	1	-004	1	
5.	T-13 (3.5-10')	3.5	10	ft	01/30/2019	0920	S	N	1	-005	1	
6.	T-13 (15-20')	15	20	ft	01/30/2019	1010	S	N	1	-006	1	
7.												
8.												
9.												
10.												

Preservative Code: A

Field Filtered Y/N: N

Matrix Code: GW = Groundwater, SW = Surface Water, WW = Waste Water, DW = Drinking Water, S = Soil/Solid, SD = Sediment, O = Other

Preservative Code: A = None, B = HCl, C = HNO_3, D = H_2SO_4, E = NaOH, F = MeOH, G = $NaHSO_4$, H = $Na_2S_2O_3$, I = Ascorbic Acid, J = NH_4Cl, K = Zn Acetate, O = Other

Analyze Lithium/Selenium per attached letter

Send Level 2 QC Report

Contact Scott Korom w/Questions 701-221-5420

BARR USE ONLY

Sampled by: DJZ

Barr Proj. Manager: SFK

Barr DQ Manager: TAO

Lab Name: Pace

Lab Location: Sheridan WY

Relinquished by: Derek Zander — On Ice? Y ⊙ N — Date 12-10-19 — Time 1700

Relinquished by: — On Ice? Y N — Date — Time

Received by: Kacie A Seco — Date 12/12/19 — Time

Received by: — Date — Time

Samples Shipped VIA: ☐ Courier ☒ Federal Express ☐ Sampler ☐ Other: _____

Air Bill Number: 7772-0595-9120

Lab WO: Temperature on Receipt (°C): Custody Seal Intact? ☐ Y ☐ N ☐ None

Requested Due Date: ☒ Standard Turn Around Time ☐ Rush _____ (mm/dd/yyyy)

Distribution - **White-Original:** Accompanies Shipment to Laboratory; **Yellow Copy:** Include in Field Documents; **Pink Copy:** Send to Data Management Administrators.

H:\RLG\STDFORMS\Chain Of Custody Form 2015 RLG Rev. 01/02/18

Pace Analytical® Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Date: 8/7/2020

CLIENT: Barr Engineering
Project: Sediment Saturated Paste Extracts
Lab Order: S2007298

CASE NARRATIVE

Report ID: S2007298001

Samples T-14 (10-13), T-14 (5-7), T-14 (7-10), T-15 (10-14.25), T-15 (5-10), T-16 (11-13), T-17 (10.75-15), T-17 (5-10.75), T-18 (10-12.5), T-18 (12.5-14.5), T-18 (5-10), T-19 (10-14.5), T-19 (3.5-5), T-19 (5-10), T-20 (12.5-15), T-20 (3.5-5.5), T-20 (8.25-12.5), T-21 (13.75-15), T-21 (5-13.75), T-22 (10-15), T-22 (15-20), T-22 (3.5-10), T-23 (10-13.5), T-23 (13.5-15) and T-23 (4.5-10) were received on July 21, 2020.

Samples T-15 (14.25-17.5), T-16 (3-11), T-20 (5.5-8.25) were originally received April 14, 2020 and samples were requested to be analyzed with the current received samples.

Samples were analyzed using the methods outlined in the following references:

U.S.E.P.A. 600/2-78-054 "Field and Laboratory Methods Applicable to Overburden and Mining Soils", 1978
American Society of Agronomy, Number 9, Part 2, 1982
USDA Handbook 60 "Diagnosis and Improvement of Saline and Alkali Soils", 1969
Wyoming Department of Environmental Quality, Land Quality Division, Guideline No. 1, 1984
New Mexico Overburden and Soils Inventory and Handling Guideline, March 1987
State of Utah, Division of Oil, Gas, and Mining: Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining, April 1988
Montana Department of State Lands, Reclamation Division: Soil, Overburden, and Regraded Spoil Guidelines, December 1994
State of Nevada Modified Sobek Procedure
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition

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

Qualifiers by sample

SATPASTE QC - Saturated Paste Metals by ICP/Boron - Spike Recovery outside accepted recovery limits
SATPASTE QC - Saturated Paste Metals by ICP/Selenium - Spike Recovery outside accepted recovery limits

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Date Received: 7/21/2020
Sampler:
Matrix: Sediment
COC: 50061

Project: Sediment Saturated Paste Extracts
Lab ID: S2007298-001
Client Sample ID: T-14 (5-7)
Depths: 5 - 7 Feet

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.2	0.1		ppm	08/04/2020 17:22 DG	EPA 200.7
Lithium	0.03	0.01		ppm	08/04/2020 17:22 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 17:22 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-002
Sampler:
Client Sample ID: T-14 (7-10)
Matrix: Sediment
Depths: 7 - 10 Feet
COC: 50061

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.3	0.1		ppm	08/04/2020 17:24 DG	EPA 200.7
Lithium	0.04	0.01		ppm	08/04/2020 17:24 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 17:24 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-003
Sampler:
Client Sample ID: T-14 (10-13)
Matrix: Sediment
Depths: 10 - 13 Feet
COC: 50061

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.3	0.1		ppm	08/04/2020 17:27 DG	EPA 200.7
Lithium	0.03	0.01		ppm	08/04/2020 17:27 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 17:27 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-004
Sampler:
Client Sample ID: T-15 (5-10)
Matrix: Sediment
Depths: 5 - 10 Feet
COC: 50061

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.5	0.1		ppm	08/04/2020 17:29 DG	EPA 200.7
Lithium	0.03	0.01		ppm	08/04/2020 17:29 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 17:29 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-005
Sampler:
Client Sample ID: T-15 (10-14.25)
Matrix: Sediment
Depths: 10 - 14.25 Feet
COC: 50061

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.6	0.1		ppm	08/04/2020 17:31 DG	EPA 200.7
Lithium	0.02	0.01		ppm	08/04/2020 17:31 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 17:31 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-006
Sampler:
Client Sample ID: T-16 (11-13)
Matrix: Sediment
Depths: 11 - 13 Feet
COC: 50061

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.3	0.1		ppm	08/04/2020 17:33 DG	EPA 200.7
Lithium	0.02	0.01		ppm	08/04/2020 17:33 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 17:33 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank	C	Calculated Value
D	Report limit raised due to dilution	E	Value above quantitation range
G	Analyzed at IML Gillette laboratory	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
U	Analyte below method detection limit	X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-007
Sampler:
Client Sample ID: T-17 (5-10.75)
Matrix: Sediment
Depths: 5 - 10.75 Feet
COC: 50061

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.4	0.1		ppm	08/04/2020 17:36 DG	EPA 200.7
Lithium	0.02	0.01		ppm	08/04/2020 17:36 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 17:36 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank	C	Calculated Value
D	Report limit raised due to dilution	E	Value above quantitation range
G	Analyzed at IML Gillette laboratory	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
U	Analyte below method detection limit	X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-008
Sampler:
Client Sample ID: T-17 (10.75-15)
Matrix: Sediment
Depths: 10.75 - 15 Feet
COC: 50061

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.3	0.1		ppm	08/06/2020 16:15 DG	EPA 200.7
Lithium	0.07	0.01		ppm	08/06/2020 16:15 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/06/2020 16:15 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-009
Sampler:
Client Sample ID: T-18 (5-10)
Matrix: Sediment
Depths: 5 - 10 Feet
COC: 50061

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.5	0.1		ppm	08/04/2020 17:45 DG	EPA 200.7
Lithium	0.03	0.01		ppm	08/04/2020 17:45 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 17:45 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-010
Sampler:
Client Sample ID: T-18 (10-12.5)
Matrix: Sediment
Depths: 10 - 12.5 Feet
COC: 50061

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.2	0.1		ppm	08/04/2020 17:47 DG	EPA 200.7
Lithium	0.02	0.01		ppm	08/04/2020 17:47 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 17:47 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Date Received: 7/21/2020
Sampler:
Matrix: Sediment
COC: 50062

Project: Sediment Saturated Paste Extracts
Lab ID: S2007298-011
Client Sample ID: T-18 (12.5-14.5)
Depths: 12.5 - 14.5 Feet

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	1.2	0.1		ppm	08/04/2020 17:49 DG	EPA 200.7
Lithium	0.14	0.01		ppm	08/04/2020 17:49 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 17:49 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-012
Sampler:
Client Sample ID: T-19 (3.5-5)
Matrix: Sediment
Depths: 3.5 - 5 Feet
COC: 50062

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.6	0.1		ppm	08/04/2020 17:51 DG	EPA 200.7
Lithium	0.06	0.01		ppm	08/04/2020 17:51 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 17:51 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-013
Sampler:
Client Sample ID: T-19 (5-10)
Matrix: Sediment
Depths: 5 - 10 Feet
COC: 50062

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.2	0.1		ppm	08/04/2020 17:54 DG	EPA 200.7
Lithium	0.02	0.01		ppm	08/04/2020 17:54 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 17:54 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-014
Sampler:
Client Sample ID: T-19 (10-14.5)
Matrix: Sediment
Depths: 10 - 14.5 Feet
COC: 50062

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.4	0.1		ppm	08/04/2020 17:56 DG	EPA 200.7
Lithium	0.02	0.01		ppm	08/04/2020 17:56 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 17:56 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-015
Sampler:
Client Sample ID: T-20 (3.5-5.5)
Matrix: Sediment
Depths: 3.5 - 5.5 Feet
COC: 50062

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.6	0.1		ppm	08/04/2020 17:58 DG	EPA 200.7
Lithium	0.04	0.01		ppm	08/04/2020 17:58 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 17:58 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-016
Sampler:
Client Sample ID: T-20 (8.25-12.5)
Matrix: Sediment
Depths: 8.25 - 12.5 Feet
COC: 50062

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.2	0.1		ppm	08/04/2020 18:00 DG	EPA 200.7
Lithium	0.01	0.01		ppm	08/04/2020 18:00 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 18:00 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-017
Sampler:
Client Sample ID: T-20 (12.5-15)
Matrix: Sediment
Depths: 12.5 - 15 Feet
COC: 50062

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.3	0.1		ppm	08/04/2020 18:03 DG	EPA 200.7
Lithium	0.02	0.01		ppm	08/04/2020 18:03 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 18:03 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-018
Sampler:
Client Sample ID: T-21 (5-13.75)
Matrix: Sediment
Depths: 5 - 13.75 Feet
COC: 50062

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.3	0.1		ppm	08/06/2020 16:20 DG	EPA 200.7
Lithium	0.05	0.01		ppm	08/06/2020 16:20 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/06/2020 16:20 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Date Received: 7/21/2020
Sampler:
Matrix: Sediment
COC: 50062

Project: Sediment Saturated Paste Extracts
Lab ID: S2007298-019
Client Sample ID: T-21 (13.75-15)
Depths: 13.75 - 15 Feet

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.4	0.1		ppm	08/04/2020 18:12 DG	EPA 200.7
Lithium	0.08	0.01		ppm	08/04/2020 18:12 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 18:12 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-020
Sampler:
Client Sample ID: T-22 (3.5-10)
Matrix: Sediment
Depths: 3.5 - 10 Feet
COC: 50062

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.3	0.1		ppm	08/04/2020 18:14 DG	EPA 200.7
Lithium	0.03	0.01		ppm	08/04/2020 18:14 DG	EPA 200.7
Selenium	0.14	0.05		ppm	08/04/2020 18:14 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank	C	Calculated Value
D	Report limit raised due to dilution	E	Value above quantitation range
G	Analyzed at IML Gillette laboratory	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
U	Analyte below method detection limit	X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-021
Sampler:
Client Sample ID: T-22 (10-15)
Matrix: Sediment
Depths: 10 - 15 Feet
COC: 50063

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.6	0.1		ppm	08/04/2020 18:16 DG	EPA 200.7
Lithium	0.10	0.01		ppm	08/04/2020 18:16 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 18:16 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank	C	Calculated Value
D	Report limit raised due to dilution	E	Value above quantitation range
G	Analyzed at IML Gillette laboratory	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
U	Analyte below method detection limit	X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-022
Sampler:
Client Sample ID: T-22 (15-20)
Matrix: Sediment
Depths: 15 - 20 Feet
COC: 50063

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.5	0.1		ppm	08/04/2020 18:18 DG	EPA 200.7
Lithium	0.10	0.01		ppm	08/04/2020 18:18 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 18:18 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank	C	Calculated Value
D	Report limit raised due to dilution	E	Value above quantitation range
G	Analyzed at IML Gillette laboratory	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
U	Analyte below method detection limit	X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-023
Sampler:
Client Sample ID: T-23 (4.5-10)
Matrix: Sediment
Depths: 4.5 - 10 Feet
COC: 50063

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.4	0.1		ppm	08/04/2020 18:21 DG	EPA 200.7
Lithium	0.03	0.01		ppm	08/04/2020 18:21 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 18:21 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank	C	Calculated Value
D	Report limit raised due to dilution	E	Value above quantitation range
G	Analyzed at IML Gillette laboratory	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
U	Analyte below method detection limit	X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Date Received: 7/21/2020
Sampler:
Matrix: Sediment
COC: 50063

Project: Sediment Saturated Paste Extracts
Lab ID: S2007298-024
Client Sample ID: T-23 (10-13.5)
Depths: 10 - 13.5 Feet

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.4	0.1		ppm	08/04/2020 18:23 DG	EPA 200.7
Lithium	0.02	0.01		ppm	08/04/2020 18:23 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 18:23 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-025
Sampler:
Client Sample ID: T-23 (13.5-15)
Matrix: Sediment
Depths: 13.5 - 15 Feet
COC: 50063

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.3	0.1		ppm	08/04/2020 18:25 DG	EPA 200.7
Lithium	0.02	0.01		ppm	08/04/2020 18:25 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/04/2020 18:25 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-026
Sampler:
Client Sample ID: T-15 (14.25-17.5)
Matrix: Sediment
Depths: 14.25 - 17.5 Feet
COC: 50063

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.1	0.1		ppm	08/06/2020 16:24 DG	EPA 200.7
Lithium	0.04	0.01		ppm	08/06/2020 16:24 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/06/2020 16:24 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-027
Sampler:
Client Sample ID: T-16 (3-11)
Matrix: Sediment
Depths: 3 - 11 Feet
COC: 50063

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.2	0.1		ppm	08/06/2020 16:31 DG	EPA 200.7
Lithium	0.03	0.01		ppm	08/06/2020 16:31 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/06/2020 16:31 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank	C	Calculated Value
D	Report limit raised due to dilution	E	Value above quantitation range
G	Analyzed at IML Gillette laboratory	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
U	Analyte below method detection limit	X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Work Order: S2007298
Collection Date:
Project: Sediment Saturated Paste Extracts
Date Received: 7/21/2020
Lab ID: S2007298-028
Sampler:
Client Sample ID: T-20 (5.5-8.25)
Matrix: Sediment
Depths: 5.5 - 8.25 Feet
COC: 50063

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.2	0.1		ppm	08/06/2020 16:34 DG	EPA 200.7
Lithium	0.02	0.01		ppm	08/06/2020 16:34 DG	EPA 200.7
Selenium	0.09	0.05		ppm	08/06/2020 16:34 DG	EPA 200.7

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

ANALYTICAL QC SUMMARY REPORT

CLIENT: Barr Engineering **Date:** 8/7/2020
Work Order: S2007298 **Report ID:** S2007298001
Project: Sediment Saturated Paste Extracts

Saturated Paste Metals by ICP Sample Type **MBLK** Units: ppm

SATPASTE BLK (08/06/20 16:43) RunNo: 181357

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Boron	ND	0.1					
Lithium	ND	0.01					
Selenium	ND	0.05					

Saturated Paste Metals by ICP Sample Type **LCS** Units: ppm

SATPASTE QC (08/04/20 18:28) RunNo: 181260

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Boron	0.2	0.1	0.31		74.7	80 - 120	S
Lithium	0.07	0.01	0.07		103	80 - 120	
Selenium	0.07	0.05	0.11		65.2	80 - 120	S

QC-2 (08/06/20 16:40) RunNo: 181357

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Boron	0.2	0.1	0.31		76.5	80 - 120	S
Lithium	0.07	0.01	0.07		98.2	80 - 120	
Selenium	0.12	0.05	0.11		106	80 - 120	

Saturated Paste Metals by ICP Sample Type **DUP** Units: ppm

S2007298-008AD (08/06/20 16:18) RunNo: 181357

Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
Boron	0.2	0.1	0.3	1.55		20	
Lithium	0.07	0.01	0.07	1.20		20	
Selenium	0.08	0.05	ND			20	R

S2007298-018AD (08/06/20 16:22) RunNo: 181357

Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
Boron	0.3	0.1	0.3	3.28		20	
Lithium	0.05	0.01	0.05	0.167		20	
Selenium	ND	0.05	ND			20	

S2007298-028AD (08/06/20 16:36) RunNo: 181357

Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
Boron	0.2	0.1	0.2	7.47		20	
Lithium	0.02	0.01	0.02	0.0234		20	
Selenium	ND	0.05	0.09			20	

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Report limit raised due to dilution
E	Value above quantitation range	G	Analyzed at IML Gillette laboratory
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

Chain of Custody for Air Canisters

BARR

☐ Ann Arbor ☒ Bismarck ☐ Duluth ☐ Hibbing ☐ Jefferson City ☐ Minneapolis

Sample Origination State: ☐ KS ☐ MO ☐ WI ☐ MI ☐ ND Other: ☐ MN ☐ SD MT

Analysis Requested: ☐ TO-14 ☐ TO-15 ☐ TO-15SIM ☐ 3C ☐ Other

COC Number: № 50061

COC 1 of 3

REPORT TO		INVOICE TO	
Company:	BARR ENGINEERING	Company:	
Address:	234 W. CENTURY	Address:	
Name:	SCOTT KOROM	Name:	SAME
email:	skorom@barr.com	email:	
Copy to: datamgt@barr.com		P.O.	
Project Name:		Barr Project No:	

Lab Deliverable Contents: (check all that apply)
☒ Sample Data with QC
☐ TIC Library Search
☐ Sample Chromatograms
☐ Individual Canister Certification Data

EDD:
☐ EQuIS ☐ EQuIS-LITE
☐ TIC results in EDD

Other:

Matrix Code:
AA = Ambient Air (Indoor/Outdoor)
SV = Soil Vapor/Landfill Gas/SVE
Other:

SEDIMENTS = SD

	Location	Canister Serial #	Canister Size	Flow Controller Serial #	Vacuum Initial	Vacuum Final	Collection Date (mm/dd/yyyy)	Collection Time Start (hh:mm)	Collection Time Stop (hh:mm)	Total Time	Matrix Code	PID Reading (ppm/ppb)	Sample Comments
1.	T-14 (5-7')	S2007298-001					4/2020				SD		SEE ATTACHED
2.	T-14 (7-10')	002					↓				SD		LETTER FOR
3.	T-14 (10-13')	003									SD		DETAILS
4.	T-15 (5-10')	004									SD		
5.	T-15 (10-14.25')	005									SD		CONTACT SCOTT
6.	T-16 (11-13')	006									SD		KOROM W/
7.	T-17 (5-10.75')	007									SD		QUESTIONS
8.	T-17 (10.75-15')	008									SD		701-335-3125
9.	T-18 (5-10')	009									SD		
10.	T-18 (10-12.5')	↓ 010									SD		

BARR USE ONLY							
Sampled by:		Relinquished by: Scott Korom	Date 7/17/20	Time	Received by: Karen Allen	Date 7/20/20	Time 1030
Barr Proj. Manager:	JEREMY GRONIK	Relinquished by:	Date	Time	Received by:	Date	Time
Barr DQ Manager:		Samples Shipped VIA: ☐ Courier ☒ Federal Express ☐ Sampler ☐ Other:			Air Bill Number:		
Lab Name:							
Lab Location:		Lab WO:	Custody Seal Intact ? ☐ Y ☐ N ☐ None				

Requested Due Date:
☐ Standard Turn Around Time
☐ Rush ______ (mm/dd/yyyy)

Distribution - **White-Original:** Accompanies Shipment to Laboratory; **Yellow Copy:** Include in Field Documents; **Pink Copy:** Send to Data Management Administrators.

Chain of Custody for Air Canisters

BARR ☐ Ann Arbor ☒ Bismarck ☐ Duluth ☐ Hibbing ☐ Jefferson City ☐ Minneapolis

Sample Origination State: ☐ KS ☐ MO ☐ WI ☐ MI ☐ ND Other: MT ☐ MN ☐ SD

Analysis Requested: ☐ TO-14 ☐ TO-15 ☐ TO-15SIM ☐ 3C ☐ Other

COC Number: № 50062 COC 2 of 3

REPORT TO	INVOICE TO
Company: BARR	Company:
Address: 234 W. CENTURY	Address:
Name: SA, SCOTT KOROM	Name: SCOTT KOROM
email: SKOROM@barr.com	email:
Copy to: datamgt@barr.com	P.O.
Project Name:	Barr Project No:

Lab Deliverable Contents: (check all that apply)
☒ Sample Data with QC
☐ TIC Library Search
☐ Sample Chromatograms
☐ Individual Canister Certification Data
EDD: ☐ EQuIS ☐ EQuIS-LITE ☐ TIC results in EDD
Other:

Matrix Code:
AA = Ambient Air (Indoor/Outdoor)
SV = Soil Vapor/Landfill Gas/SVE
Other: SD = SEDIMENTS

Location	Canister Serial #	Canister Size	Flow Controller Serial #	Vacuum Initial	Vacuum Final	Collection Date (mm/dd/yyyy)	Collection Time Start (hh:mm)	Collection Time Stop (hh:mm)	Total Time	Matrix Code	PID Reading (ppm/ppb)	Sample Comments
1. 11 T-18 (12.5-14.5')	S20		07298-011			04/2020				SD		SEE ATTACHED
2. 12 T-19 (3.5-5')			012							SD		LETTER
3. 13 T-19 (5-10')			013							SD		
4. 14 T-19 (10-14.5')			014							SD		
5. 15 T-20 (3.5-5.5')			015							SD		
6. 16 T-20 (8.25-12.5')			016							SD		SCOTT KOROM
7. 17 T-20 (12.5'-15')			017							SD		701-335-3125
8. 18 T-21 (5-13.75')			018							SD		
8. 19 T-21 (13.75-15')			019							SD		
10. 20 T-22 (3.5-10')			020							SD		

BARR USE ONLY					
Sampled by:	Relinquished by: SCOTT KOROM	Date 7/17/20	Time	Received by: Kalen Sea	Date 7/20/20 Time 1030
Barr Proj. Manager: J. GACNIK	Relinquished by:	Date	Time	Received by:	Date Time
Barr DQ Manager:	Samples Shipped VIA: ☐ Courier ☐ Federal Express ☐ Sampler ☐ Other:			Air Bill Number:	Requested Due Date: ☐ Standard Turn Around Time ☐ Rush (mm/dd/yyyy)
Lab Name:	Lab WO:			Custody Seal Intact ? ☐ Y ☐ N ☐ None	
Lab Location:					

H:\RLG\STDFORMS\Chain Of Custody for Air Canisters Form 2015 RLG Rev. 06/16/15

Distribution - **White-Original:** Accompanies Shipment to Laboratory; **Yellow Copy:** Include in Field Documents; **Pink Copy:** Send to Data Management Administrators.

Chain of Custody for Air Canisters

BARR ☐ Ann Arbor ☒ Bismarck ☐ Duluth ☐ Hibbing ☐ Jefferson City ☐ Minneapolis

Sample Origination State: ☐ KS ☐ MO ☐ WI ☐ MI ☐ ND Other: MT ☐ MN ☐ SD

Analysis Requested: ☐ TO-14 ☐ TO-15 ☐ TO-15SIM ☐ 3C ☐ Other

COC Number: № 50063
COC 3 of 3

REPORT TO	INVOICE TO
Company: BARR	Company:
Address: 234 W. CENTURY	Address: SAME
Name: SCOTT KORDOM	Name:
email: skordom@barr.com	email:
Copy to: datamgt@barr.com	P.O.
Project Name:	Barr Project No:

Lab Deliverable Contents: (check all that apply)
☒ Sample Data with QC
☐ TIC Library Search
☐ Sample Chromatograms
☐ Individual Canister Certification Data
EDD: ☐ EQuIS ☐ EQuIS-LITE ☐ TIC results in EDD
Other:

Matrix Code:
AA = Ambient Air (Indoor/Outdoor)
SV = Soil Vapor/Landfill Gas/SVE
Other: SD = SEDIMENTS

Location	Canister Serial #	Canister Size	Flow Controller Serial #	Vacuum Initial	Vacuum Final	Collection Date (mm/dd/yyyy)	Collection Time Start (hh:mm)	Collection Time Stop (hh:mm)	Total Time	Matrix Code	PID Reading (ppm/ppb)	Sample Comments
1. ~~21~~ T-22(10-15')	5200	12	98-021			04/2020				SD		SEE ATTACHED
2. ~~22~~ T-22(15-20')	↓		022			↓				SD		LETTER
3. ~~23~~ T-23(4.5-10')			023							SD		
4. ~~24~~ T-23(10-13.5')			024							SD		
5. ~~25~~ T-23(13.5-15')	↓		025			↓				SD		SCOTT KORDOM 701-335-3125
6.												
7.												
8.												
9.												
10.												

BARR USE ONLY	Relinquished by:	Date	Time	Received by:	Date	Time
Sampled by:	SCOTT KORDOM	7/17/20		KaleSea	7/20/20	1030
Barr Proj. Manager: J. GACNIK	Relinquished by:	Date	Time	Received by:	Date	Time
Barr DQ Manager:	Samples Shipped VIA: ☐ Courier ☐ Federal Express ☐ Sampler ☐ Other:			Air Bill Number:	Requested Due Date: ☐ Standard Turn Around Time ☐ Rush (mm/dd/yyyy)	
Lab Name:	Lab WO:			Custody Seal Intact ? ☐ Y ☐ N ☐ None		
Lab Location:						

Distribution - White-Original: Accompanies Shipment to Laboratory; **Yellow Copy:** Include in Field Documents; **Pink Copy:** Send to Data Management Administrators.

H:\RLG\STDFORMS\Chain Of Custody for Air Canisters Form 2015 RLG Rev. 06/16/15

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

Report Date: 12 Feb 19
Lab Number: 19-W185
Work Order #:82-0201
Account #: 013200
Date Sampled: 31 Jan 19 14:50
Date Received: 4 Feb 19 16:56
Sampled By: Client

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: T-3

Temp at Receipt: 2.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
pH - Field	7.45	units	NA	SM 4500 H+ B	31 Jan 19 14:50	
Lithium - Total	0.106	mg/l	0.020	6010D	7 Feb 19 11:43	FFP
Selenium - Total	< 0.005	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

CC

Approved by: Claudette K. Carroll 12 Feb 19

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
MEMBER ACIL

Report Date: 12 Feb 19
Lab Number: 19-W186
Work Order #:82-0201
Account #: 013200
Date Sampled: 31 Jan 19 14:05
Date Received: 4 Feb 19 16:56
Sampled By: Client

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: T-4

Temp at Receipt: 2.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
pH - Field	7.27	units	NA	SM 4500 H+ B	31 Jan 19 14:05	
Lithium - Total	0.180	mg/l	0.020	6010D	7 Feb 19 11:43	FFP
Selenium - Total	0.0192	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

CC

Approved by: Claudette K. Carroll 12 Feb 19

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

Report Date: 12 Feb 19
Lab Number: 19-W187
Work Order #:82-0201
Account #: 013200
Date Sampled: 31 Jan 19 11:00
Date Received: 4 Feb 19 16:56
Sampled By: Client

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: T-7

Temp at Receipt: 2.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
pH - Field	7.31	units	NA	SM 4500 H+ B	31 Jan 19 11:00	
Temperature - Field	1.84	Degrees C	NA	SM 2550B	31 Jan 19 11:00	
Lithium - Total	0.148	mg/l	0.020	6010D	7 Feb 19 11:43	FFP
Selenium - Total	0.0959	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

Approved by: Claudette K. Carroll CC 12 Feb 19

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
MEMBER ACIL

Report Date: 12 Feb 19
Lab Number: 19-W188
Work Order #:82-0201
Account #: 013200
Date Sampled: 31 Jan 19 16:40
Date Received: 4 Feb 19 16:56
Sampled By: Client

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: T-8

Temp at Receipt: 2.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
pH - Field	6.64	units	NA	SM 4500 H+ B	31 Jan 19 16:40	
Lithium - Total	0.165	mg/l	0.020	6010D	7 Feb 19 11:43	FFP
Selenium - Total	< 0.005	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

Approved by: Claudette K. Carroll CC 12/6/19

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
MEMBER ACIL

Report Date: 12 Feb 19
Lab Number: 19-W189
Work Order #:82-0201
Account #: 013200
Date Sampled: 31 Jan 19 10:00
Date Received: 4 Feb 19 16:56
Sampled By: Client

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: T-9

Temp at Receipt: 2.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
pH - Field	6.72	units	NA	SM 4500 H+ B	31 Jan 19 10:00	
Temperature - Field	6.98	Degrees C	NA	SM 2550B	31 Jan 19 10:00	
Lithium - Total	0.170	mg/l	0.020	6010D	7 Feb 19 11:43	FFP
Selenium - Total	< 0.005	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

Approved by: Claudette K. Carroll CC 12 Feb 19

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

Report Date: 12 Feb 19
Lab Number: 19-W190
Work Order #:82-0201
Account #: 013200
Date Sampled: 31 Jan 19 18:00
Date Received: 4 Feb 19 16:56
Sampled By: Client

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: T-11

Temp at Receipt: 2.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
pH - Field	7.01	units	NA	SM 4500 H+ B	31 Jan 19 18:00	
Lithium - Total	0.650	mg/l	0.020	6010D	7 Feb 19 11:43	FFP
Selenium - Total	0.1026	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

Approved by: Claudette K. Carroll 12 Feb 19

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
MEMBER ACIL

Report Date: 12 Feb 19
Lab Number: 19-W191
Work Order #:82-0201
Account #: 013200
Date Sampled: 31 Jan 19 15:50
Date Received: 4 Feb 19 16:56
Sampled By: Client

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: T-13

Temp at Receipt: 2.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
pH - Field	7.80	units	NA	SM 4500 H+ B	31 Jan 19 15:50	
Lithium - Total	0.121	mg/l	0.020	6010D	7 Feb 19 11:43	FFP
Selenium - Total	< 0.005	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

Approved by: Claudette K. Carroll CC 12 Feb 19

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

Report Date: 12 Feb 19
Lab Number: 19-W192
Work Order #:82-0201
Account #: 013200
Date Sampled: 1 Feb 19 10:25
Date Received: 4 Feb 19 16:56
Sampled By: Client

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: T-1

Temp at Receipt: 2.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
pH - Field	6.90	units	NA	SM 4500 H+ B	1 Feb 19 10:25	
Lithium - Total	0.048	mg/l	0.020	6010D	7 Feb 19 11:43	FFP
Selenium - Total	< 0.005	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

Approved by: Claudette K. Carroll CC 12 Feb 19

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
MEMBER ACIL

Report Date: 12 Feb 19
Lab Number: 19-W193
Work Order #:82-0201
Account #: 013200
Date Sampled: 1 Feb 19 12:40
Date Received: 4 Feb 19 16:56
Sampled By: Client

PO #: 26411007.10

Temp at Receipt: 2.5C

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

Sample Description: T-2

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
pH - Field	6.87	units	NA	SM 4500 H+ B	1 Feb 19 12:40	
Lithium - Total	0.043	mg/l	0.020	6010D	7 Feb 19 11:43	FFP
Selenium - Total	< 0.005	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

Approved by: Claudette K Carroll CC 12 Feb 19

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

Report Date: 12 Feb 19
Lab Number: 19-W194
Work Order #:82-0201
Account #: 013200
Date Sampled: 1 Feb 19 15:50
Date Received: 4 Feb 19 16:56
Sampled By: Client

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: T-5

Temp at Receipt: 2.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
pH - Field	6.89	units	NA	SM 4500 H+ B	1 Feb 19 15:50	
Lithium - Total	0.145	mg/l	0.020	6010D	7 Feb 19 11:43	FFP
Selenium - Total	< 0.005	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

Approved by: Claudette K. Carroll CC 12 Feb 19

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
MEMBER ACIL

Report Date: 12 Feb 19
Lab Number: 19-W195
Work Order #:82-0201
Account #: 013200
Date Sampled: 1 Feb 19 18:20
Date Received: 4 Feb 19 16:56
Sampled By: Client

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: T-6

Temp at Receipt: 2.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
Lithium - Total	0.116	mg/l	0.020	6010D	7 Feb 19 12:43	FFP
Selenium - Total	< 0.005	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

Approved by: Claudette K. Carroll CC 12 Feb 19

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
MEMBER ACIL

Report Date: 12 Feb 19
Lab Number: 19-W196
Work Order #:82-0201
Account #: 013200
Date Sampled: 1 Feb 19 18:00
Date Received: 4 Feb 19 16:56
Sampled By: Client

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: T-12

Temp at Receipt: 2.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
Lithium - Total	0.270	mg/l	0.020	6010D	7 Feb 19 12:43	FFP
Selenium - Total	0.0056	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

Approved by: Claudette K. Carrep CC 12 Fe 19

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
MEMBER ACIL

Report Date: 12 Feb 19
Lab Number: 19-W197
Work Order #:82-0201
Account #: 013200
Date Sampled: 1 Feb 19
Date Received: 4 Feb 19 16:56
Sampled By: Client

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: Duplicate

Temp at Receipt: 2.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
Lithium - Total	0.048	mg/l	0.020	6010D	7 Feb 19 12:43	FFP
Selenium - Total	< 0.005	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

Approved by: Claudette K. Carroll CC 12 Feb 19

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
MEMBER ACIL

Report Date: 12 Feb 19
Lab Number: 19-W198
Work Order #:82-0201
Account #: 013200
Date Sampled: 1 Feb 19 15:20
Date Received: 4 Feb 19 16:56
Sampled By: Client

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: Field Blank

Temp at Receipt: 2.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
Lithium - Total	< 0.02	mg/l	0.020	6010D	7 Feb 19 12:43	FFP
Selenium - Total	< 0.005	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

Approved by: Claudette K. Carroll CC 12 Feb 19

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

Report Date: 12 Feb 19
Lab Number: 19-W199
Work Order #:82-0201
Account #: 013200
Date Sampled: 1 Feb 19 15:30
Date Received: 4 Feb 19 16:56
Sampled By: Client

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: Equipment Blank

Temp at Receipt: 2.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	5 Feb 19	SVS
Lithium - Total	< 0.02	mg/l	0.020	6010D	7 Feb 19 12:43	FFP
Selenium - Total	< 0.005	mg/l	0.0050	6020B	12 Feb 19 12:19	BMB

Approved by: Claudette K. Carroll CC 12 Feb 19

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

MVTL

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
ACIL

Quality Control Report

Lab IDs: 19-W185 to 19-W199 **Project:** MDU Lewis & Clark **Work Order:** 201982-0201

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	0.400	99	80-120	0.400 0.400	19-W187 19-W197	0.148 0.048	0.567 0.453	105 101	75-125 75-125	0.567 0.453	0.552 0.466	101 104	2.7 2.8	20 20	- - -	- - -	< 0.02 < 0.02 < 0.02
Selenium - Total mg/l	0.1000	106	80-120	0.400 0.100	19-W187 19-W195	0.0959 < 0.005	0.5280 0.0968	108 97	75-125 75-125	0.5280 0.0968	0.5252 0.0939	107 94	0.5 3.0	20 20	- -	- -	< 0.005

Samples were received in good condition on 4 Feb 2019 at 1656.
Temperature upon receipt at the Bismarck laboratory was 2.5°C. 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.
Approved methodology was followed for all sample analyses.
All acceptance criteria were met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/duplicates unless noted here.

Approved by: C. Gust
12 Feb 19

* Rush Li and Se Samples!

82-0201

Barr Engineering Co. Chain of Custody

BARR ☐ Ann Arbor ☒ Bismarck ☐ Duluth ☐ Hibbing ☐ Jefferson City ☐ Minneapolis

Sample Origination State: ☐ KS ☐ MO ☐ WI ☐ MI ☐ ND Other: MT ☐ MN ☐ SD

COC Number: 52676

COC 1 of 1

REPORT TO	INVOICE TO
Company: Barr Engineering	Company:
Address: 234 W. Century Ave	Address:
Name: Terri Olson	Name: Same
email: Tolson@barr.com	email:
Copy to: datamgt@barr.com	P.O.
Project Name: MDU Lewis and Clark	Barr Project No: 26411007.10

Matrix Code: GW = Groundwater; SW = Surface Water; WW = Waste Water; DW = Drinking Water; S = Soil/Solid; SD = Sediment; O = Other

Preservative Code: A = None; B = HCl; C = HNO_3; D = H_2SO_4; E = NaOH; F = MeOH; G = $NaHSO_4$; H = $Na_2S_2O_3$; I = Ascorbic Acid; J = NH_4Cl; K = Zn Acetate; O = Other

Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number Of Containers	Analysis Requested: Water	Analysis Requested: Soil	% Solids	Preservative Code	Field Filtered Y/N
1. T-3 W185	N/A	—	1	01/31/2019	13:50	GW	N	1	1				
2. T-4 W186	N/A	—	1		13:05		N	1	1				
3. T-7 W187	N/A	—	1		10:00		Y	1	1				
4. T-8 W188	N/A	—	1		15:40		N	1	1				
5. T-9 W189	N/A	—	1		09:00		N	1	1				
6. T-11 W190	N/A	—	1		17:00		N	1	1				
7. T-13 W191	N/A	—	1		14:50		N	1	1				
8.					* MDT								
9.													
10.													

C
N

- See attached Table 1 for requested analysis.
- Contact Terri Olson with questions.
- Perform MS/MSD on T-7 for Li and Se only!
- Lithium + Selenium only on these samples.

2.5°C TMJ07

BARR USE ONLY	Relinquished by:	On Ice? (Y) N	Date	Time	Received by:	Date	Time
Sampled by: MLJ2							
Barr Proj. Manager: JLS4	Relinquished by:	On Ice? Y N	Date	Time	Received by:	Date	Time
Barr DQ Manager: TAO							
Lab Name: MVTL	Samples Shipped VIA: ☐ Courier ☐ Federal Express ☒ Sampler ☐ Other:				Air Bill Number:		
Lab Location: Bismarck, ND	Lab WO:	Temperature on Receipt (°C):			Custody Seal Intact? ☐ Y ☐ N ☐ None		

Requested Due Date: ☒ Standard Turn Around Time ☒ Rush _____ (mm/dd/yyyy)

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.

H:\RLG\STDFORMS\Chain Of Custody Form 2015 RLG Rev. 06/16/15

* Rush Li and Se Samples!

Barr Engineering Co. Chain of Custody

BARR ☐ Ann Arbor ☒ Bismarck ☐ Duluth ☐ Hibbing ☐ Jefferson City ☐ Minneapolis

Sample Origination State: ☐ KS ☐ MO ☐ WI ☐ MI ☐ ND Other: MT ☐ MN ☐ SD

COC Number: 52677

COC 1 of 1

REPORT TO	INVOICE TO
Company: Barr Engineering	Company:
Address: 234 W. Century Ave	Address:
Name: Terri Olson	Name: Same
email: TOlson@Barr.com	email:
Copy to: datamgt@barr.com	P.O.
Project Name: MDU Lewis and Clark	Barr Project No: 26411007.10

Matrix Code: GW = Groundwater; SW = Surface Water; WW = Waste Water; DW = Drinking Water; S = Soil/Solid; SD = Sediment; O = Other

Preservative Code: A = None; B = HCl; C = HNO_3; D = H_2SO_4; E = NaOH; F = MeOH; G = $NaHSO_4$; H = $Na_2S_2O_3$; I = Ascorbic Acid; J = NH_4Cl; K = Zn Acetate; O = Other

Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number Of Containers	Analysis Requested: Water	Analysis Requested: Soil	% Solids	Preservative Code	Field Filtered Y/N	
								A						
								N						
1. T-1 W192	N/A	—	1	02/01/2019	09:25	GW	N	1	1					● see attached Table 1 for requested analysis.
2. T-2 W193	N/A	—	1		11:40		N	1	1					Contact Terri Olson
3. T-5 W194	N/A	—	1		10:15/14:50		N	1	1					with questions.
4. T-6 W195	N/A	—	1		14:15/17:20		N	1	1					
5. T-12 W196	N/A	—	1		15:10/17:00		N	1	1					● Low Sample Volume
6. Duplicate W197	N/A	—	1		—		N	1	1					
7. Field Blank W198	N/A	—	1		14:20		N	1	1					
8. Equipment Blank W199	N/A	—	1		14:30		N	1	1					
9.														
10.														

BARR USE ONLY		Relinquished by	On Ice? Y N	Date	Time	Received by	Date	Time
Sampled by:	MLJ2							
Barr Proj. Manager:	JLS4	Relinquished by:	On Ice? Y N	Date	Time	Received by:	Date	Time
Barr DQ Manager:	TAO							
Lab Name:	MVTL	Samples Shipped VIA: ☐ Courier ☐ Federal Express ☒ Sampler ☐ Other:				Air Bill Number:		
Lab Location:	Bismarck, ND	Lab WO:	Temperature on Receipt (°C):			Custody Seal Intact? ☐ Y ☐ N ☐ None		

Requested Due Date: ☒ Standard Turn Around Time ☒ Rush _____ (mm/dd/yyyy)

Distribution - White-Original: Accompanies Shipment to Laboratory; **Yellow Copy:** Include in Field Documents; **Pink Copy:** Send to Data Management Administrators.

H:\RLG\STDFORMS\Chain Of Custody Form 2015 RLG Rev. 06/16/15

MINNESOTA VALLEY TESTING LABORATORIES, INC.
1126 North Front 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
MEMBER ACIL

Selenium Added 11Jun2020

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Report Date: 20 Apr 20
Lab Number: 20-W635
Work Order #:82-0830
Account #: 013200
Date Sampled: 6 Apr 20 12:02
Date Received: 9 Apr 20 15:05
Sampled By: Client

Project Name: 26411007.15
Sample Description: T-15
Sample Site: MDU L&C

Temp at Receipt: 0.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Apr 20	HT
Lithium - Total	0.042	mg/l	0.020	6010D	15 Apr 20 11:09	MDE
Boron - Total	0.18	mg/l	0.10	6010D	16 Apr 20 11:42	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	17 Jun 20 9:48	MDE

cc

Approved by: Claudette K. Carrep 1 JUL 2020

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
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
MEMBER ACIL

Selenium Added 11Jun2020

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Report Date: 20 Apr 20
Lab Number: 20-W636
Work Order #:82-0830
Account #: 013200
Date Sampled: 6 Apr 20 13:30
Date Received: 9 Apr 20 15:05
Sampled By: Client

Project Name: 26411007.15
Sample Description: T-16
Sample Site: MDU L&C

Temp at Receipt: 0.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Apr 20	HT
Lithium - Total	0.045	mg/l	0.020	6010D	15 Apr 20 11:09	MDE
Boron - Total	0.15	mg/l	0.10	6010D	16 Apr 20 11:42	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	17 Jun 20 9:48	MDE

Approved by: Claudette K Carrep CC 1 JUL 2020

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
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

Selenium Added 11Jun2020

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Report Date: 20 Apr 20
Lab Number: 20-W637
Work Order #:82-0830
Account #: 013200
Date Sampled: 6 Apr 20 15:45
Date Received: 9 Apr 20 15:05
Sampled By: Client

Project Name: 26411007.15
Sample Description: T-18
Sample Site: MDU L&C

Temp at Receipt: 0.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Apr 20	HT
Lithium - Total	0.044	mg/l	0.020	6010D	15 Apr 20 11:09	MDE
Boron - Total	0.13	mg/l	0.10	6010D	16 Apr 20 11:42	MDE
Selenium - Total	0.0090	mg/l	0.0050	6020B	17 Jun 20 9:48	MDE

Approved by: Claudette K. Carrep CC 1 JUL 2020

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
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
MEMBER ACIL

Selenium Added 11Jun2020

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Report Date: 20 Apr 20
Lab Number: 20-W638
Work Order #:82-0830
Account #: 013200
Date Sampled: 6 Apr 20 16:45
Date Received: 9 Apr 20 15:05
Sampled By: Client

Project Name: 26411007.15
Sample Description: T-17
Sample Site: MDU L&C

Temp at Receipt: 0.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Apr 20	HT
Lithium - Total	0.033	mg/l	0.020	6010D	15 Apr 20 12:09	MDE
Boron - Total	0.16	mg/l	0.10	6010D	16 Apr 20 11:42	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	17 Jun 20 9:48	MDE

Approved by: Claudette K. Carroll CC 1 JUL 2020

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
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

Selenium Added 11Jun2020

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Report Date: 20 Apr 20
Lab Number: 20-W639
Work Order #:82-0830
Account #: 013200
Date Sampled: 6 Apr 20 17:33
Date Received: 9 Apr 20 15:05
Sampled By: Client

Project Name: 26411007.15
Sample Description: T-21
Sample Site: MDU L&C

Temp at Receipt: 0.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Apr 20	HT
Lithium - Total	0.041	mg/l	0.020	6010D	15 Apr 20 12:09	MDE
Boron - Total	0.19	mg/l	0.10	6010D	16 Apr 20 11:42	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	17 Jun 20 9:48	MDE

Approved by: Claudette K. Carrol CC 1 JUL 2020

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
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

Selenium Added 11Jun2020

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Report Date: 20 Apr 20
Lab Number: 20-W640
Work Order #:82-0830
Account #: 013200
Date Sampled: 6 Apr 20 19:10
Date Received: 9 Apr 20 15:05
Sampled By: Client

Project Name: 26411007.15
Sample Description: T-19
Sample Site: MDU L&C

Temp at Receipt: 0.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Apr 20	HT
Lithium - Total	0.036	mg/l	0.020	6010D	15 Apr 20 12:09	MDE
Boron - Total	0.16	mg/l	0.10	6010D	16 Apr 20 12:42	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	17 Jun 20 9:48	MDE

Approved by: Claudette K. Carrol CL 1 JUL 2020

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
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

Selenium Added 11Jun2020

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Report Date: 20 Apr 20
Lab Number: 20-W641
Work Order #:82-0830
Account #: 013200
Date Sampled: 7 Apr 20 10:54
Date Received: 9 Apr 20 15:05
Sampled By: Client

Project Name: 26411007.15
Sample Description: T-14
Sample Site: MDU L&C

Temp at Receipt: 0.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Apr 20	HT
Lithium - Total	0.038	mg/l	0.020	6010D	15 Apr 20 12:09	MDE
Boron - Total	0.17	mg/l	0.10	6010D	16 Apr 20 12:42	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	17 Jun 20 9:48	MDE

Approved by: Claudette K. Carroll CC 1 JUL 2020

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
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

Selenium Added 11Jun2020

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Report Date: 20 Apr 20
Lab Number: 20-W642
Work Order #:82-0830
Account #: 013200
Date Sampled: 7 Apr 20 12:45
Date Received: 9 Apr 20 15:05
Sampled By: Client

Project Name: 26411007.15
Sample Description: T-20
Sample Site: MDU L&C

Temp at Receipt: 0.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Apr 20	HT
Lithium - Total	0.070	mg/l	0.020	6010D	15 Apr 20 12:09	MDE
Boron - Total	0.21	mg/l	0.10	6010D	16 Apr 20 12:42	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	17 Jun 20 9:48	MDE

Approved by: Claudette K. Carrol 1 JUL 2020

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
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

Selenium Added 11Jun2020

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Report Date: 20 Apr 20
Lab Number: 20-W643
Work Order #:82-0830
Account #: 013200
Date Sampled: 8 Apr 20 8:25
Date Received: 9 Apr 20 15:05
Sampled By: Client

Project Name: 26411007.15
Sample Description: T-22
Sample Site: MDU L&C

Temp at Receipt: 0.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Apr 20	HT
Lithium - Total	0.077	mg/l	0.020	6010D	15 Apr 20 12:09	MDE
Boron - Total	0.38	mg/l	0.10	6010D	16 Apr 20 12:42	MDE
Selenium - Total	0.0077	mg/l	0.0050	6020B	17 Jun 20 9:48	MDE

Approved by: Claudette K. Carrep CC 17JUL2020

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
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
MEMBER ACIL

Selenium Added 11Jun2020

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Report Date: 20 Apr 20
Lab Number: 20-W644
Work Order #:82-0830
Account #: 013200
Date Sampled: 8 Apr 20 9:00
Date Received: 9 Apr 20 15:05
Sampled By: Client

Project Name: 26411007.15
Sample Description: T-23
Sample Site: MDU L&C

Temp at Receipt: 0.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	14 Apr 20	HT
Lithium - Total	0.535	mg/l	0.020	6010D	15 Apr 20 12:09	MDE
Boron - Total	0.58	mg/l	0.10	6010D	16 Apr 20 12:42	MDE
Selenium - Total	0.0352	mg/l	0.0050	6020B	17 Jun 20 9:48	MDE

CC

Approved by: Claudette K. Carroll 17 JUL 2020

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
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
MEMBER ACIL

Selenium Added 11Jun2020

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Report Date: 20 Apr 20
Lab Number: 20-W645
Work Order #:82-0830
Account #: 013200
Date Sampled:
Date Received: 9 Apr 20 15:05
Sampled By: Client

Project Name: 26411007.15
Sample Description: T-D
Sample Site: MDU L&C

Temp at Receipt: 0.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Apr 20	HT
Lithium - Total	0.044	mg/l	0.020	6010D	15 Apr 20 12:09	MDE
Boron - Total	0.16	mg/l	0.10	6010D	16 Apr 20 12:42	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	17 Jun 20 9:48	MDE

Approved by: Claudette K Carrep CC 1 JUL 2020

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
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

Selenium Added 11Jun2020

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

Report Date: 20 Apr 20
Lab Number: 20-W646
Work Order #:82-0830
Account #: 013200
Date Sampled:
Date Received: 9 Apr 20 15:05
Sampled By: Client

Project Name: 26411007.15
Sample Description: T-RB
Sample Site: MDU L&C

Temp at Receipt: 0.4C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Apr 20	HT
Lithium - Total	< 0.02	mg/l	0.020	6010D	15 Apr 20 12:09	MDE
Boron - Total	< 0.1	mg/l	0.10	6010D	16 Apr 20 12:42	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	17 Jun 20 9:48	MDE

cc

Approved by: Claudette K. Carroll 1 JUL 2020

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

MVTL

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
ACIL

Quality Control Report - Amended

Lab IDs: 20-W635 to 20-W646 **Project:** 26411007.15 **Work Order:** 202082-0830

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 - Total mg/l	0.40	92	80-120	0.400	20-D1057	0.32	0.75	108	75-125	0.75	0.75	108	0.0	20	-	-	< 0.1
	0.40	90	80-120	0.400	20-D1072	0.13	0.53	100	75-125	0.53	0.54	102	1.9	20	-	-	< 0.1
	0.40	92	80-120	0.400	20-D1132	1.56	2.04	120	75-125	2.04	1.97	102	3.5	20	-	-	< 0.1
	0.40	90	80-120	0.400	20-W638	0.16	0.57	102	75-125	0.57	0.57	102	0.0	20	-	-	< 0.1
	0.40	90	80-120	0.400	20-W646	< 0.1	0.31	78	75-125	0.31	0.30	75	3.3	20	-	-	< 0.1
															-	-	< 0.1
															-	-	< 0.1
Lithium - Total mg/l	0.400	102	80-120	0.400	20-W578	< 0.02	0.411	103	75-125	0.411	0.402	100	2.2	20	-	-	< 0.02
	0.400	99	80-120	0.400	20-W638	0.033	0.464	108	75-125	0.464	0.465	108	0.2	20	-	-	< 0.02
															-	-	< 0.02
															-	-	< 0.02
Selenium - Total mg/l	0.1000	101	80-120	0.400	20W635q	< 0.005	0.4034	101	75-125	0.4034	0.4102	103	1.7	20	-	-	< 0.005
				0.400	20W645q	< 0.005	0.4138	103	75-125	0.4138	0.4562	114	9.7	20	-	-	

Samples were received in good condition on 9 Apr 2020 at 1505.
Temperature upon receipt at the Bismarck laboratory was 0.4°C.
All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
All holding times were met.
Approved methodology was followed for all sample analyses.
All acceptance criteria were met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/duplicates unless noted here.
Per email from Terri Olson with Barr dated 11 Jun 2020, selenium was added to the samples.

Approved by: C. Carlo

1 Jun 2020

Claudette Carroll

From: Terri A. Olson <TOlson@barr.com>
Sent: Thursday, June 11, 2020 11:15 AM
To: Claudette Carroll
Subject: RE: 202082-0830 BARR.pdf

Hi Claudette,

Glad that Scott requested this. Please analyze selenium by EPA 6020B on all 10 samples.

Thanks Claudette.

Terri A. Olson
Senior Data Quality Specialist
Minneapolis, MN office: 952.842.3578
TOlson@barr.com
www.barr.com

resourceful. naturally. BARR

From: Claudette Carroll <ccarroll@mvtl.com>
Sent: Thursday, June 11, 2020 9:46 AM
To: Terri A. Olson <TOlson@barr.com>
Subject: RE: 202082-0830 BARR.pdf

Hi Terri,

Cost of selenium would be $18 per sample. Per an earlier request by Scott Korum, we have held onto these samples and will be able to run them for selenium, if requested.

Claudette

MVTL Minnesota Valley Testing Laboratories, Inc.
Providing Analytical Excellence Since 1951

ccarroll@mvtl.com
701-258-9720

2616 E. Broadway Ave/Bismarck, ND 58501
#NDSmart, #NDStrong, #InThisTogether

From: Terri A. Olson <TOlson@barr.com>
Sent: Thursday, June 11, 2020 8:17 AM
To: Claudette Carroll <ccarroll@mvtl.com>
Subject: 202082-0830 BARR.pdf

Hi Claudette,

We are thinking about having selenium analyzed for the samples in the attached report. Do you have any sample left? Based on past work, I believe we would want the selenium by 6020 and the B and Li were by 6010 so reporting from the same run isn't an optino. If you have sample, what would be the associated cost for Se by 6020?

Thank-you,

Terri A. Olson
Senior Data Quality Specialist
Minneapolis, MN office: 952.842.3578
TOlson@barr.com
www.barr.com

resourceful. naturally. BARR

82-0830

Barr Engineering Co. Chain of Custody

BARR

☐ Ann Arbor ☒ Bismarck ☐ Duluth ☐ Hibbing ☐ Jefferson City ☐ Minneapolis

Sample Origination State: ☐ KS ☐ MI ☐ MN ☐ MO ☐ ND ☐ SD ☐ WI Other: MT

COC Number: 54259

COC 1 of 2

REPORT TO	
Company:	Barr Engineering
Address:	234 W Century Ave
Name:	Terri Olson
email:	TOlson@barr.com
Copy to:	datamgt@barr.com
Project Name:	MDU L&C

INVOICE TO	
Company:	Same
Address:	
Name:	
email:	
P.O.	
Barr Project No:	26411007.15

Analysis Requested: Water / Soil — Total lithium + boron (1-liter plastic); % Solids

Preservative Code: C; Field Filtered Y/N: N

	Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y/N	Total Number Of Containers	Total lithium + boron
1.	T-15 W635	—	—	—	04/06/2020	12:02	GW	N	1	1
2.	T-16 W636	—	—	—		13:30				
3.	T-18 W637	—	—	—		15:45				
4.	T-17 W638	—	—	—		16:45				
5.	T-21 W639	—	—	—		17:33				
6.	T-19 W640	—	—	—		19:10				
7.	T-14 W641	—	—	—	04/07/2020	10:54				
8.	T-20 W642	—	—	—		12:45				
9.	T-22 W643	—	—	—	04/08/2020	08:25				
10.	T-23 W644	—	—	—		09:00	GW			

Comments: • Contact Terri Olson w/ Questions.

Matrix Code: GW = Groundwater; SW = Surface Water; WW = Waste Water; DW = Drinking Water; S = Soil/Solid; SD = Sediment; O = Other

Preservative Code: A = None; B = HCl; C = HNO_3; D = H_2SO_4; E = NaOH; F = MeOH; G = $NaHSO_4$; H = $Na_2S_2O_3$; I = Ascorbic Acid; J = NH_4Cl; K = Zn Acetate; O = Other

BARR USE ONLY

Sampled by: MLJ2

Barr Proj. Manager: Jeremy Gacnick

Barr DQ Manager: Terri Olson

Lab Name: MVTL

Lab Location: Bismarck

Relinquished by:	On Ice?	Date	Time	Received by:	Date	Time
[signature]	(Y) N	4-9-2020	15:05	[signature]	9Apr2020	1505
	Y N					

Samples Shipped VIA: ☐ Courier ☐ Federal Express ☒ Sampler ☐ Other: ______

Air Bill Number:

Requested Due Date: ☒ Standard Turn Around Time ☐ Rush ______ (mm/dd/yyyy)

Lab WO: Temperature on Receipt (°C): 0.4 Custody Seal Intact? ☐ Y ☐ N ☐ None

Distribution - **White-Original:** Accompanies Shipment to Laboratory; **Yellow Copy:** Include in Field Documents; **Pink Copy:** Send to Data Management Administrators.

TM 562

H:\RLG\STDFORMS\Chain Of Custody Form 2015 RLG Rev. 06/16/15

82-0830

Barr Engineering Co. Chain of Custody

BARR ☐ Ann Arbor ☒ Bismarck ☐ Duluth ☐ Hibbing ☐ Jefferson City ☐ Minneapolis

Sample Origination State: ☐ KS ☐ MO ☐ WI ☐ MI ☐ ND Other: MT ☐ MN ☐ SD

COC Number: 54258
COC 2 of 2

REPORT TO	INVOICE TO
Company: Barr Engineering	Company: Same
Address: 234 W Century Ave	Address:
Name: Terri Olson	Name:
email: TOlson@Barr.com	email:
Copy to: datamgt@barr.com	P.O.
Project Name: MDU LRC	Barr Project No: 26411007.15

Matrix Code: GW = Groundwater, SW = Surface Water, WW = Waste Water, DW = Drinking Water, S = Soil/Solid, SD = Sediment, O = Other

Preservative Code: A = None, B = HCl, C = HNO_3, D = H_2SO_4, E = NaOH, F = MeOH, G = $NaHSO_4$, H = $Na_2S_2O_3$, I = Ascorbic Acid, J = NH_4Cl, K = Zn Acetate, O = Other

Location	Sample Depth Start	Stop	Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y/N	Total Number Of Containers C	N	Analysis Requested: Water: Lithium + boron (total) (1-liter plastic)	Soil: % Solids	Preservative Code / Field Filtered Y/N
1. T-D W645						GW	N	1	1			Contact Terri
2. T-RB W646						I						Olson w/
3.												questions.
4.												
5.												
6.												
7.												
8.												
9.												
10.												

BARR USE ONLY

Sampled by: MKJ
Barr Proj. Manager: Jeremy Gacnick
Barr DQ Manager: Terri Olson
Lab Name: MVTL
Lab Location: Bismarck, ND

Relinquished by: [signature] On Ice? (Y) N Date 4-9-2020 Time 15:05 Received by: [signature] Date 4/9/20 Time 1505

Relinquished by: On Ice? Y N Date Time Received by: Date Time

Samples Shipped VIA: ☐ Courier ☐ Federal Express ☒ Sampler ☐ Other: Air Bill Number:

Lab WO: Temperature on Receipt (°C): 0.4 Custody Seal Intact? ☐ Y ☐ N ☐ None

Requested Due Date: ☒ Standard Turn Around Time ☐ Rush (mm/dd/yyyy)

H:\RLG\STDFORMS\Chain Of Custody Form 2015 RLG Rev. 06/16/15

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.

TMW2

Pace Analytical® Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Date: 8/26/2020

CLIENT: Barr Engineering
Project: 26411007.15
Lab Order: S2008131

CASE NARRATIVE

Report ID: S2008131001

Samples COAL PILE COAL 2, SB-2 20.5-21, T-17 10.75-15, T-18 12.5-14.5, T-2 22.5-23.5, T-22 10-15, T-3 30-32.5, T-5 10-15 and T-6 19.5-20 were received on August 6, 2020.

Samples were analyzed using the methods outlined in the following references:

U.S.E.P.A. 600/2-78-054 "Field and Laboratory Methods Applicable to Overburden and Mining Soils", 1978
American Society of Agronomy, Number 9, Part 2, 1982
USDA Handbook 60 "Diagnosis and Improvement of Saline and Alkali Soils", 1969
Wyoming Department of Environmental Quality, Land Quality Division, Guideline No. 1, 1984
New Mexico Overburden and Soils Inventory and Handling Guideline, March 1987
State of Utah, Division of Oil, Gas, and Mining: Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining, April 1988
Montana Department of State Lands, Reclamation Division: Soil, Overburden, and Regraded Spoil Guidelines, December 1994
State of Nevada Modified Sobek Procedure
Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition

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

Qualifiers by sample

SATPASTE QC - Saturated Paste Metals by ICP/Boron - Spike Recovery outside accepted recovery limits

Please note that during sample preparation for total metals analysis, a standard was used which did not contain lithium. This was not discovered until the samples were analyzed on August 25. Therefore, there is no spike QC data for lithium, but all QC for boron and selenium are present and acceptable.

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Work Order: S2008131
Collection Date:
Project: 26411007.15
Date Received: 8/6/2020
Lab ID: S2008131-001
Sampler:
Client Sample ID: SB-2 20.5-21
Matrix: Solid
Depths: 20.5 - 21 Feet
COC: 58270

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	9.4	0.1		ppm	08/20/2020 16:17 DG	EPA 200.7
Lithium	0.11	0.01		ppm	08/20/2020 16:17 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/20/2020 16:17 DG	EPA 200.7
Total Metals-3050/6010						
Boron	59	5		mg/Kg	08/25/2020 15:46 DG	EPA 6010C
Lithium	1.8	0.2		mg/Kg	08/25/2020 15:46 DG	EPA 6010C
Selenium	ND	1.3		mg/Kg	08/25/2020 15:46 DG	EPA 6010C

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Work Order: S2008131
Collection Date:
Project: 26411007.15
Date Received: 8/6/2020
Lab ID: S2008131-002
Sampler:
Client Sample ID: T-2 22.5-23.5
Matrix: Solid
Depths: 22.5 - 23.5 Feet
COC: 58270

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	3.2	0.1		ppm	08/20/2020 16:19 DG	EPA 200.7
Lithium	0.07	0.01		ppm	08/20/2020 16:19 DG	EPA 200.7
Selenium	0.13	0.05		ppm	08/20/2020 16:19 DG	EPA 200.7
Total Metals-3050/6010						
Boron	42	5		mg/Kg	08/25/2020 15:50 DG	EPA 6010C
Lithium	5.0	0.2		mg/Kg	08/25/2020 15:50 DG	EPA 6010C
Selenium	2.9	1.3		mg/Kg	08/25/2020 15:50 DG	EPA 6010C

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Work Order: S2008131
Collection Date:
Project: 26411007.15
Date Received: 8/6/2020
Lab ID: S2008131-003
Sampler:
Client Sample ID: T-3 30-32.5
Matrix: Solid
Depths: 30 - 32.5 Feet
COC: 58270

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	1.5	0.1		ppm	08/20/2020 16:21 DG	EPA 200.7
Lithium	0.13	0.01		ppm	08/20/2020 16:21 DG	EPA 200.7
Selenium	0.07	0.05		ppm	08/20/2020 16:21 DG	EPA 200.7
Total Metals-3050/6010						
Boron	33	5		mg/Kg	08/25/2020 15:59 DG	EPA 6010C
Lithium	13.4	0.2		mg/Kg	08/25/2020 15:59 DG	EPA 6010C
Selenium	3.1	1.3		mg/Kg	08/25/2020 15:59 DG	EPA 6010C

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank	C	Calculated Value
D	Report limit raised due to dilution	E	Value above quantitation range
G	Analyzed at IML Gillette laboratory	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
U	Analyte below method detection limit	X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Work Order: S2008131
Collection Date:
Project: 26411007.15
Date Received: 8/6/2020
Lab ID: S2008131-004
Sampler:
Client Sample ID: T-5 10-15
Matrix: Solid
Depths: 10 - 15 Feet
COC: 58270

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.8	0.1		ppm	08/20/2020 16:24 DG	EPA 200.7
Lithium	0.09	0.01		ppm	08/20/2020 16:24 DG	EPA 200.7
Selenium	0.06	0.05		ppm	08/20/2020 16:24 DG	EPA 200.7
Total Metals-3050/6010						
Boron	33	5		mg/Kg	08/25/2020 16:02 DG	EPA 6010C
Lithium	15.9	0.2		mg/Kg	08/25/2020 16:02 DG	EPA 6010C
Selenium	ND	1.3		mg/Kg	08/25/2020 16:02 DG	EPA 6010C

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Work Order: S2008131
Collection Date:
Project: 26411007.15
Date Received: 8/6/2020
Lab ID: S2008131-005
Sampler:
Client Sample ID: T-6 19.5-20
Matrix: Solid
Depths: 19.5 - 20 Feet
COC: 58270

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.6	0.1		ppm	08/20/2020 16:26 DG	EPA 200.7
Lithium	0.08	0.01		ppm	08/20/2020 16:26 DG	EPA 200.7
Selenium	0.09	0.05		ppm	08/20/2020 16:26 DG	EPA 200.7
Total Metals-3050/6010						
Boron	25	5		mg/Kg	08/25/2020 16:04 DG	EPA 6010C
Lithium	18.8	0.2		mg/Kg	08/25/2020 16:04 DG	EPA 6010C
Selenium	ND	1.3		mg/Kg	08/25/2020 16:04 DG	EPA 6010C

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Work Order: S2008131
Collection Date:
Project: 26411007.15
Date Received: 8/6/2020
Lab ID: S2008131-006
Sampler:
Client Sample ID: T-17 10.75-15
Matrix: Solid
Depths: 10.75 - 15 Feet
COC: 58270

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	2.2	0.1		ppm	08/20/2020 16:30 DG	EPA 200.7
Lithium	0.10	0.01		ppm	08/20/2020 16:30 DG	EPA 200.7
Selenium	0.06	0.05		ppm	08/20/2020 16:30 DG	EPA 200.7
Total Metals-3050/6010						
Boron	44	5		mg/Kg	08/25/2020 16:06 DG	EPA 6010C
Lithium	13.3	0.2		mg/Kg	08/25/2020 16:06 DG	EPA 6010C
Selenium	ND	1.3		mg/Kg	08/25/2020 16:06 DG	EPA 6010C

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank	C	Calculated Value
D	Report limit raised due to dilution	E	Value above quantitation range
G	Analyzed at IML Gillette laboratory	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
U	Analyte below method detection limit	X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Work Order: S2008131
Collection Date:
Project: 26411007.15
Date Received: 8/6/2020
Lab ID: S2008131-007
Sampler:
Client Sample ID: T-18 12.5-14.5
Matrix: Solid
Depths: 12.5 - 14.5 Feet
COC: 58270

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	3.3	0.1		ppm	08/20/2020 16:32 DG	EPA 200.7
Lithium	0.09	0.01		ppm	08/20/2020 16:32 DG	EPA 200.7
Selenium	0.07	0.05		ppm	08/20/2020 16:32 DG	EPA 200.7
Total Metals-3050/6010						
Boron	47	5		mg/Kg	08/25/2020 16:08 DG	EPA 6010C
Lithium	12.6	0.2		mg/Kg	08/25/2020 16:08 DG	EPA 6010C
Selenium	ND	1.3		mg/Kg	08/25/2020 16:08 DG	EPA 6010C

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Work Order: S2008131
Collection Date:
Project: 26411007.15
Date Received: 8/6/2020
Lab ID: S2008131-008
Sampler:
Client Sample ID: T-22 10-15
Matrix: Solid
Depths: 10 - 15 Feet
COC: 58270

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	0.9	0.1		ppm	08/20/2020 16:35 DG	EPA 200.7
Lithium	0.06	0.01		ppm	08/20/2020 16:35 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/20/2020 16:35 DG	EPA 200.7
Total Metals-3050/6010						
Boron	34	5		mg/Kg	08/25/2020 16:10 DG	EPA 6010C
Lithium	12.4	0.2		mg/Kg	08/25/2020 16:10 DG	EPA 6010C
Selenium	ND	1.3		mg/Kg	08/25/2020 16:10 DG	EPA 6010C

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
COC: 58270

Project: 26411007.15
Lab ID: S2008131-009
Client Sample ID: COAL PILE COAL 2
Depths: 0 - 0 Feet

Analyses	Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste Metals						
Boron	2.6	0.1		ppm	08/20/2020 16:37 DG	EPA 200.7
Lithium	0.03	0.01		ppm	08/20/2020 16:37 DG	EPA 200.7
Selenium	ND	0.05		ppm	08/20/2020 16:37 DG	EPA 200.7
Total Metals-3050/6010						
Boron	63	5		mg/Kg	08/25/2020 16:15 DG	EPA 6010C
Lithium	1.3	0.2		mg/Kg	08/25/2020 16:15 DG	EPA 6010C
Selenium	ND	1.3		mg/Kg	08/25/2020 16:15 DG	EPA 6010C

These results apply only to the samples tested.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
D	Report limit raised due to dilution
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analyte below method detection limit
C	Calculated Value
E	Value above quantitation range
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
X	Matrix Effect

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

ANALYTICAL QC SUMMARY REPORT

CLIENT: Barr Engineering **Date:** 8/26/2020

Work Order: S2008131 **Report ID:** S2008131001

Project:

Saturated Paste Metals by ICP Sample Type **MBLK** Units: ppm

SATPASTE BLK (08/20/20 16:46) RunNo: 181804

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Boron	ND	0.1					
Lithium	ND	0.01					
Selenium	ND	0.05					

Saturated Paste Metals by ICP Sample Type **LCS** Units: ppm

SATPASTE QC (08/20/20 16:44) RunNo: 181804

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Boron	0.4	0.1	0.31		124	80 - 120	S
Lithium	0.08	0.01	0.07		116	80 - 120	
Selenium	0.10	0.05	0.11		86.7	80 - 120	

Saturated Paste Metals by ICP Sample Type **DUP** Units: ppm

S2008131-005AD (08/20/20 16:28) RunNo: 181804

Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
Boron	0.6	0.1	0.6	7.17		20	
Lithium	0.08	0.01	0.08	5.44		20	
Selenium	0.07	0.05	0.09	24.9		20	R

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Report limit raised due to dilution
E	Value above quantitation range	G	Analyzed at IML Gillette laboratory
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

Pace Analytical
Formerly Inter-Mountain Laboratories
1673 Terra Avenue Sheridan, WY 82801 ph: (307) 672-8945

ANALYTICAL QC SUMMARY REPORT

CLIENT: Barr Engineering **Date:** 8/26/2020
Work Order: S2008131 **Report ID:** S2008131001
Project:

Total (3050) Metals by ICP - 6010C Sample Type **MBLK** Units: mg/Kg

MB-17637 (08/25/20 14:57) RunNo: 181916 PrepDate: 08/20/20 17:23 BatchID 17637

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Boron	ND	5					
Lithium	ND	0.2					
Selenium	ND	1.3					

Total (3050) Metals by ICP - 6010C Sample Type **LCS** Units: mg/Kg

LCS-17637 (08/25/20 14:59) RunNo: 181916 PrepDate: 08/20/20 17:23 BatchID 17637

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Boron	47	5	50		93.9	80 - 120	
Selenium	48.8	1.3	50		97.6	80 - 120	

Total (3050) Metals by ICP - 6010C Sample Type **MS** Units: mg/Kg

S2008131-009AS (08/25/20 16:17) RunNo: 181916 PrepDate: 08/20/20 7:45 BatchID 17637

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Boron	108	5	50	63	91.2	75 - 125	
Selenium	41.2	1.3	50	ND	82.4	75 - 125	

Total (3050) Metals by ICP - 6010C Sample Type **MSD** Units: mg/Kg

S2008131-009AMSD (08/25/20 16:26) RunNo: 181916 PrepDate: 08/20/20 7:45 BatchID 17637

Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Boron	105	5	108	2.88	85.0	20	
Selenium	40.0	1.3	41.2	2.96	80.0	20	

Total (3050) Metals by ICP - 6010C Sample Type **DUP** Units: mg/Kg

S2008131-001AD (08/25/20 15:48) RunNo: 181916 PrepDate: 08/20/20 7:45 BatchID 17637

Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
Boron	61	5	59	3.10		20	
Lithium	1.7	0.2	1.8	6.08		20	
Selenium	1.5	1.3	ND			20	R

S2008131-008AD (08/25/20 16:13) RunNo: 181916 PrepDate: 08/20/20 7:45 BatchID 17637

Analyte	Result	RL	Ref Samp	%RPD	%REC	% RPD Limits	Qual
Boron	36	5	34	4.95		20	
Lithium	12.9	0.2	12.4	3.79		20	
Selenium	ND	1.3	ND			20	

Qualifiers:

B	Analyte detected in the associated Method Blank	D	Report limit raised due to dilution
E	Value above quantitation range	G	Analyzed at IML Gillette laboratory
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

Barr Engineering Co. Chain of Custody

BARR ☐ Ann Arbor ☒ Bismarck ☐ Duluth ☐ Grand Rapids ☐ Hibbing ☐ Jefferson City ☐ Minneapolis ☐ Salt Lake City

Sample Origination State: ☐ KS ☐ MO ☐ UT ☐ MI ☐ ND ☐ WI ☐ MN ☐ SD Other: MT

COC Number: 58270

COC 1 of 1

REPORT TO	INVOICE TO
Company: BARR ENGINEERING	Company:
Address: 234 W. CENTURY	Address:
Name: SCOTT KORDOM	Name: SAME
email: skordom@barr.com	email:
Copy to: datamgt@barr.com	P.O.
Project Name: [redacted]	Barr Project No: 26411007.15

Matrix Code: GW = Groundwater, SW = Surface Water, WW = Waste Water, DW = Drinking Water, S = Soil/Solid, SD = Sediment, O = Other

Preservative Code: A = None, B = HCl, C = HNO_3, D = H_2SO_4, E = NaOH, F = MeOH, G = $NaHSO_4$, H = $Na_2S_2O_3$, I = Ascorbic Acid, J = NH_4Cl, K = Zn Acetate, O = Other

Location	Sample Depth Start	Sample Depth Stop	Sample Depth Unit (m./ft. or in.)	Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number Of Containers	Analysis Requested: Water / Soil: SATURATED PASTE TOTAL METALS (B, K, Se)	% Solids	Preservative Code	Field Filtered Y/N
1. SB-2 20.5-21'				IN BARR RECORDS	IN BARR RECORDS	SD			52008131-001			
2. T-2 22.5-23.5'									002		SEE ATTACHED	
3. T-3 30-32.5'									003		LETER FOR	
4. T-5 10-15'									004		DETAILS	
5. T-6 19.5-20'									005			
6. T-17 10.75-15'									006		CONTACT SCOTT	
7. T-18 12.5'-14.5'									007		KORDOM W/ QUESTIONS	
8. T-22 10-15'									008		701-335-3125	
9. COAL PILE COAL 2									009			
10.												

BARR USE ONLY

Sampled by: DJZ
Barr Proj. Manager: JJG3
Barr DQ Manager: TAO
Lab Name: PACE
Lab Location: Sheridan WY

Relinquished by: [signature] On Ice? Y (N) Date 8-4-20 Time 1300 Received by: Fedex Date Time

Relinquished by: Fedex On Ice? Y (N) Date Time Received by: [signature] Date 8/6/20 Time 1030

Samples Shipped VIA: ☐ Courier ☒ Federal Express ☐ Sampler ☐ Other: _____ Air Bill Number: 7711 7216 8518

Lab WO: Temperature on Receipt (°C): Custody Seal Intact? ☐ Y ☐ N ☐ None

Requested Due Date: ☒ Standard Turn Around Time ☐ Rush _____ (mm/dd/yyyy)

Distribution - White-Original: Accompanies Shipment to Laboratory; **Yellow Copy:** Include in Field Documents; **Pink Copy:** Send to Data Management Administrators.

H:RLG\STDFORMS\Chain Of Custody Form 2015 RLG Rev. 01/02/18

Appendix C

Groundwater Flow Rate Calculations

Lewis & Clark Station CCR Unit Groundwater Velocity Calculation

Sampling Date 3/15-16/21

Upgradient (MW103)

Top of Casing Elevation	1927.33	ft amsl	*Groundwater Monitoring System Documentation (Barr, 2018)*
Depth to Water	11.36	ft below TOC	
Water Level Elevation	1915.97	ft amsl	

Downgradient (MW117)

Top of Casing Elevation	1920.34	ft amsl	*Groundwater Monitoring System Documentation (Barr, 2018)*
Depth to Water	8.14	ft below TOC	
Water Level Elevation	1912.20	ft amsl	

horizontal hydraulic conductivity (Kh)	0.001	cm/s	*Placement Above the Uppermost Aquifer Determination (Barr, 2018)*
	2.8	ft/day	
porosity (n)	0.3		
horizontal distance	645	ft	
WL elevation difference	3.77	ft	
gradient (i)	0.006	ft/ft	
horizontal linear velocity (V)	0.0552	ft/day	
horizontal V	**20**	ft/yr	

Lewis & Clark Station CCR Unit Groundwater Velocity Calculation

Sampling Date 9/14/2021

Upgradient (MW103)

Top of Casing Elevation	1927.33	ft amsl	*Groundwater Monitoring System Documentation (Barr, 2018)*
Depth to Water	10.76	ft below TOC	
Water Level Elevation	1916.57	ft amsl	

Downgradient (MW117)

Top of Casing Elevation	1920.34	ft amsl	*Groundwater Monitoring System Documentation (Barr, 2018)*
Depth to Water	6.47	ft below TOC	
Water Level Elevation	1913.87	ft amsl	

horizontal hydraulic conductivity (Kh)	0.001	cm/s	*Placement Above the Uppermost Aquifer Determination (Barr, 2018)*
	2.8	ft/day	
porosity (n)	0.3		
horizontal distance	645	ft	
WL elevation difference	2.70	ft	
gradient (i)	0.004	ft/ft	
horizontal linear velocity (V)	0.0396	ft/day	
horizontal V	**14**	ft/yr	