



2022 Annual Groundwater Monitoring and Corrective Action Report

Scrubber Ponds

Lewis & Clark Station Sidney, Montana

Prepared for
Montana Dakota Utilities

January 2023

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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
RICE	Reciprocating Internal Combustion Engine
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 2022 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 fall 2021 and spring 2022 monitoring events. While lithium was also detected at statistically significant levels 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.

The CCR units were decommissioned by removal of CCR in 2022, and the site was regraded to establish positive drainage and minimize infiltration. The coal-fired generating plant was demolished, leaving only gas-fired reciprocating internal combustion engine (RICE) generation at the site. Groundwater monitoring will continue until it is demonstrated that closure by removal requirements (§ 257.102(c) Closure by removal of CCR) have been met. No remedial activities were initiated in 2022.

1 Introduction

Montana-Dakota Utilities Co. (MDU) owns and operates Lewis & Clark Station near Sidney, Montana (Figure 1). A coal-fired electrical generation unit was retired in 2021 and demolished by mid-2022, and a gas-fired reciprocating internal combustion engine (RICE) generation unit continues to operate. Coal combustion residuals (CCR) were managed in two storage ponds at the property and regulated by the US Environmental Protection Agency (EPA) CCR Rule (40 CFR Parts 257 and 261, Disposal of Coal Combustion Residuals from Electric Utilities), referred to herein as the CCR Rule. The storage ponds—which comprised a single, multi-unit CCR surface impoundment under the CCR Rule—were named the East and West Scrubber Ponds, or collectively the Scrubber Ponds.

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

The coal-fired Lewis & Clark generating plant was retired on March 31, 2021. Decommissioning and demolition of the plant and supporting facilities were substantially completed October 24, 2022. Gas-fired reciprocating internal combustion engine (RICE) generation continues to operate at the site. CCR solids and impacted liquids removal from the CCR unit was complete June 24, 2022. Regrading of the Scrubber Ponds area was completed September 19, 2022.

The locations of the former Scrubber Ponds and TSP are shown on Figure 1. This 2022 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). Statistical evaluation of detection monitoring program results 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 2022.

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 Groundwater Monitoring and Corrective Action Program

This section documents the status of the groundwater monitoring and corrective action program for the CCR unit for 2022. 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 2023 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). The coal-fired plant, Scrubber Ponds, and the TSP were removed and the site regraded in 2022 so the aerial imagery no longer represents current conditions. 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 2022.

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 in the 2021 annual report (Barr, 2022).

2.2.3 Monitoring Actions and Results

The following actions and results occurred during assessment monitoring in 2022:

- 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). The assessment monitoring sampling events (May 11-12 and August 16-17, 2022) 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 2022 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 (Barr, 2021). Results of the statistical analyses for the spring 2022 and fall 2022 events are presented in Table 5 and Table 6, respectively.

2.2.4 Groundwater Flow

Groundwater is generally encountered at 4 to 10 feet below ground surface (Table 4). 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 2022 events. Groundwater level contour maps showing flow direction are included as Figure 2 for spring 2022 and Figure 3 for fall 2022. 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 2022:

- 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 during the fall 2021, spring 2022, and fall 2022 monitoring events.
- Completed an ASD for lithium for the fall 2021 and spring 2022 monitoring events (Appendix B).

No problems were encountered.

The CCR unit was decommissioned by removal of CCR in 2022, and the site was regraded to establish positive drainage and minimize infiltration. Closure construction for the CCR unit was completed October 24, 2022.

2.5 Key Activities for Upcoming Year

The following key groundwater monitoring program activities are planned for 2023:

- Continue the assessment monitoring program in accordance with the CCR Rule.
- Evaluate the potential for an ASD for the fall 2022 lithium monitoring results and prepare an ASD, if appropriate.
- Evaluate analytical results from 2023 monitoring events according to the Statistical Method Selection Certification (Barr, 2017).
- Evaluate monitoring results for closure of the CCR unit under § 257.102(c), Closure by removal of CCR.

3 References

- Barr, 2022. 2021 Annual Groundwater Monitoring and Corrective Action Report, Scrubber Pond and Temporary Storage Area. Prepared for Montana Dakota Utilities Company. January 2021.
- 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.

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 2022
§ 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 through Table 6, 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).
Background concentration levels may exhibit slight variability among monitoring event evaluations due to corrections for seasonal variability as required by 40 CFR 257.93(g)(6).

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
Date			5/11/2022	8/16/2022	5/11/2022	8/16/2022	5/12/2022	8/17/2022	5/12/2022	8/17/2022	5/12/2022
Sample Type			N	N	N	N	N	N	N	N	N
Parameter	Analysis Location	Units									
Appendix III											
Boron, total	Lab	mg/l	0.82	1.12	0.21	0.25	7.97	11.1	8.78	9.23	1.22
Calcium, total	Lab	mg/l	96.8	97.8	80.7	79.9	162	261	335	336	86.0
Chloride	Lab	mg/l	31.6	29.7	22.6	19.4	32.4	45.7	41.3	43.1	29.9
Fluoride	Lab	mg/l	0.62	0.72	0.45	0.52	1.90	2.24	0.22	0.26	0.97
pH	Field	pH units	7.39	7.41	7.41	7.19	7.27	7.32	7.39	7.45	7.49
Solids, total dissolved	Lab	mg/l	992	1110	674	666	3380	5020	7660	7840	1170
Sulfate, as SO4	Lab	mg/l	318	411	190	160	1780	2700	4640	4490	481
Appendix IV											
Antimony, total	Lab	mg/l	0.0054	0.0049	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U	< 0.001 U
Arsenic, total	Lab	mg/l	0.0023	0.0030	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U
Barium, total	Lab	mg/l	0.0359	0.0385	0.0319	0.0333	0.0189	0.0338	0.013	0.0181	0.0252
Beryllium, total	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
Cadmium, total	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
Chromium, total	Lab	mg/l	< 0.002 U	0.0022	0.0021	< 0.002 U	< 0.002 U	< 0.002 U	0.0042	0.0029	< 0.002 U
Cobalt, total	Lab	mg/l	0.0073	0.0046	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U
Lead, total	Lab	mg/l	0.0007	< 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, total	Lab	mg/l	0.0487	0.0515	0.0326	0.0368	0.166	0.225	0.118	0.122	0.0683
Mercury, total	Lab	mg/l	< 0.0002 U	< 0.0002	< 0.0002 U	< 0.0002	< 0.0002 U	< 0.0002	< 0.0002 U	< 0.0002	< 0.0002 U
Molybdenum, total	Lab	mg/l	0.0193	0.0246	0.0032	0.0042	0.0553	0.0817	0.0042	0.0057	0.0368
Selenium, total	Lab	mg/l	0.0328	0.0463	< 0.005 U	< 0.005 U	0.0567	0.0612	0.0310	0.0332	0.0584
Thallium, total	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
Radium 226	Lab	pCi/l	0.575 +/- 0.251	0.533 +/- 0.418 ND	0.287 +/- 0.225 ND	3.14 +/- 0.816	0.232 +/- 0.197 ND	0.384 +/- 0.345 ND	0.498 +/- 0.266	0.822 +/- 0.457 UB	0.290 +/- 0.197
Radium 228	Lab	pCi/l	0.712 +/- 1.06 ND	0.528 +/- 1.71 ND	0.907 +/- 0.951 ND	0.468 +/- 0.892 ND	1.26 +/- 1.03 ND	2.38 +/- 1.33	2.16 +/- 1.07	2.49 +/- 1.47	2.36 +/- 1.28
Radium, combined (226+228)	Barr Calculation	pCi/l	1.287 +/- 1.09 q	1.061 +/- 1.76 ND	1.194 +/- 0.98 ND	3.608 +/- 1.21 q	1.492 +/- 1.05 ND	2.764 +/- 1.37 q	2.658 +/- 1.10	2.49 +/- 1.47	2.650 +/- 1.30
Water Levels											
Depth to water	Field	ft	10.18	10.02	8.65	8.46	7.25	7.58	4.08	5.25	7.96
Elevation	Calc.	ft amsl	1917.15	1917.31	1917.65	1917.84	1915.95	1915.62	1916.26	1915.09	1916.15

-- Not analyzed/Not available.
N Sample Type: Normal.
FD Sample Type: Field Duplicate.
U The analyte was analyzed for, but was not detected.
ND Not detected. Radium result was below uncertainty and/or minimum detectable concentration.
q The combined radium result includes both detected and not detected values.
UB The analyte was detected in one of the associated laboratory, equipment, field or trip blank samples and is considered non-detect at the concentration reported by the laboratory.

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

Location			MW118	MW119		MW119		MW120	MW120	QC	QC
Date			8/17/2022	5/11/2022		8/16/2022		5/11/2022	8/16/2022	5/12/2022	8/17/2022
Sample Type			N	N	FD	N	FD	N	N	Field Blank	Field Blank
Parameter	Analysis Location	Units									
Appendix III											
Boron, total	Lab	mg/l	1.71	0.22	0.20	0.23	0.23	5.50	8.96	< 0.1 U	< 0.1 U
Calcium, total	Lab	mg/l	92.3	83.9	83.2	87.1	82.8	431	455	< 1 U	< 1 U
Chloride	Lab	mg/l	30.2	25.2	25.4	24.0	24.0	52.2	64.8	< 2 U	< 2.0 U
Fluoride	Lab	mg/l	1.15	0.45	0.43	0.49	0.48	0.48	0.47	< 0.1 U	< 0.1 U
pH	Field	pH units	7.51	7.39	7.39	7.23	--	6.8	6.93	--	--
Solids, total dissolved	Lab	mg/l	1400	683	689	726	714	8500	8760	< 10 U	< 10 U
Sulfate, as SO4	Lab	mg/l	575	176	161	172	158	4870	4850	< 5 U	< 5 U
Appendix IV											
Antimony, total	Lab	mg/l	< 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, total	Lab	mg/l	0.0026	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U
Barium, total	Lab	mg/l	0.0317	0.0284	0.0270	0.0341	0.0329	0.0190	0.0197	< 0.002 U	< 0.002 U
Beryllium, total	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
Cadmium, total	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
Chromium, total	Lab	mg/l	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	< 0.002 U	0.0030	< 0.002 U	< 0.002 U	< 0.002 U
Cobalt, total	Lab	mg/l	< 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, total	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
Lithium, total	Lab	mg/l	0.0840	0.0343	0.0352	0.0393	0.0388	0.129	0.176	< 0.02 U	< 0.02 U
Mercury, total	Lab	mg/l	< 0.0002	< 0.0002 U	< 0.0002 U	< 0.0002	< 0.0002	< 0.0002 U	< 0.0002	< 0.0002 U	< 0.0002
Molybdenum, total	Lab	mg/l	0.0431	0.0034	0.0034	0.0042	0.0040	0.0031	0.0030	< 0.002 U	< 0.002 U
Selenium, total	Lab	mg/l	0.0494	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	0.0131	< 0.005 U	< 0.005 U	< 0.005 U
Thallium, total	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
Radium 226	Lab	pCi/l	0.617 +/- 0.400 UB	0.281 +/- 0.195	0.466 +/- 0.246	4.24 +/- 0.859	0.239 +/- 0.292 ND	0.569 +/- 0.248	0.691 +/- 0.394 UB	0.191 +/- 0.193 ND	0.611 +/- 0.357
Radium 228	Lab	pCi/l	0.519 +/- 1.07 ND	1.06 +/- 1.07 ND	1.38 +/- 1.02 ND	-0.165 +/- 1.28 ND	0.849 +/- 1.03 ND	1.53 +/- 1.04 ND	1.42 +/- 0.902	0.802 +/- 0.897 ND	0.414 +/- 1.13 ND
Radium, combined (226+228)	Barr Calculation	pCi/l	0.519 +/- 1.07 ND	1.341 +/- 1.09 q	1.846 +/- 1.05 q	4.240 +/- 0.86 q	1.087 +/- 1.07 ND	2.099 +/- 1.07 q	1.42 +/- 0.902	0.993 +/- 0.92 ND	1.025 +/- 1.19 q
Water Levels											
Depth to water	Field	ft	8.05	8.4	--	8.35	--	14.15	14.36	--	--
Elevation	Calc.	ft amsl	1916.06	1917.88	--	1917.93	--	1911.07	1910.86	--	--

-- Not analyzed/Not available.
N Sample Type: Normal.
FD Sample Type: Field Duplicate.
U The analyte was analyzed for, but was not detected.
ND Not detected. Radium result was below uncertainty and/or minimum detectable concentration.
q The combined radium result includes both detected and not detected values.
UB The analyte was detected in one of the associated laboratory, equipment, field or trip blank samples and is considered non-detect at the concentration reported by the laboratory.

Table 5
Summary of Statistical Results
May 2022 Assessment Monitoring
Lewis & Clark Station

	Parameter	Units	GWPS	PL/TL	Analysis Type	MW111	MW117	MW118	MW120
Appendix III Constituents	Boron	mg/L	<i>n/a</i>	2.4	NP PL	7.97	8.78	1.22	5.50
	Calcium	mg/L	<i>n/a</i>	105	P PL	162	335	86	431
	Chloride	mg/L	<i>n/a</i>	27	P PL	32.4	41.3	29.9	52.2
	Fluoride	mg/L	<i>n/a</i>	0.87	NP PL	1.9	0.22	0.97	0.48
	pH	units	<i>n/a</i>	7.0 - 7.5	P PL	7.27	7.39	7.49	6.80
	Sulfate	mg/L	<i>n/a</i>	516	NP PL	1780	4640	481	4870
	TDS	mg/L	<i>n/a</i>	1080	NP PL	3380	7660	1170	8500
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	18.9	13.0	25.2	19.0
	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	< 2	4.2	< 2	3.0
	Cobalt	µg/L	6	2.7	NP TL	< 2	< 2	< 2	< 2
	Fluoride	mg/L	4	0.87	NP TL	1.90	0.22	0.97	0.48
	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	166	118	68.3	129
	Mercury	µg/L	2	0.2	NP TL	< 0.2	< 0.2	< 0.2	< 0.2
	Molybdenum	µg/L	100	29.2	NP TL	55.3	4.20	36.8	3.10
	Selenium	µg/L	70.5	70.5	NP TL, Trend	56.7	31.0	58.4	13.1
	Thallium	µg/L	2	0.5	NP TL	< 0.5	< 0.5	< 0.5	< 0.5
Radium 226+228	pCi/L	5	2.5	NP TL	< 1.492	2.658	2.650	2.099	

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.

**Table 6
Summary of Statistical Results
August 2022 Assessment Monitoring
Lewis & Clark Station**

	Parameter	Units	GWPS	PL/TL	Analysis Type	MW111	MW117	MW118	MW120
Appendix III Constituents	Boron	mg/L	n/a	2.6	NP PL (d)	11.1	9.23	1.71	8.96
	Calcium	mg/L	n/a	105	P PL	261	336	92.3	455
	Chloride	mg/L	n/a	27	P PL	45.7	43.1	30.2	64.8
	Fluoride	mg/L	n/a	0.87	NP PL	2.24	0.26	1.15	0.47
	pH	units	n/a	7.0 - 7.5	NP PL (d)	7.32	7.45	7.51	6.93
	Sulfate	mg/L	n/a	516	NP PL	2700	4490	575	4850
	TDS	mg/L	n/a	1080	NP PL	5020	7840	1400	8760
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	2.6	< 2
	Barium	µg/L	2000	40.2	P TL	33.8	18.1	31.7	19.7
	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	< 2	2.9	< 2	< 2
	Cobalt	µg/L	6	2.7	NP TL	< 2	< 2	< 2	< 2
	Fluoride	mg/L	4	0.87	NP TL	2.24	0.26	1.15	0.47
	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	225	122	84	176
	Mercury	µg/L	2	0.2	NP TL	< 0.2	< 0.2	< 0.2	< 0.2
	Molybdenum	µg/L	100	29.2	NP TL	81.7	5.7	43.1	3
	Selenium	µg/L	70.5	70.5	NP TL, Trend	61.2	33.2	49.4	< 5
	Thallium	µg/L	2	0.5	NP TL	< 0.5	< 0.5	< 0.5	< 0.5
Radium 226+228	pCi/L	5	2.5	NP TL	2.764	2.49	< 0.519	1.42	

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.

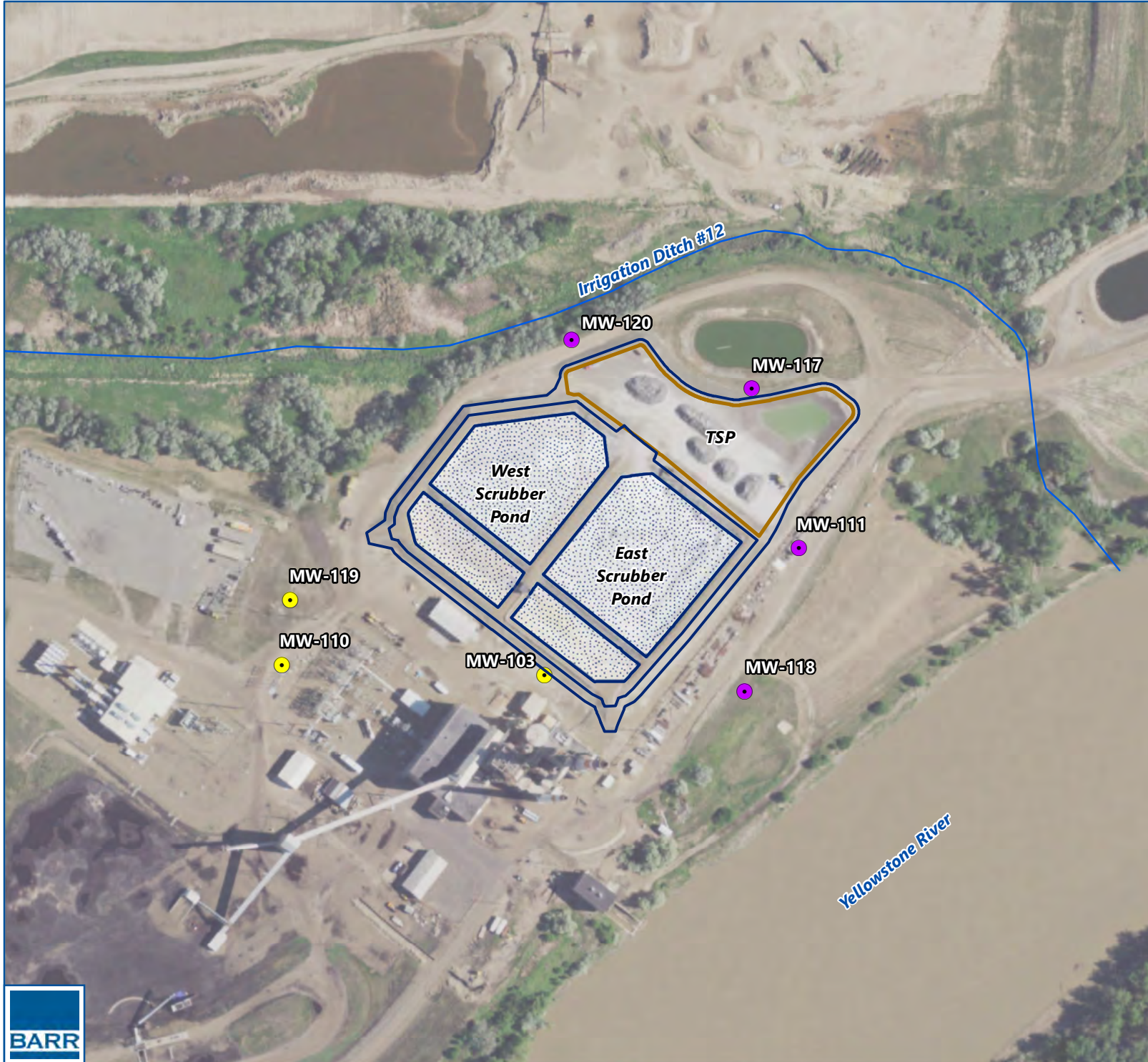
-Parametric (P) interwell prediction limits (PL, Appx III) or tolerance limits (TL, Appx IV) used if background data satisfied normality test. If not, non-parametric (NP) prediction/tolerance limits of highest background value used.





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

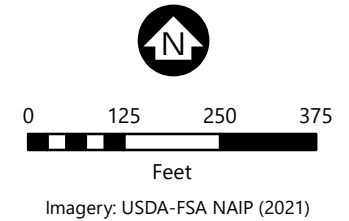
-GWPS comparison used lower confidence limits (LCLs) of the mean, median, or trend line.

-Boron and pH data were deseasonalized (d). Adjustments may result in additional SSIs.

Figures



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



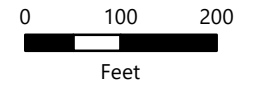
GROUNDWATER MONITORING SYSTEM
Lewis & Clark Station
Annual Groundwater Monitoring and Corrective Action Report
Montana-Dakota Utilities Co.



FIGURE 1



- Groundwater Monitoring System Well Location
- Water Level Monitoring Well Location
- Groundwater Elevation Contours (dashed where inferred)
- ↗ Direction of Groundwater Flow



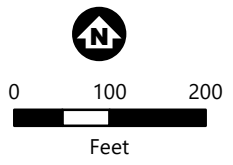
Groundwater Elevation Contours
Spring 2022
Lewis & Clark Station
Montana Dakota Utilities Co.

FIGURE 2





- Groundwater Monitoring System Well Location
- Water Level Monitoring Well Location
- Groundwater Elevation Contours (dashed where inferred)
- ➔ Direction of Groundwater Flow



Groundwater Elevation Contours
Fall 2022
Lewis & Clark Station
Montana Dakota Utilities Co.

FIGURE 3

Appendices

Appendix A

Laboratory Reports and Field Sheets



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1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
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Account #: 2800 **Client:** Montana-Dakota Utilities - Bismarck
Workorder: MDU Lewis & Clark Spring 2022 (1072) **PO:** 190709 OP

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

CCR_APP III

Certificate of Analysis

Approval

All data reported has been reviewed and approved by:

C. Carroll

Claudette Carroll, Lab Manager Bismarck, ND

Analyses performed under Minnesota Department of Health Accreditation conforms to the current TNI standards.

NEW ULM LAB CERTIFICATIONS:
MN LAB # 027-015-125 ND WW/DW # R-040

BISMARCK LAB CERTIFICATIONS:
MN LAB # 038-999-267 ND W/DW # ND-016

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Workorder Summary

Workorder Comments

All analytes with dilution factors greater than 1 (displayed in DF column) required dilution due to matrix or high concentration of target analyte unless otherwise noted and reporting limits (RDL column) have been adjusted accordingly.

Analysis Results Comments

1072001 (MW103)

Sample analyzed beyond holding time.(pH)

1072002 (MW110)

Sample analyzed beyond holding time.(pH)

1072003 (MW119)

Sample analyzed beyond holding time.(pH)

1072004 (MW111)

Sample analyzed beyond holding time.(pH)

1072005 (MW117)

Sample analyzed beyond holding time.(pH)

1072006 (MW118)

Sample analyzed beyond holding time.(pH)

1072007 (MW120)

Sample analyzed beyond holding time.(pH)

1072008 (Dup 1)

Sample analyzed beyond holding time.(pH)

1072009 (Field Blank (FB))

Sample analyzed beyond holding time.(pH)

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Report Date: Thursday, July 14, 2022 8:29:21 AM

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 www.MVTL.com

**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072001 **Date Collected:** 05/11/2022 16:47 **Matrix:** Groundwater
Sample ID: MW103 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6**Method: 120.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	1170	umhos/cm	1	1	05/11/2022 16:47	05/11/2022 16:47	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	7.39	units	0.01	1	05/11/2022 16:47	05/11/2022 16:47	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	8.47	degrees C		1	05/11/2022 16:47	05/11/2022 16:47	JSM		

Method: ASTM D516-11

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	318	mg/L	10	2	05/20/2022 12:23	05/20/2022 12:23	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	0.82	mg/L	0.1	1	05/13/2022 17:00	05/23/2022 16:00	SLZ	MA,NDA	
Calcium	96.8	mg/L	1	1	05/13/2022 17:00	05/19/2022 12:05	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.4	units	0.1	1	05/13/2022 16:24	05/13/2022 16:24	AMC	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	31.6	mg/L	2	1	05/18/2022 09:58	05/18/2022 09:58	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	0.62	mg/L	0.1	1	05/13/2022 16:24	05/13/2022 16:24	AMC		

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www.MVTL.com



Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1072001 **Date Collected:** 05/11/2022 16:47 **Matrix:** Groundwater
Sample ID: MW103 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	992	mg/L	10	1	05/13/2022 13:00	05/13/2022 13:00	RAA	MA,NDA	

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Report Date: Thursday, July 14, 2022 8:29:21 AM

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072002 **Date Collected:** 05/11/2022 08:05 **Matrix:** Groundwater
Sample ID: MW110 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6**Method: 120.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	989	umhos/cm	1	1	05/11/2022 08:05	05/11/2022 08:05	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	7.41	units	0.01	1	05/11/2022 08:05	05/11/2022 08:05	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	7.78	degrees C		1	05/11/2022 08:05	05/11/2022 08:05	JSM		

Method: ASTM D516-11

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	190	mg/L	10	2	05/20/2022 12:24	05/20/2022 12:24	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	0.21	mg/L	0.1	1	05/13/2022 17:00	05/23/2022 16:01	SLZ	MA,NDA	
Calcium	80.7	mg/L	1	1	05/13/2022 17:00	05/19/2022 12:07	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.8	units	0.1	1	05/13/2022 17:22	05/13/2022 17:22	AMC	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	22.6	mg/L	2	1	05/18/2022 09:59	05/18/2022 09:59	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	0.45	mg/L	0.1	1	05/13/2022 17:22	05/13/2022 17:22	AMC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1072002 **Date Collected:** 05/11/2022 08:05 **Matrix:** Groundwater
Sample ID: MW110 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	674	mg/L	10	1	05/13/2022 13:00	05/13/2022 13:00	RAA	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072003 **Date Collected:** 05/11/2022 10:25 **Matrix:** Groundwater
Sample ID: MW119 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6**Method: 120.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	971	umhos/cm	1	1	05/11/2022 10:25	05/11/2022 10:25	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	7.39	units	0.01	1	05/11/2022 10:25	05/11/2022 10:25	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	7.46	degrees C		1	05/11/2022 10:25	05/11/2022 10:25	JSM		

Method: ASTM D516-11

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	176	mg/L	10	2	05/20/2022 12:25	05/20/2022 12:25	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	0.22	mg/L	0.1	1	05/13/2022 17:00	05/23/2022 16:03	SLZ	MA,NDA	
Calcium	83.9	mg/L	1	1	05/13/2022 17:00	05/19/2022 12:09	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.8	units	0.1	1	05/13/2022 17:44	05/13/2022 17:44	AMC	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	25.2	mg/L	2	1	05/18/2022 10:00	05/18/2022 10:00	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	0.45	mg/L	0.1	1	05/13/2022 17:44	05/13/2022 17:44	AMC		

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Report Date: Thursday, July 14, 2022 8:29:21 AM



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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1072003 **Date Collected:** 05/11/2022 10:25 **Matrix:** Groundwater
Sample ID: MW119 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	683	mg/L	10	1	05/13/2022 13:00	05/13/2022 13:00	RAA	MA,NDA	

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Report Date: Thursday, July 14, 2022 8:29:21 AM

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 www.MVTL.com

**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072004 **Date Collected:** 05/12/2022 08:13 **Matrix:** Groundwater
Sample ID: MW111 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service
Temp @ Receipt (C): 0.6 **Received on Ice:** Yes

Method: 120.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	3106	umhos/cm	1	1	05/12/2022 08:13	05/12/2022 08:13	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	7.27	units	0.01	1	05/12/2022 08:13	05/12/2022 08:13	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	7.75	degrees C		1	05/12/2022 08:13	05/12/2022 08:13	JSM		

Method: ASTM D516-11

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	1780	mg/L	50	10	05/20/2022 12:26	05/20/2022 12:26	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	7.97	mg/L	1	10	05/13/2022 17:00	05/23/2022 18:17	SLZ	MA,NDA	
Calcium	162	mg/L	1	1	05/13/2022 17:00	05/19/2022 12:16	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.6	units	0.1	1	05/13/2022 17:54	05/13/2022 17:54	AMC	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	32.4	mg/L	2	1	05/18/2022 10:02	05/18/2022 10:02	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	1.90	mg/L	0.1	1	05/13/2022 17:54	05/13/2022 17:54	AMC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1072004 **Date Collected:** 05/12/2022 08:13 **Matrix:** Groundwater
Sample ID: MW111 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6 **Received on Ice:** Yes

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	3380	mg/L	10	1	05/13/2022 13:00	05/13/2022 13:00	RAA	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072005 **Date Collected:** 05/12/2022 06:12 **Matrix:** Groundwater
Sample ID: MW117 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6**Method: 120.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	6727	umhos/cm	1	1	05/12/2022 06:12	05/12/2022 06:12	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	7.39	units	0.01	1	05/12/2022 06:12	05/12/2022 06:12	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	7	degrees C		1	05/12/2022 06:12	05/12/2022 06:12	JSM		

Method: ASTM D516-11

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	4640	mg/L	200	40	05/20/2022 12:27	05/20/2022 12:27	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	8.78	mg/L	2	20	05/13/2022 17:00	05/23/2022 18:19	SLZ	MA,NDA	
Calcium	335	mg/L	5	5	05/13/2022 17:00	05/19/2022 12:18	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.3	units	0.1	1	05/13/2022 18:04	05/13/2022 18:04	AMC	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	41.3	mg/L	2	1	05/18/2022 10:03	05/18/2022 10:03	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	0.22	mg/L	0.1	1	05/13/2022 18:04	05/13/2022 18:04	AMC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1072005 **Date Collected:** 05/12/2022 06:12 **Matrix:** Groundwater
Sample ID: MW117 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	7660	mg/L	10	1	05/13/2022 13:00	05/13/2022 13:00	RAA	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072006 **Date Collected:** 05/12/2022 10:25 **Matrix:** Groundwater
Sample ID: MW118 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service
Temp @ Receipt (C): 0.6 **Received on Ice:** Yes

Method: 120.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	1377	umhos/cm	1	1	05/12/2022 10:25	05/12/2022 10:25	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	7.49	units	0.01	1	05/12/2022 10:25	05/12/2022 10:25	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	7.84	degrees C		1	05/12/2022 10:25	05/12/2022 10:25	JSM		

Method: ASTM D516-11

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	481	mg/L	25	5	05/20/2022 12:29	05/20/2022 12:29	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	1.22	mg/L	0.1	1	05/13/2022 17:00	05/23/2022 16:13	SLZ	MA,NDA	
Calcium	86.0	mg/L	1	1	05/13/2022 17:00	05/19/2022 12:20	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.9	units	0.1	1	05/16/2022 15:30	05/16/2022 15:30	RAA	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	29.9	mg/L	2	1	05/18/2022 10:04	05/18/2022 10:04	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	0.97	mg/L	0.1	1	05/13/2022 19:21	05/13/2022 19:21	AMC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1072006 **Date Collected:** 05/12/2022 10:25 **Matrix:** Groundwater
Sample ID: MW118 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6 **Received on Ice:** Yes

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	1170	mg/L	10	1	05/13/2022 13:00	05/13/2022 13:00	RAA	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072007 **Date Collected:** 05/11/2022 12:58 **Matrix:** Groundwater
Sample ID: MW120 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6**Method: 120.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	6579	umhos/cm	1	1	05/11/2022 12:58	05/11/2022 12:58	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	6.8	units	0.01	1	05/11/2022 12:58	05/11/2022 12:58	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	7.29	degrees C		1	05/11/2022 12:58	05/11/2022 12:58	JSM		

Method: ASTM D516-11

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	4870	mg/L	200	40	05/20/2022 12:30	05/20/2022 12:30	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	5.50	mg/L	0.5	5	05/13/2022 17:00	05/23/2022 16:15	SLZ	MA,NDA	
Calcium	431	mg/L	5	5	05/13/2022 17:00	05/19/2022 12:24	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.3	units	0.1	1	05/16/2022 15:30	05/16/2022 15:30	RAA	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	52.2	mg/L	2	1	05/18/2022 10:05	05/18/2022 10:05	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	0.48	mg/L	0.1	1	05/13/2022 19:57	05/13/2022 19:57	AMC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1072007 **Date Collected:** 05/11/2022 12:58 **Matrix:** Groundwater
Sample ID: MW120 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	8500	mg/L	10	1	05/13/2022 13:00	05/13/2022 13:00	RAA	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072008 **Date Collected:** 05/11/2022 10:25 **Matrix:** Groundwater
Sample ID: Dup 1 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6**Method: 120.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	971	umhos/cm	1	1	05/11/2022 10:25	05/11/2022 10:25	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	7.39	units	0.01	1	05/11/2022 10:25	05/11/2022 10:25	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	7.46	degrees C		1	05/11/2022 10:25	05/11/2022 10:25	JSM		

Method: ASTM D516-11

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	161	mg/L	5	1	05/20/2022 14:00	05/20/2022 14:00	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	0.20	mg/L	0.1	1	05/13/2022 17:00	05/23/2022 16:17	SLZ	MA,NDA	
Calcium	83.2	mg/L	1	1	05/13/2022 17:00	05/19/2022 12:26	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.9	units	0.1	1	05/16/2022 15:30	05/16/2022 15:30	RAA	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	25.4	mg/L	2	1	05/18/2022 10:06	05/18/2022 10:06	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	0.43	mg/L	0.1	1	05/13/2022 20:28	05/13/2022 20:28	AMC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1072008 **Date Collected:** 05/11/2022 10:25 **Matrix:** Groundwater
Sample ID: Dup 1 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	689	mg/L	10	1	05/13/2022 13:00	05/13/2022 13:00	RAA	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072009 **Date Collected:** 05/12/2022 09:25 **Matrix:** Groundwater
Sample ID: Field Blank (FB) **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service
Temp @ Receipt (C): 0.6 **Received on Ice:** Yes

Method: ASTM D516-11

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	<5	mg/L	5	1	05/20/2022 14:01	05/20/2022 14:01	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	<0.1	mg/L	0.1	1	05/13/2022 17:00	05/23/2022 16:23	SLZ	MA,NDA	
Calcium	<1	mg/L	1	1	05/13/2022 17:00	05/19/2022 12:33	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	8.8	units	0.1	1	05/13/2022 15:30	05/13/2022 15:30	AMC	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	<2	mg/L	2	1	05/18/2022 10:12	05/18/2022 10:12	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	<0.1	mg/L	0.1	1	05/13/2022 15:30	05/13/2022 15:30	AMC		

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	<10	mg/L	10	1	05/13/2022 13:00	05/13/2022 13:00	RAA	MA,NDA	

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Report Date: Thursday, July 14, 2022 8:29:21 AM



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www.MVTL.com



Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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May 19, 2022

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

RE: MDU Lewis & Clark Groundwater Sampling

Dear Mr. Peterson,

From May 11-12, 2022, MVTL Field Services division collected ground water samples at the MDU Lewis and Clark Station near Sidney, MT. A duplicate sample was collected from well 119. Samples collected were placed on ice and transported to MVTL in Bismarck, ND for analysis.

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

Sincerely,

Jeremy Meyer

MVTL Field Services Manager

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

	Minnesota Valley Testing Laboratories 2616 E. Broadway Ave Bismarck, ND 58501 (701) 258-9720	Montana - Dakota Utilities - Bis WO: 1072 	Chain of Custody Record 1072
	Report To: MDU Attn: Todd Peterson Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-425-2427 Email: Todd.Peterson@mdu.com		Project Name: MDU Lewis & Clark Event: Spring 2022 Sampled By: <i>Jeremy</i>

Lab Number	Sample ID	Sample Information		Sample Type	Sample Containers				Field Readings				Analysis Required
		Date	Time		1 Liter Raw	500 mL HNO3	500 mL HNO3 (filtered)	250 mL H2SO4	Temp (°C)	Spec. Cond.	pH	Turbidity (NTU)	
001	MW103	11 May 22	1647	GW	X	X	X	X	8.47	1170	7.39	4.33	MDU Lewis & Clark List
002	MW110	11 May 22	0805	GW	X	X	X	X	7.78	989	7.41	3.41	
003	MW119	11 May 22	1025	GW	X	X	X	X	7.46	971	7.39	1.66	
004	MW111	12 May 22	0813	GW	X	X	X	X	7.75	3106	7.27	1.66	
005	MW117	12 May 22	0612	GW	X	X	X	X	7.00	6727	7.79	5725	
006	MW118	12 May 22	1025	GW	X	X	X	X	7.84	1377	7.49	2.53	
007	MW120	11 May 22	1258	GW	X	X	X	X	7.29	6579	6.80	0.65	
008	Dup 1	11 May 22	1025	GW	X	X	X	X	7.46	971	7.39	1.66	
009	Field Blank (FB)	12 May 22	0925	GW	X	X	X	X	NA	NA	NA	NA	

Comments:

	Relinquished By		Sample Condition		Received By	
	Name	Date/Time	Location	Temp (°C)	Name	Date/Time
1	<i>[Signature]</i>	13 May 22 0805	LOG In Walk In #2	0.6 TM562 / TM805	<i>[Signature]</i>	13 May 22 0805
2						

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
Surface water Assessment

Company: MDU Lewis & Clark
Event: March 2022 Spring 2022
Sampling Personal: Jay Ph

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	12/12/22	0558	2"	8.50	
MW105		1307	2"	8.35	
MW106		1305	2"	8.95	
MW107		0556	2"	4.00	
MW108		1302	2"	16.40	
MW116		0600	2"	12.08	

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: **MDU Lewis & Clark**
 Event: **March 2022**
 Sample ID: 103
 Sampling Personal: J. May

Weather Conditions: Temp: _____ °F Wind: _____ @ Precip: **Sunny / Partly Cloudy / Cloudy**

WELL INFORMATION			
Well Locked?	YES	NO	<u>NO</u>
Well Labeled?	YES	NO	
Casing Strait?	YES	NO	
Grout Seal Intact?	YES	NO	<u>Not Visible</u>
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	10.18	ft	
Total Depth of Well:		ft	
Well Volume:		liters	
Depth to Top of Pump:		ft	
Water Level After Sample:	10.20	ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION			
Purging Method:	Bladder		
Sampling Method:	Bladder		
Dedicated Equipment?	YES	NO	<u>NO</u>
Duplicate Sample?	YES	NO	<u>NO</u>
Duplicate Sample ID:			
Bottle List:			
1 Liter Raw	4- 1L Nitric		
500mL Nitric			
500mL Nitric (filtered)			
250mL Sulfuric			

Control Settings:	
Purge:	4 Sec.
Recover:	56 Sec.
PSI:	20

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate mL/Min	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10					clear, slightly turbid, turbid
11 Mar 22	1512	Start of Well Purge									
	1517	4.08	1822	7.40	2.06	134.6	97.62	10.15	100.0	500.0	Clear
	1547	8.56	1249	7.37	0.49	134.3	27.49	10.17	100.0	3000.0	Clear
	1607	8.41	1207	7.39	1.14	103.9	14.38	10.18	100.0	2000.0	Clear
	1627	8.39	1183	7.39	1.73	102.3	8.71	10.20	100.0	2000.0	Clear
	1637	8.51	1174	7.39	1.86	106.3	4.71	10.18	100.0	1000.0	Clear
	1647	8.50	1173	7.39	1.87	106.7	4.67	10.19	100.0	500.0	Clear
	1647	8.47	1170	7.39	1.87	106.6	4.73	10.19	100.0	500.0	Clear
Well Stabilized?		YES	NO	Total Volume Purged: <u>9500.0</u> mL							

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment Clarity, Color, Odor, Ect.
11 Mar 22	1647	8.47	1170	7.39	4.73	Clear

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
Groundwater Assessment

Company: MDU Lewis & Clark
Event: March 2022
Sample ID: 110
Sampling Personal: J. J. [Signature]

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

WELL INFORMATION table with fields: Well Locked?, Well Labeled?, Casing Strait?, Grout Seal Intact?, Repairs Necessary?, Casing Diameter, Water Level Before Purge, Total Depth of Well, Well Volume, Depth to Top of Pump, Water Level After Sample, Measurement Method.

SAMPLING INFORMATION table with fields: Purging Method, Sampling Method, Dedicated Equipment?, Duplicate Sample?, Duplicate Sample ID, Bottle List.

Control Settings table with fields: Purge, Recover, PSI.

FIELD READINGS

FIELD READINGS table with columns: Purge Date, Time, Temp, Spec. Cond., pH, DO, ORP, Turbidity, Water Level, Pumping Rate, mL Removed, Appearance or Comment.

Summary table with columns: Sample Date, Time, Temp, Spec. Cond., pH, Turbidity, Appearance or Comment.

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
Groundwater Assessment

Company: MDU Lewis & Clark
Event: March 2022
Sample ID: 119
Sampling Personal: Jeremy Payer

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

WELL INFORMATION table with fields: Well Locked?, Well Labeled?, Casing Strait?, Grout Seal Intact?, Repairs Necessary?, Casing Diameter, Water Level Before Purge, Total Depth of Well, Well Volume, Depth to Top of Pump, Water Level After Sample, Measurement Method.

SAMPLING INFORMATION table with fields: Purging Method, Sampling Method, Dedicated Equipment?, Duplicate Sample?, Duplicate Sample ID, Bottle List.

Control Settings table with fields: Purge, Recover, PSI.

FIELD READINGS

FIELD READINGS table with columns: Purge Date, Time, Temp, Spec. Cond., pH, DO, ORP, Turbidity, Water Level, Pumping Rate, mL Removed, Appearance or Comment.

Summary table with columns: Sample Date, Time, Temp, Spec. Cond., pH, Turbidity, Appearance or Comment.

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
 Groundwater Assessment

Company: MDU Lewis & Clark
 Event: March 2022
 Sample ID:
 Sampling Personal: *John III*

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:	7.25	ft	
Total Depth of Well:	ft		
Well Volume:	liters		
Depth to Top of Pump:	ft		
Water Level After Sample:	7.40	ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION			
Purging Method:	Bladder	Control Settings:	
Sampling Method:	Bladder	Purge:	4 Sec.
Dedicated Equipment?	YES	Recover:	56 Sec.
		PSI:	20
Duplicate Sample?	YES		
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 (ft)	Pumping Rate ml/Min	ml Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10					
	0718	Start of Well Purge									
12 May 22	0723	9.13	4205	7.05	0.54	208.7	114.36	7.36	100.0	500.0	Clear
	0753	7.63	3338	7.19	1.63	210.0	33.26	7.38	100.0	500.0	Clear
	0803	7.69	3083	7.26	2.50	210.7	1.69	7.40	100.0	1000.0	Clear
	0808	7.68	3085	7.26	2.51	210.4	1.54	7.41	100.0	500.0	Clear
	0813	7.75	3106	7.27	2.59	207.9	1.66	7.41	100.0	500.0	Clear
Well Stabilized?		YES	NO	Total Volume Purged: 5500.0 ml							

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment Clarity, Color, Odor, Ect.
12 May 22	0813	7.75	3106	7.27	1.66	Clear

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: **MDU Lewis & Clark**
 Event: **March 2022**
 Sample ID:
 Sampling Personal: *J. Kelly*

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

WELL INFORMATION	
Well Locked?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Well Labeled?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Casing Strait?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Grout Seal Intact?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Not Visible <input type="checkbox"/>
Repairs Necessary?	<input type="checkbox"/>
Casing Diameter:	2"
Water Level Before Purge:	4.08 ft
Total Depth of Well:	11.51 ft
Well Volume:	4.6 liters
Depth to Top of Pump:	9.50 ft
Water Level After Sample:	4.05 ft
Measurement Method:	Electric Water Level Indicator

SAMPLING INFORMATION	
Purging Method:	Bladder <input checked="" type="checkbox"/>
Sampling Method:	Bladder <input checked="" type="checkbox"/>
Dedicated Equipment?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
Duplicate Sample?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
Duplicate Sample ID:	---
Bottle List:	
1 Liter Raw	4- 1L Nitric
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge:	4 Sec.
Recover:	16 Sec.
PSI:	20

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate (ml/Min)	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10					Clarity, Color, Odor, Ect.
11 May 22											
	1400	Start of Well Purge									
	1405	6.68	5743	7.34	9.68	206.1	1.66	4.71	100.0	500.0	Clear
	1425	6.72	5613	7.39	10.42	215.7	3.07	7.01	100.0	2000.0	Clear
	1445	6.83	5649	7.45	10.02	187.2	2.94	8.97	100.0	2000.0	Clear
	1505	6.74	5671	7.40	9.74	178.5	2.01	Relaxing	100.0	2000.0	Clear
		Purged DM									
12 May 22											
	0607	Purged DM clear from line before sampling									
	0612	7.00	6727	7.39	10.03	179.3	87.25	4.05	100.0	500.0	Clear
Well Stabilized? YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>											
										Total Volume Purged: 7000.0 ml	

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
12 May 22	0612	7.00	6727	7.39	87.25	Clear

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
 Groundwater Assessment

Company: MDU Lewis & Clark
 Event: March 2022
 Sample ID: 118
 Sampling Personal: Jerry Meyer

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

WELL INFORMATION				SAMPLING INFORMATION			
Well Locked?	YES	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Purging Method:	Bladder		
Well Labeled?	YES	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sampling Method:	Bladder		
Casing Strait?	YES	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Dedicated Equipment?	YES	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Grout Seal Intact?	YES	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Not Visible			Control Settings:
Repairs Necessary?				Duplicate Sample?	YES	<input checked="" type="checkbox"/>	Purge: 4 Sec.
Casing Diameter:	2"			Duplicate Sample ID:			
Water Level Before Purge:	7.96 ft			Bottle List:			
Total Depth of Well:	ft			1 Liter Raw 4- 1L Nitric			
Well Volume:	liters			500ml Nitric			
Depth to Top of Pump:	ft			500ml Nitric (filtered)			
Water Level After Sample:	8.04 ft			250ml Sulfuric			
Measurement Method:	Electric Water Level Indicator						

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate (ml/Min)	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10					clear, slightly turbid, turbid
	0915	Start of Well Purge									
12 May 22	0920	10.55	1525	7.33	3.02	190.9	15.14	8.00	100.0	500.0	Clear
	0950	8.00	1447	7.47	4.10	129.0	19.02	8.02	100.0	300.0	Clear
	1010	7.87	1373	7.49	4.14	114.7	5.41	8.02	100.0	200.0	Clear
	1015	7.80	1379	7.49	4.15	113.5	3.53	8.03	100.0	500.0	Clear
	1020	7.73	1378	7.49	4.19	112.5	3.27	8.03	100.0	500.0	Clear
	1025	7.84	1377	7.49	4.21	112.2	2.53	8.03	100.0	500.0	Clear
Well Stabilized?		<input checked="" type="checkbox"/> YES		NO							
										Total Volume Purged: 7000.0 mL	

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH		Turbidity (NTU)	Appearance or Comment
12 May 22	1025	7.84	1377	7.49		2.53	Clear

Comments: Collected field blank @ 0925

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: March 2022
 Sample ID: ~~120~~ 120
 Sampling Personal: J. J. [Signature]

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 <u>Not Visible</u>
Repairs Necessary?	
Casing Diameter:	2"
Water Level Before Purge:	14.15 ft
Total Depth of Well:	— ft
Well Volume:	— liters
Depth to Top of Pump:	— ft
Water Level After Sample:	14.32 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:	4 Sec.
Recover:	56 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 (ft)	Pumping Rate (ml/Min)	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10					Clarity, Color, Odor, Ect.
	12:18	Start of Well Purge									
11 Mar 22	12:23	7.93	7794	6.78	0.48	185.5	101	14.22	100.0	500.0	Clear
	12:33	7.60	7407	6.79	0.75	187.3	1.80	14.25	100.0	1000.0	Clear
	12:38	7.53	7237	6.78	0.81	188.4	0.67	14.26	100.0	500.0	Clear
	12:43	7.37	7029	6.79	0.91	189.0	1.27	14.28	100.0	500.0	Clear
	12:48	7.21	6674	6.80	1.35	188.8	1.47	14.29	100.0	500.0	Clear
	12:53	7.29	6630	6.80	1.39	188.6	0.98	14.30	100.0	500.0	Clear
	12:58	7.29	6579	6.80	1.46	188.4	0.65	14.30	100.0	500.0	Clear
Well Stabilized?		YES NO		Total Volume Purged: 4,000.0 mL							

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
11 Mar 22	12:58	7.29	6579	6.80	0.65	Clear

Comments:

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Account #: 2800 **Client:** Montana-Dakota Utilities - Bismarck
Workorder: MDU Lewis & Clark Spring 2022 (1072) **PO:** 190709 OP

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

CCR_APP IV

Certificate of Analysis

Approval

All data reported has been reviewed and approved by:

C. Carroll

Claudette Carroll, Lab Manager Bismarck, ND

Analyses performed under Minnesota Department of Health Accreditation conforms to the current TNI standards.

NEW ULM LAB CERTIFICATIONS:
MN LAB # 027-015-125 ND WW/DW # R-040

BISMARCK LAB CERTIFICATIONS:
MN LAB # 038-999-267 ND W/DW # ND-016

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Workorder Summary

Workorder Comments

All analytes with dilution factors greater than 1 (displayed in DF column) required dilution due to matrix or high concentration of target analyte unless otherwise noted and reporting limits (RDL column) have been adjusted accordingly.

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072001 **Date Collected:** 05/11/2022 16:47 **Matrix:** Groundwater
Sample ID: MW103 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6**Method: EPA 245.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	05/19/2022 08:35	05/19/2022 12:00	MDE	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.0487	mg/L	0.02	1	05/13/2022 17:00	05/24/2022 12:41	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	0.0054	mg/L	0.001	5	05/13/2022 17:00	06/07/2022 11:21	MDE	MA,NDA	
Arsenic	0.0023	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:21	MDE	MA,NDA	
Barium	0.0359	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:21	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:21	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:21	MDE	MA,NDA	
Chromium	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:21	MDE	MA,NDA	
Cobalt	0.0073	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:21	MDE	MA,NDA	
Lead	0.0007	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:21	MDE	MA,NDA	
Molybdenum	0.0193	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:21	MDE	MA,NDA	
Selenium	0.0328	mg/L	0.005	5	05/13/2022 17:00	06/07/2022 11:21	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:21	MDE	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072002 **Date Collected:** 05/11/2022 08:05 **Matrix:** Groundwater
Sample ID: MW110 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6**Method: EPA 245.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	05/19/2022 08:35	05/19/2022 12:00	MDE	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.0326	mg/L	0.02	1	05/13/2022 17:00	05/24/2022 12:43	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	05/13/2022 17:00	06/07/2022 11:23	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:23	MDE	MA,NDA	
Barium	0.0319	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:23	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:23	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:23	MDE	MA,NDA	
Chromium	0.0021	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:23	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:23	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:23	MDE	MA,NDA	
Molybdenum	0.0032	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:23	MDE	MA,NDA	
Selenium	<0.005	mg/L	0.005	5	05/13/2022 17:00	06/07/2022 11:23	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:23	MDE	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072003 **Date Collected:** 05/11/2022 10:25 **Matrix:** Groundwater
Sample ID: MW119 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6**Method: EPA 245.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	05/19/2022 08:35	05/19/2022 12:00	MDE	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.0343	mg/L	0.02	1	05/13/2022 17:00	05/24/2022 12:45	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	05/13/2022 17:00	06/07/2022 11:26	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:26	MDE	MA,NDA	
Barium	0.0284	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:26	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:26	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:26	MDE	MA,NDA	
Chromium	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:26	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:26	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:26	MDE	MA,NDA	
Molybdenum	0.0034	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:26	MDE	MA,NDA	
Selenium	<0.005	mg/L	0.005	5	05/13/2022 17:00	06/07/2022 11:26	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:26	MDE	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072004 **Date Collected:** 05/12/2022 08:13 **Matrix:** Groundwater
Sample ID: MW111 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service
Temp @ Receipt (C): 0.6 **Received on Ice:** Yes

Method: EPA 245.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	05/19/2022 08:35	05/19/2022 12:00	MDE	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.166	mg/L	0.02	1	05/13/2022 17:00	05/24/2022 12:47	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	05/13/2022 17:00	06/07/2022 11:29	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:29	MDE	MA,NDA	
Barium	0.0189	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:29	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:29	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:29	MDE	MA,NDA	
Chromium	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:29	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:29	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:29	MDE	MA,NDA	
Molybdenum	0.0553	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:29	MDE	MA,NDA	
Selenium	0.0567	mg/L	0.005	5	05/13/2022 17:00	06/07/2022 11:29	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:29	MDE	MA,NDA	

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1072005 **Date Collected:** 05/12/2022 06:12 **Matrix:** Groundwater
Sample ID: MW117 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6

Method: EPA 245.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	05/19/2022 08:35	05/19/2022 12:00	MDE	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.118	mg/L	0.1	5	05/13/2022 17:00	05/24/2022 12:48	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	05/13/2022 17:00	06/07/2022 11:44	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:44	MDE	MA,NDA	
Barium	0.0130	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:44	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:44	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:44	MDE	MA,NDA	
Chromium	0.0042	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:44	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:44	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:44	MDE	MA,NDA	
Molybdenum	0.0042	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:44	MDE	MA,NDA	
Selenium	0.0310	mg/L	0.005	5	05/13/2022 17:00	06/07/2022 11:44	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:44	MDE	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072006 **Date Collected:** 05/12/2022 10:25 **Matrix:** Groundwater
Sample ID: MW118 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service
Temp @ Receipt (C): 0.6 **Received on Ice:** Yes

Method: EPA 245.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	05/19/2022 08:35	05/19/2022 12:00	MDE	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.0683	mg/L	0.02	1	05/13/2022 17:00	05/24/2022 12:54	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	05/13/2022 17:00	06/07/2022 11:56	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:56	MDE	MA,NDA	
Barium	0.0252	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:56	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:56	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:56	MDE	MA,NDA	
Chromium	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:56	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:56	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:56	MDE	MA,NDA	
Molybdenum	0.0368	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:56	MDE	MA,NDA	
Selenium	0.0584	mg/L	0.005	5	05/13/2022 17:00	06/07/2022 11:56	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:56	MDE	MA,NDA	

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Report Date: Thursday, July 14, 2022 8:36:24 AM

**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

**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072007 **Date Collected:** 05/11/2022 12:58 **Matrix:** Groundwater
Sample ID: MW120 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6**Method: EPA 245.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	05/19/2022 08:35	05/19/2022 12:00	MDE	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.129	mg/L	0.1	5	05/13/2022 17:00	05/24/2022 12:55	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	05/13/2022 17:00	06/07/2022 11:59	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:59	MDE	MA,NDA	
Barium	0.0190	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:59	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:59	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:59	MDE	MA,NDA	
Chromium	0.0030	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:59	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:59	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:59	MDE	MA,NDA	
Molybdenum	0.0031	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 11:59	MDE	MA,NDA	
Selenium	0.0131	mg/L	0.005	5	05/13/2022 17:00	06/07/2022 11:59	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 11:59	MDE	MA,NDA	

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 www.MVTL.com

**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072008 **Date Collected:** 05/11/2022 10:25 **Matrix:** Groundwater
Sample ID: Dup 1 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 0.6**Method: EPA 245.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	05/19/2022 08:35	05/19/2022 12:00	MDE	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.0352	mg/L	0.02	1	05/13/2022 17:00	05/24/2022 12:57	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	05/13/2022 17:00	06/07/2022 12:02	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 12:02	MDE	MA,NDA	
Barium	0.0270	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 12:02	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 12:02	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 12:02	MDE	MA,NDA	
Chromium	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 12:02	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 12:02	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 12:02	MDE	MA,NDA	
Molybdenum	0.0034	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 12:02	MDE	MA,NDA	
Selenium	<0.005	mg/L	0.005	5	05/13/2022 17:00	06/07/2022 12:02	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 12:02	MDE	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 1072009 **Date Collected:** 05/12/2022 09:25 **Matrix:** Groundwater
Sample ID: Field Blank (FB) **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service
Temp @ Receipt (C): 0.6 **Received on Ice:** Yes

Method: EPA 245.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	05/19/2022 08:35	05/19/2022 12:00	MDE	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	<0.02	mg/L	0.02	1	05/13/2022 17:00	05/24/2022 12:59	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	05/13/2022 17:00	06/07/2022 12:05	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 12:05	MDE	MA,NDA	
Barium	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 12:05	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 12:05	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 12:05	MDE	MA,NDA	
Chromium	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 12:05	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 12:05	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 12:05	MDE	MA,NDA	
Molybdenum	<0.002	mg/L	0.002	5	05/13/2022 17:00	06/07/2022 12:05	MDE	MA,NDA	
Selenium	<0.005	mg/L	0.005	5	05/13/2022 17:00	06/07/2022 12:05	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	05/13/2022 17:00	06/07/2022 12:05	MDE	MA,NDA	

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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May 19, 2022

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

RE: MDU Lewis & Clark Groundwater Sampling

Dear Mr. Peterson,

From May 11-12, 2022, MVTL Field Services division collected ground water samples at the MDU Lewis and Clark Station near Sidney, MT. A duplicate sample was collected from well 119. Samples collected were placed on ice and transported to MVTL in Bismarck, ND for analysis.

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

Sincerely,

Jeremy Meyer

MVTL Field Services Manager

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

	Minnesota Valley Testing Laboratories 2616 E. Broadway Ave Bismarck, ND 58501 (701) 258-9720	Montana - Dakota Utilities - Bis WO: 1072 	Chain of Custody Record 1072
	Report To: MDU Attn: Todd Peterson Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-425-2427 Email: Todd.Peterson@mdu.com		Project Name: MDU Lewis & Clark Event: Spring 2022 Sampled By: <i>Jeremy</i>

Report To: MDU Attn: Todd Peterson Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-425-2427 Email: Todd.Peterson@mdu.com	CC:	Project Name: MDU Lewis & Clark Event: Spring 2022 Sampled By: <i>Jeremy</i>
--	-----	--

Lab Number	Sample ID	Sample Information		Sample Type	Sample Containers				Field Readings				Analysis Required
		Date	Time		1 Liter Raw	500 mL HNO3	500 mL HNO3 (filtered)	250 mL H2SO4	Temp (°C)	Spec. Cond.	pH	Turbidity (NTU)	
001	MW103	11 May 22	1647	GW	X	X	X	X	8.47	1170	7.39	4.33	MDU Lewis & Clark List
002	MW110	11 May 22	0805	GW	X	X	X	X	7.78	989	7.41	3.41	
003	MW119	11 May 22	1025	GW	X	X	X	X	7.46	971	7.39	1.66	
004	MW111	12 May 22	0813	GW	X	X	X	X	7.75	3106	7.27	1.66	
005	MW117	12 May 22	0612	GW	X	X	X	X	7.00	6727	7.79	5725	
006	MW118	12 May 22	1025	GW	X	X	X	X	7.84	1377	7.49	2.53	
007	MW120	11 May 22	1258	GW	X	X	X	X	7.29	6579	6.80	0.65	
008	Dup 1	11 May 22	1025	GW	X	X	X	X	7.46	971	7.39	1.66	
009	Field Blank (FB)	12 May 22	0925	GW	X	X	X	X	NA	NA	NA	NA	

Comments:

	Relinquished By		Sample Condition		Received By	
	Name	Date/Time	Location	Temp (°C)	Name	Date/Time
1	<i>[Signature]</i>	13 May 22 0805	LOG In Walk In #2	0.6 TM562 / TM805	<i>[Signature]</i>	13 May 22 0805
2						

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
Surface water Assessment

Company: MDU Lewis & Clark
Event: March 2022 Spring 2022
Sampling Personal: Jay Ph

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	12/12/22	0558	2"	8.50	
MW105		1307	2"	8.35	
MW106		1305	2"	8.95	
MW107		0556	2"	4.00	
MW108		1302	2"	16.40	
MW116		0600	2"	12.08	

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: **MDU Lewis & Clark**
 Event: **March 2022**
 Sample ID: 103
 Sampling Personal: J. H. Hays

Weather Conditions: Temp: _____ °F Wind: _____ @ _____ Precip: **Sunny / Partly Cloudy / Cloudy**

WELL INFORMATION			
Well Locked?	YES	NO	<u>NO</u>
Well Labeled?	YES	NO	
Casing Strait?	YES	NO	
Grout Seal Intact?	YES	NO	<u>Not Visible</u>
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	10.18	ft	
Total Depth of Well:		ft	
Well Volume:		liters	
Depth to Top of Pump:		ft	
Water Level After Sample:	10.20	ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION			
Purging Method:	Bladder		
Sampling Method:	Bladder		
Dedicated Equipment?	YES	NO	<u>NO</u>
Duplicate Sample?	YES	NO	<u>NO</u>
Duplicate Sample ID:			
Bottle List:			
1 Liter Raw	4- 1L Nitric		
500mL Nitric			
500mL Nitric (filtered)			
250mL Sulfuric			

Control Settings:	
Purge:	4 Sec.
Recover:	56 Sec.
PSI:	20

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate mL/Min	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10					clear, slightly turbid, turbid
11 Mar 22	15:12	Start of Well Purge									
	15:17	4.08	1822	7.40	2.06	134.6	97.62	10.15	100.0	500.0	Clear
	15:47	8.56	1249	7.37	0.49	134.3	27.49	10.17	100.0	3000.0	Clear
	16:07	8.41	1207	7.39	1.14	103.9	14.38	10.18	100.0	2000.0	Clear
	16:27	8.39	1183	7.39	1.73	102.3	8.71	10.20	100.0	2000.0	Clear
	16:37	8.51	1174	7.39	1.86	106.3	4.71	10.18	100.0	1000.0	Clear
	16:47	8.50	1173	7.39	1.87	106.7	4.67	10.19	100.0	500.0	Clear
	16:47	8.47	1170	7.39	1.87	106.6	4.73	10.19	100.0	500.0	Clear
Well Stabilized?		YES	NO	Total Volume Purged: <u>9500.0</u> mL							

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment Clarity, Color, Odor, Ect.
11 Mar 22	16:47	8.47	1170	7.39	4.73	Clear

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
Groundwater Assessment

Company: MDU Lewis & Clark
Event: March 2022
Sample ID: 110
Sampling Personal: J. [Signature]

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

WELL INFORMATION table with fields: Well Locked?, Well Labeled?, Casing Strait?, Grout Seal Intact?, Repairs Necessary?, Casing Diameter, Water Level Before Purge, Total Depth of Well, Well Volume, Depth to Top of Pump, Water Level After Sample, Measurement Method.

SAMPLING INFORMATION table with fields: Purging Method, Sampling Method, Dedicated Equipment?, Duplicate Sample?, Duplicate Sample ID, Bottle List.

Control Settings table with fields: Purge, Recover, PSI.

FIELD READINGS

FIELD READINGS table with columns: Purge Date, Time, Temp, Spec. Cond., pH, DO, ORP, Turbidity, Water Level, Pumping Rate, mL Removed, Appearance or Comment.

Summary table with columns: Sample Date, Time, Temp, Spec. Cond., pH, Turbidity, Appearance or Comment.

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
Groundwater Assessment

Company: MDU Lewis & Clark
Event: March 2022
Sample ID: 119
Sampling Personal: Jeremy Payer

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

WELL INFORMATION table with fields: Well Locked?, Well Labeled?, Casing Strait?, Grout Seal Intact?, Repairs Necessary?, Casing Diameter, Water Level Before Purge, Total Depth of Well, Well Volume, Depth to Top of Pump, Water Level After Sample, Measurement Method.

SAMPLING INFORMATION table with fields: Purging Method, Sampling Method, Dedicated Equipment?, Duplicate Sample?, Duplicate Sample ID, Bottle List.

Control Settings table with fields: Purge, Recover, PSI.

FIELD READINGS

FIELD READINGS table with columns: Purge Date, Time, Temp, Spec. Cond., pH, DO, ORP, Turbidity, Water Level, Pumping Rate, mL Removed, Appearance or Comment.

Summary table with columns: Sample Date, Time, Temp, Spec. Cond., pH, Turbidity, Appearance or Comment.

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
 Groundwater Assessment

Company: **MDU Lewis & Clark**
 Event: **March 2022**
 Sample ID: _____
 Sampling Personal: [Signature]

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

WELL INFORMATION		
Well Locked?	YES <input type="checkbox"/> NO	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Well Labeled?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Casing Strait?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Grout Seal Intact?	YES <input type="checkbox"/> NO	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
Repairs Necessary?	Not Visible	
Casing Diameter:	2"	
Water Level Before Purge:	7.25 ft	
Total Depth of Well:	— ft	
Well Volume:	— liters	
Depth to Top of Pump:	— ft	
Water Level After Sample:	7.40 ft	
Measurement Method:	Electric Water Level Indicator	

SAMPLING INFORMATION	
Purging Method:	Bladder
Sampling Method:	Bladder
Dedicated Equipment?	YES <input type="checkbox"/> NO
Duplicate Sample?	YES <input type="checkbox"/> NO
Duplicate Sample ID:	—
Bottle List:	
1 Liter Raw	4- 1L Nitric
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	

Control Settings:	
Purge:	4 Sec.
Recover:	56 Sec.
PSI:	20

FIELD READINGS

Stabilization Parameters (3 Consecutive)	Time	Temp. (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate ml/Min	mL Removed	Appearance or Comment
											Clear, Color, Odor, Ect.
Start of Well Purge											
	0718										
	0723	9.13	4205	7.05	0.54	208.7	114.36	7.36	100.0	500.0	Clear
	0753	7.63	3338	7.19	1.63	210.0	33.26	7.36	100.0	500.0	Clear
	0803	7.69	3083	7.26	2.50	210.7	1.69	7.40	100.0	1000.0	Clear
	0808	7.68	3085	7.26	2.51	210.4	1.54	7.41	100.0	500.0	Clear
	0813	7.75	3106	7.27	2.59	207.9	1.66	7.41	100.0	500.0	Clear
Well Stabilized? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO											
										Total Volume Purged: 5500.0 mL	

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate ml/Min	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.
12/2/22	0813	7.75	3106	7.27			1.66				Clear

Comments: _____

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: March 2022
 Sample ID:
 Sampling Personal: *J. Kelly*

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:	4.08	ft	
Total Depth of Well:	11.51	ft	
Well Volume:	4.6	liters	
Depth to Top of Pump:	9.50	ft	
Water Level After Sample:		ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION			
Purging Method:	Bladder	Control Settings:	
Sampling Method:	Bladder	Purge:	4 Sec.
Dedicated Equipment?	YES	Recover:	16 Sec.
		PSI:	20
Duplicate Sample?	YES	NO	
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 (ft)	Pumping Rate (ml/Min)	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10					Clarity, Color, Odor, Ect.
11 May 22		Start of Well Purge									
	1400										
	1405	6.68	5743	7.34	9.68	206.1	1.66	4.71	100.0	500.0	Clear
	1425	6.72	5613	7.39	10.42	215.7	3.07	7.01	100.0	2000.0	Clear
	1445	6.83	5649	7.45	10.02	187.2	2.94	8.97	100.0	2000.0	Clear
	1505	6.74	5671	7.40	9.74	178.5	2.01	Relax	100.0	2000.0	Clear
12 May 22		Purged DM									
	0607							4.05			
	0612	7.00	6727	7.39	10.03	179.3	87.25	5.00	100.0	500.0	Clear
		Well Stabilized? YES (NO)									
										Total Volume Purged: 7000.0 ml	

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH		Turbidity (NTU)		Appearance or Comment
								Clarity, Color, Odor, Ect.
12 May 22	0612	7.00	6727	7.39		87.25		Clear

Comments:

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Report Date: Thursday, July 14, 2022 8:36:24 AM



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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
Groundwater Assessment

Company: MDU Lewis & Clark
Event: March 2022
Sample ID: 118
Sampling Personal: Jerry Meyer

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

WELL INFORMATION table with rows for Well Locked?, Well Labeled?, Casing Strait?, Grout Seal Intact?, Repairs Necessary?, Casing Diameter, Water Level Before Purge, Total Depth of Well, Well Volume, Depth to Top of Pump, Water Level After Sample, Measurement Method.

SAMPLING INFORMATION table with rows for Purging Method, Sampling Method, Dedicated Equipment?, Duplicate Sample?, Duplicate Sample ID, and Bottle List.

Control Settings table with rows for Purge, Recover, and PSI.

FIELD READINGS

FIELD READINGS table with columns for Purge Date, Time, Temp, Spec. Cond., pH, DO, ORP, Turbidity, Water Level, Pumping Rate, mL Removed, Appearance or Comment.

Summary table with columns for Sample Date, Time, Temp, Spec. Cond., pH, Turbidity, Appearance or Comment.

Comments: Collected Field Blank @ 0925

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: March 2022
 Sample ID: ~~120~~ 120
 Sampling Personal: J. J. [Signature]

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

WELL INFORMATION	
Well Locked?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Well Labeled?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Casing Strait?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Grout Seal Intact?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> <u>Not Visible</u>
Repairs Necessary?	
Casing Diameter:	2"
Water Level Before Purge:	14.15 ft
Total Depth of Well:	— ft
Well Volume:	— liters
Depth to Top of Pump:	— ft
Water Level After Sample:	14.32 ft
Measurement Method:	Electric Water Level Indicator

SAMPLING INFORMATION	
Purging Method:	Bladder
Sampling Method:	Bladder
Dedicated Equipment?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Duplicate Sample?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Duplicate Sample ID:	—
Control Settings:	
Purge:	4 Sec.
Recover:	56 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 (ft)	Pumping Rate (ml/Min)	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10					Clarity, Color, Odor, Ect.
	12:18	Start of Well Purge									
11 Mar 22	12:23	7.93	7794	6.78	0.48	185.5	101	14.22	100.0	500.0	Clear
	12:33	7.60	7407	6.79	0.75	187.3	1.80	14.25	100.0	1000.0	Clear
	12:38	7.53	7237	6.78	0.81	188.4	0.67	14.26	100.0	500.0	Clear
	12:43	7.37	7029	6.79	0.91	189.0	1.27	14.28	100.0	500.0	Clear
	12:48	7.21	6674	6.80	1.35	188.8	1.47	14.29	100.0	500.0	Clear
	12:53	7.29	6630	6.80	1.39	188.6	0.98	14.30	100.0	500.0	Clear
	12:58	7.29	6579	6.80	1.46	188.4	0.65	14.30	100.0	500.0	Clear
Well Stabilized?		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>		Total Volume Purged: 4,000.0 mL							

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
11 Mar 22	12:58	7.29	6579	6.80	0.65	Clear

Comments:

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Account #: 2800 **Client:** Montana-Dakota Utilities - Bismarck
Workorder: MDU Lewis & Clark (1071) **PO:** 190709 OP

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

Certificate of Analysis

Approval

All data reported has been reviewed and approved by:

Claudette Carroll, Lab Manager Bismarck, ND

Analyses performed under Minnesota Department of Health Accreditation conforms to the current TNI standards.

NEW ULM LAB CERTIFICATIONS:
MN LAB # 027-015-125 ND WW/DW # R-040

BISMARCK LAB CERTIFICATIONS:
MN LAB # 038-999-267 ND W/DW # ND-016 SD SDWA

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1071001 **Date Collected:** 05/11/2022 16:47 **Matrix:** Groundwater
Sample ID: MW103 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 9.2

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		
Radium 228	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1071002 **Date Collected:** 05/11/2022 08:05 **Matrix:** Groundwater
Sample ID: MW110 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 9.2

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		
Radium 228	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1071003 **Date Collected:** 05/11/2022 10:25 **Matrix:** Groundwater
Sample ID: MW119 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 9.2

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		
Radium 228	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1071004 **Date Collected:** 05/12/2022 08:13 **Matrix:** Groundwater
Sample ID: MW111 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 9.2

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		
Radium 228	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1071005 **Date Collected:** 05/12/2022 06:12 **Matrix:** Groundwater
Sample ID: MW117 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 9.2

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		
Radium 228	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1071006 **Date Collected:** 05/12/2022 10:25 **Matrix:** Groundwater
Sample ID: MW118 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 9.2

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		
Radium 228	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1071007 **Date Collected:** 05/11/2022 12:58 **Matrix:** Groundwater
Sample ID: MW120 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 9.2

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		
Radium 228	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1071008 **Date Collected:** 05/11/2022 **Matrix:** Groundwater
Sample ID: Dup 1 **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 9.2

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		
Radium 228	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 1071009 **Date Collected:** 05/12/2022 09:25 **Matrix:** Groundwater
Sample ID: Field Blank **Date Received:** 05/13/2022 08:05 **Collector:** MVTL Field Service

Temp @ Receipt (C): 9.2

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		
Radium 228	See Attached			1	06/28/2022 08:20	06/28/2022 08:20	CC		

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www.MVTL.com



Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



June 15, 2022

Claudette Carroll

2616 E Broadway Ave
Bismarck, North Dakota 58501

Re: Routine Analysis - Radiochemistry
Work Order: 580421
SDG: 1071

Dear Claudette Carroll:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 19, 2022. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 1614.

Sincerely,

Joanne Harley for
Delaney Stone
Project Manager

Purchase Order: BL6542
Enclosures





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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

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Case Narrative



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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Receipt Narrative
for
Minnesota Valley Testing Laboratories, Inc.
SDG: 1071
Work Order: 580421

June 15, 2022

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on May 19, 2022 for analysis. The samples were delivered with proper chain of custody documentation and signatures. The samples were screened according to GEL Standard Operating Procedure. All sample containers arrived without any visible signs of tampering or breakage. Containers were checked for pH, where appropriate, and matched the preservative as documented on the accompanying chain of custody. Shipping container temperatures were checked, documented, and within specifications. Samples were received within the specified holding time. There are no additional comments concerning sample receipt. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification: The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
580421001	MW103
580421002	MW110
580421003	MW119
580421004	MW111
580421005	MW117
580421006	MW118
580421007	MW120
580421008	Dup 1
580421009	Field Blank

Case Narrative:

Sample analyses were conducted using methodology as outlined in GEL's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Radiochemistry.

A handwritten signature in blue ink that reads "Joanne Harley".

Joanne Harley for
Delaney Stone
Project Manager



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Chain of Custody and Supporting Documentation

Page 4 of 26 SDG: 1071

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Page 1 of 1

580421
Chain of Custody Record

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

Phone: (701) 258-9720
Fax: (701) 258-9724

Company Name and Address:

MVTL
2616 E Broadway
Bismarck, ND 58501

PO Box 249
New Ulm, MN 56073

Billing Address (indicate if different from above):

Account #: **WO #1071**

Phone #: **701-258-9720**

Fax #: **701-258-9720**

Contact: **Claudette**

Name of Sampler: **gcarroll@mvtl.com**

Quote Number: **13-May-22**

Project Name/Number: **BL6542**

Purchase Order #: **Analysis**

IML Lab Number	MVTL Lab Number	Client Sample ID	Sample Type	Date Sampled	Time Sampled	Bottle Type				Analysis Required	
						Untreated	1000 ml HNO3	VOC Vials	Unpreserved		Glass Jar
	1071001	MW103	GW	11-May-22	1647	4					Ra226 & Ra228
	1071002	MW110	GW	11-May-22	805	4					Ra226 & Ra228
	1071003	MW119	GW	11-May-22	1025	4					Ra226 & Ra228
	1071004	MW111	GW	12-May-22	813	4					Ra226 & Ra228
	1071005	MW117	GW	12-May-22	612	4					Ra226 & Ra228
	1071006	MW118	GW	12-May-22	1025	4					Ra226 & Ra228
	1071007	MW120	GW	11-May-22	1258	4					Ra226 & Ra228
	1071008	Dup 1	GW	11-May-22	925	4					Ra226 & Ra228
	1071009	Field Blank	GW	12-May-22	925	4					Ra226 & Ra228

All results must be reported as a numerical value

Transferred by: **T. Olson**

Date: **13-May-22**

Time: **1700**

Sample Condition: **Temp: 1008**

Received by: **[Signature]**

Date: **5-14-22**

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

GEL Laboratories LLC SAMPLE RECEIPT & REVIEW FORM
Client: MVTL
SDG/AR/COC/Work Order: 500-412
Received By: DC
Date Received: 5-19-22
Carrier and Tracking Number: 1Z5559010360891269, 1Z5559010365159879
Suspected Hazard Information: No
A) Shipped as a DOT Hazardous? No
B) Did the client designate the samples are to be received as radioactive? No
C) Did the RSO classify the samples as radioactive? No
D) Did the client designate samples are hazardous? No
E) Did the RSO identify possible hazards? No
Sample Receipt Criteria: 1 Shipping containers received intact and sealed? Yes
2 Chain of custody documents included with shipment? Yes
3 Samples requiring cold preservation within (0 < 6 deg. C)?* Yes
4 Daily check performed and passed on IR temperature gun? Yes
5 Sample containers intact and sealed? Yes
6 Samples requiring chemical preservation at proper pH? Yes
7 Do any samples require Volatile Analysis? Yes
8 Samples received within holding time? Yes
9 Sample ID's on COC match ID's on bottles? Yes
10 Date & time on COC match date & time on bottles? Yes
11 Number of containers received match number indicated on COC? Yes
12 Are sample containers identifiable as GEL provided by use of GEL labels? Yes
13 COC form is properly signed in relinquished/received sections? Yes
Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials JML Date 5/23/22 Page 1 of 1

GL-CHL-SR-001 Rev 7

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Laboratory Certifications



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List of current GEL Certifications as of 15 June 2022

State	Certification
Alabama	42200
Alaska	17-018
Alaska Drinking Water	SC00012
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (A133904)
Maine	2019020
Maryland	270
Massachusetts	M-SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122022-4
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2019-165
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-22-20
Utah NELAP	SC000122021-36
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Radiological Analysis



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Case Narrative



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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Radiochemistry
Technical Case Narrative
Minnesota Valley Testing Laboratories, Inc.
SDG #: 1071
Work Order #: 580421

Product: GFPC Ra228, Liquid
Analytical Method: EPA 904.0/SW846 9320 Modified
Analytical Procedure: GL-RAD-A-063 REV# 5
Analytical Batch: 2269599

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
580421001	MW103
580421002	MW110
580421003	MW119
580421004	MW111
580421005	MW117
580421006	MW118
580421007	MW120
580421008	Dup 1
580421009	Field Blank
1205099226	Method Blank (MB)
1205099227	580421001(MW103) Sample Duplicate (DUP)
1205099228	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Product: Lucas Cell, Ra226, Liquid
Analytical Method: EPA 903.1 Modified
Analytical Procedure: GL-RAD-A-008 REV# 15
Analytical Batch: 2269591

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
580421001	MW103
580421002	MW110
580421003	MW119
580421004	MW111
580421005	MW117
580421006	MW118

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

580421007	MW120
580421008	Dup 1
580421009	Field Blank
1205099213	Method Blank (MB)
1205099214	580421001(MW103) Sample Duplicate (DUP)
1205099215	580421001(MW103) Matrix Spike (MS)
1205099216	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

There are no exceptions, anomalies or deviations from the specified methods. All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.



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Client: Montana-Dakota Utilities - Bismarck

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

**Qualifier Definition Report
for**

MVTL001 Minnesota Valley Testing Laboratories, Inc.
Client SDG: 1071 GEL Work Order: 580421

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 	Name: Theresa Austin
Date: 16 JUN 2022	Title: Group Leader



MINNESOTA VALLEY TESTING LABORATORIES, INC.

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Client: Montana-Dakota Utilities - Bismarck

Sample Data Summary

Page 14 of 26 SDG: 1071

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Account #: 2800

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GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: June 15, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: MW103
Sample ID: 580421001
Matrix: Ground Water
Collect Date: 11-MAY-22 16:47
Receive Date: 19-MAY-22
Collector: Client

Project: MVTL00121
Client ID: MVTL001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC Ra228, Liquid "As Received"													
Radium-228	U	0.712	+/-1.06	1.82	3.00	pCi/L		JXC9	06/08/22	1028	2269599		1
Rad Radium-226													
Lucas Cell, Ra226, Liquid "As Received"													
Radium-226		0.575	+/-0.251	0.200	1.00	pCi/L		LXP1	06/14/22	1000	2269591		2

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	EPA 904.0/SW846 9320 Modified		
2	EPA 903.1 Modified		

Surrogate/Tracer	Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer		GFPC Ra228, Liquid "As Received"			94.2	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: June 15, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: MW110 Project: MVTL00121
Sample ID: 580421002 Client ID: MVTL001
Matrix: Ground Water
Collect Date: 11-MAY-22 08:05
Receive Date: 19-MAY-22
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC Ra228, Liquid "As Received"													
Radium-228	U	0.907	+/-0.951	1.57	3.00	pCi/L		JXC9	06/08/22	1028	2269599		1
Rad Radium-226													
Lucas Cell, Ra226, Liquid "As Received"													
Radium-226	U	0.287	+/-0.225	0.317	1.00	pCi/L		LXP1	06/14/22	1000	2269591		2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer	Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer		GFPC Ra228, Liquid "As Received"			76	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: June 15, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: MW119
Sample ID: 580421003
Matrix: Ground Water
Collect Date: 11-MAY-22 10:25
Receive Date: 19-MAY-22
Collector: Client

Project: MVTL00121
Client ID: MVTL001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC Ra228, Liquid "As Received"													
Radium-228	U	1.06	+/-1.07	1.77	3.00	pCi/L		JXC9	06/08/22	1028	2269599		1
Rad Radium-226													
Lucas Cell, Ra226, Liquid "As Received"													
Radium-226		0.281	+/-0.195	0.259	1.00	pCi/L		LXP1	06/14/22	1000	2269591		2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer	Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer		GFPC Ra228, Liquid "As Received"			89.1	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: June 15, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: MW111
Sample ID: 580421004
Matrix: Ground Water
Collect Date: 12-MAY-22 08:13
Receive Date: 19-MAY-22
Collector: Client

Project: MVTL00121
Client ID: MVTL001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Rad Gas Flow Proportional Counting												
GFPC Ra228, Liquid "As Received"												
Radium-228	U	1.26	+/-1.03	1.64	3.00	pCi/L		JXC9	06/08/22	1028	2269599	1
Rad Radium-226												
Lucas Cell, Ra226, Liquid "As Received"												
Radium-226	U	0.232	+/-0.197	0.278	1.00	pCi/L		LXP1	06/14/22	1031	2269591	2
The following Analytical Methods were performed:												
Method	Description	Analyst Comments										
1	EPA 904.0/SW846 9320 Modified											
2	EPA 903.1 Modified											
Surrogate/Tracer	Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits						
Barium-133 Tracer		GFPC Ra228, Liquid "As Received"			86.4	(15%-125%)						

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

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Certificate of Analysis

Report Date: June 15, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: MW117
Sample ID: 580421005
Matrix: Ground Water
Collect Date: 12-MAY-22 06:12
Receive Date: 19-MAY-22
Collector: Client

Project: MVTL00121
Client ID: MVTL001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC Ra228, Liquid "As Received"													
Radium-228		2.16	+/-1.07	1.50	3.00	pCi/L			JXC9	06/08/22	1029	2269599	1
Rad Radium-226													
Lucas Cell, Ra226, Liquid "As Received"													
Radium-226		0.498	+/-0.266	0.306	1.00	pCi/L			LXP1	06/14/22	1031	2269591	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer	Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer		GFPC Ra228, Liquid "As Received"			87.9	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

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Certificate of Analysis

Report Date: June 15, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: MW118
Sample ID: 580421006
Matrix: Ground Water
Collect Date: 12-MAY-22 10:25
Receive Date: 19-MAY-22
Collector: Client

Project: MVTL00121
Client ID: MVTL001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Rad Gas Flow Proportional Counting												
GFPC Ra228, Liquid "As Received"												
Radium-228		2.36	+/-1.28	1.93	3.00	pCi/L			JXC9	06/08/22	1029 2269599	1
Rad Radium-226												
Lucas Cell, Ra226, Liquid "As Received"												
Radium-226		0.290	+/-0.197	0.222	1.00	pCi/L			LXP1	06/14/22	1031 2269591	2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer	Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer		GFPC Ra228, Liquid "As Received"			89.6	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Account #: 2800

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Certificate of Analysis

Report Date: June 15, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: MW120
Sample ID: 580421007
Matrix: Ground Water
Collect Date: 11-MAY-22 12:58
Receive Date: 19-MAY-22
Collector: Client

Project: MVTL00121
Client ID: MVTL001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC Ra228, Liquid "As Received"													
Radium-228	U	1.53	+/-1.04	1.61	3.00	pCi/L		JXC9	06/08/22	1029	2269599		1
Rad Radium-226													
Lucas Cell, Ra226, Liquid "As Received"													
Radium-226		0.569	+/-0.248	0.198	1.00	pCi/L		LXP1	06/14/22	1031	2269591		2
The following Analytical Methods were performed:													
Method	Description	Analyst Comments											
1	EPA 904.0/SW846 9320 Modified												
2	EPA 903.1 Modified												
Surrogate/Tracer	Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits							
Barium-133 Tracer		GFPC Ra228, Liquid "As Received"			88.6	(15%-125%)							

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:
DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

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Certificate of Analysis

Report Date: June 15, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: Dup 1
Sample ID: 580421008
Matrix: Ground Water
Collect Date: 11-MAY-22 00:00
Receive Date: 19-MAY-22
Collector: Client

Project: MVTL00121
Client ID: MVTL001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Rad Gas Flow Proportional Counting													
GFPC Ra228, Liquid "As Received"													
Radium-228	U	1.38	+/-1.02	1.59	3.00	pCi/L		JXC9	06/08/22	1029	2269599		1
Rad Radium-226													
Lucas Cell, Ra226, Liquid "As Received"													
Radium-226		0.466	+/-0.246	0.262	1.00	pCi/L		LXP1	06/14/22	1031	2269591		2

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	EPA 903.1 Modified	

Surrogate/Tracer	Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer		GFPC Ra228, Liquid "As Received"			91.2	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: June 15, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: Field Blank
Sample ID: 580421009
Matrix: Ground Water
Collect Date: 12-MAY-22 09:25
Receive Date: 19-MAY-22
Collector: Client

Project: MVTL00121
Client ID: MVTL001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Rad Gas Flow Proportional Counting												
GFPC Ra228, Liquid "As Received"												
Radium-228	U	0.802	+/-0.897	1.50	3.00	pCi/L		JXC9	06/08/22	1029	2269599	1
Rad Radium-226												
Lucas Cell, Ra226, Liquid "As Received"												
Radium-226	U	0.191	+/-0.193	0.302	1.00	pCi/L		LXP1	06/14/22	1031	2269591	2
The following Analytical Methods were performed:												
Method	Description	Analyst Comments										
1	EPA 904.0/SW846 9320 Modified											
2	EPA 903.1 Modified											
Surrogate/Tracer	Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits						
Barium-133 Tracer		GFPC Ra228, Liquid "As Received"			80.5	(15%-125%)						

Notes:
Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:
DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Quality Control Summary

Page 24 of 26 SDG: 1071

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Report Date: Thursday, June 30, 2022 1:55:41 PM

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: June 15, 2022

Page 1 of 2

Contact: 2616 E Broadway Ave
Bismarck, North Dakota
Claudette Carroll

Workorder: 580421

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	2269599										
QC1205099227	580421001	DUP									
Radium-228	U	0.712	U	1.00	pCi/L	N/A		N/A	JXC9	06/08/22	10:28
	Uncertainty	+/-1.06		+/-1.04							
QC1205099228	LCS										
Radium-228	45.9			43.0	pCi/L		93.7	(75%-125%)		06/08/22	10:28
	Uncertainty			+/-3.44							
QC1205099226	MB										
Radium-228			U	0.965	pCi/L					06/08/22	10:28
	Uncertainty			+/-1.21							
Rad Ra-226											
Batch	2269591										
QC1205099214	580421001	DUP									
Radium-226		0.575		0.633	pCi/L	9.66		(0% - 100%)	LXP1	06/14/22	11:04
	Uncertainty	+/-0.251		+/-0.319							
QC1205099216	LCS										
Radium-226	26.7			21.4	pCi/L		80.2	(75%-125%)		06/14/22	11:04
	Uncertainty			+/-1.48							
QC1205099213	MB										
Radium-226			U	0.177	pCi/L					06/14/22	11:04
	Uncertainty			+/-0.231							
QC1205099215	580421001	MS									
Radium-226	133	0.575		141	pCi/L		106	(75%-125%)		06/14/22	11:04
	Uncertainty	+/-0.251		+/-8.85							

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- ** Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

GEL LABORATORIES LLC

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QC Summary

Workorder: 580421

Page 2 of 2

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
J											
J											
K											
L											
M											
M											
N/A											
N1											
ND											
NJ											
Q											
R											
U											
UI											
UJ											
UL											
X											
Y											
^											
h											

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where the duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.



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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

	Minnesota Valley Testing Laboratories 2616 E. Broadway Ave Bismarck, ND 58501 (701) 258-9720	Montana - Dakota Utilities - Bismarck WO: 1071 	Chain of Custody Record
	Report To: MDU Attn: Todd Peterson Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-425-2427 Email: Todd.Peterson@mdu.com	CC:	Project Name: MDU Lewis & Clark Event: Spring 2022 Sampled By: <i>Jerry Peterson</i>

Lab Number	Sample Information				Sample Containers				Field Readings				Analysis Required
	Sample ID	Date	Time	Sample Type	1 Liter	Metric							
001	MW103	11 May 22	1647	GW	4								Rad 226 & 228
002	MW110	11 May 22	0805	GW	4								
003	MW119	11 May 22	1025	GW	4								
004	MW111	12 May 22	0813	GW	4								
005	MW117	12 May 22	0612	GW	4								
006	MW118	12 May 22	1025	GW	4								
007	MW120	11 May 22	1256	GW	4								
008	Dup 1	11 May 22	1025	GW	4								
009	Field Blank (FB)	12 May 22	0925	GW	4								

Comments:

Relinquished By		Sample Condition		Received By	
Name	Date/Time	Location	Temp (°C)	Name	Date/Time
<i>Jerry Peterson</i>	13 May 22 0805	Leg 1a Walk In #2	9.2 TMS62 / TMBDS	<i>[Signature]</i>	13 May 22 0805

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Report Date: Thursday, June 30, 2022 1:55:41 PM



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



Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



Field Datasheet
Surface water Assessment

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

Company: MDU Lewis & Clark
Event: March 2022 Spring 2022
Sampling Personal: *J. Clark*

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	12/2/22	0558	2"	8.50	
MW105		1307	2"	8.35	
MW106		1305	2"	8.95	
MW107		0556	2"	4.00	
MW108		1302	2"	16.40	
MW116		0600	2"	12.08	

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: March 2022
 Sample ID: 103
 Sampling Personal: J. J. [Signature]

Weather Conditions: Temp: _____ °F Wind: _____ @ Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION			SAMPLING INFORMATION		
Well Locked?	YES	NO	Purging Method:	Bladder	
Well Labeled?	YES	NO	Sampling Method:	Bladder	
Casing Strait?	YES	NO	Dedicated Equipment?	YES	NO
Grout Seal Intact?	YES	NO	Duplicate Sample?	YES	NO
Repairs Necessary?			Duplicate Sample ID:		
Casing Diameter:	2"		Bottle List:		
Water Level Before Purge:	10.18 ft		1 Liter Raw	4- 1L Nitric	
Total Depth of Well:	— ft		500mL Nitric		
Well Volume:	— liters		500mL Nitric (filtered)		
Depth to Top of Pump:	— ft		250mL Sulfuric		
Water Level After Sample:	10.20 ft				
Measurement Method:	Electric Water Level Indicator				
			Control Settings:		
			Purge:	4	Sec.
			Recover:	56	Sec.
			PSI:	20	

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate (mL/Min)	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10					Clarity, Color, Odor, Ect.
11 May 22	1512	Start of Well Purge									
	1517	9.08	1822	7.40	2.06	134.6	97.62	10.15	100.0	500.0	Clear
	1547	8.56	1249	7.37	0.49	134.3	27.49	10.17	100.0	3000.0	Clear
	1607	8.41	1207	7.39	1.14	103.9	14.30	10.18	100.0	2000.0	Clear
	1627	8.39	1183	7.39	1.33	102.3	8.71	10.20	100.0	2000.0	Clear
	1637	8.51	1174	7.39	1.06	106.3	4.71	10.18	100.0	1000.0	Clear
	1642	8.50	1173	7.39	1.87	106.7	4.67	10.19	100.0	500.0	Clear
	1647	8.47	1170	7.39	1.87	106.6	4.73	10.19	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
11 May 22	1647	8.47	1170	7.39	4.73	Clear

Comments: _____

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
Event: March 2022
Sample ID:
Sampling Personal: Jeremy Meyer

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

WELL INFORMATION table with fields: Well Locked?, Well Labeled?, Casing Strait?, Grout Seal Intact?, Repairs Necessary?, Casing Diameter, Water Level Before Purge, Total Depth of Well, Well Volume, Depth to Top of Pump, Water Level After Sample, Measurement Method.

SAMPLING INFORMATION table with fields: Purging Method, Sampling Method, Dedicated Equipment?, Duplicate Sample?, Duplicate Sample ID, Bottle List, Control Settings.

FIELD READINGS table with columns: Purge Date, Time, Temp, Spec. Cond., pH, DO, ORP, Turbidity, Water Level, Pumping Rate, mL Removed, Appearance or Comment.

Summary table with columns: Sample Date, Time, Temp, Spec. Cond., pH, Turbidity, Appearance or Comment.

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
Event: March 2022
Sample ID:
Sampling Personal: [Signature]

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

WELL INFORMATION table with fields: Well Locked?, Well Labeled?, Casing Strait?, Grout Seal Intact?, Repairs Necessary?, Casing Diameter, Water Level Before Purge, Total Depth of Well, Well Volume, Depth to Top of Pump, Water Level After Sample, Measurement Method.

SAMPLING INFORMATION table with fields: Purging Method, Sampling Method, Dedicated Equipment?, Duplicate Sample?, Duplicate Sample ID, Control Settings, Bottle List.

FIELD READINGS

FIELD READINGS table with columns: Purge Date, Time, Temp. (C), Spec. Cond., pH, DO (mg/L), ORP (mV), Turbidity (NTU), Water Level (ft), Pumping Rate (mL/Min), mL Removed, Appearance or Comment.

Summary table with columns: Sample Date, Time, Temp. (C), Spec. Cond., pH, Turbidity (NTU), Appearance or Comment.

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
Event: March 2022
Sample ID:
Sampling Personal: *J. J. J.*

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
Repairs Necessary?		Not Visible
Casing Diameter:	2"	
Water Level Before Purge:	4.08 ft	
Total Depth of Well:	11.51 ft	
Well Volume:	4.6 liters	
Depth to Top of Pump:	9.50 ft	
Water Level After Sample:	ft	
Measurement Method:	Electric Water Level Indicator	

SAMPLING INFORMATION		
Purging Method:	Bladder	1"
Sampling Method:	Bladder	1"
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:	4	Sec.
Recover:	16	Sec.
PSI:	20	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate (ml/Min)	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10					Clarity, Color, Odor, Ect.
11 May 22	1400	Start of Well Purge									
	1405	6.68	5743	7.34	9.68	206.1	1.66	4.71	100.0	500.0	Clear
	1425	6.72	5613	7.39	10.42	215.7	3.07	7.01	100.0	2000.0	Clear
	1445	6.83	5649	7.45	10.02	187.2	2.94	8.97	100.0	2000.0	Clear
	1505	6.74	5671	7.40	9.74	148.5	2.01	Relativity	100.0	2000.0	Clear
12 May 22	0607	Purged 1m									
	0612	7.00	6727	7.39	10.03	179.3	87.25	5.00	100.0	500.0	Clear
Well Stabilized?		YES		(NO)	Total Volume Purged: 7000.0 ml						

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
12 May 22	0612	7.00	6727	7.39	87.25	Clear

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: March 2022
 Sample ID: 118
 Sampling Personal: Jerry May

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
Repairs Necessary?	Not Visible	
Casing Diameter:	2"	
Water Level Before Purge:	7.96	ft
Total Depth of Well:	-	
Well Volume:	-	
Depth to Top of Pump:	-	
Water Level After Sample:	8.04	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:	4 Sec.
Recover:	56 Sec.
PSI:	20

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate mL/Min	mL Removed	Appearance or Comment
Purge Date	Time										clear, slightly turbid, turbid
12 May 22	0915	Start of Well Purge									
	0920	10.55	1525	7.33	3.02	190.9	151.14	8.00	100.0	500.0	Clear
	0950	8.00	1447	7.47	4.10	129.0	19.02	8.02	100.0	3000.6	Clear
	1010	7.87	1373	7.49	4.14	114.7	5.41	8.02	100.0	2000.0	Clear
	1015	7.80	1379	7.49	4.15	113.5	3.53	8.03	100.0	500.0	Clear
	1020	7.73	1378	7.49	4.19	112.5	3.27	8.03	100.0	500.0	Clear
	1025	7.84	1377	7.49	4.21	112.2	2.53	8.03	100.0	500.0	Clear

Well Stabilized? YES NO Total Volume Purged: 7000.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
12 May 22	1025	7.84	1377	7.49	2.53	Clear

Comments: Collected field blank @ 0925

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: March 2022
 Sample ID: 120
 Sampling Personal: J. J. Meyer

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

WELL INFORMATION	
Well Locked?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Well Labeled?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Casing Strait?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Grout Seal Intact?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/> <u>Not Visible</u>
Repairs Necessary?	
Casing Diameter:	2" ft
Water Level Before Purge:	14.15 ft
Total Depth of Well:	— ft
Well Volume:	— liters
Depth to Top of Pump:	— ft
Water Level After Sample:	14.32 ft
Measurement Method:	Electric Water Level Indicator

SAMPLING INFORMATION	
Purging Method:	Bladder
Sampling Method:	Bladder
Dedicated Equipment?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Duplicate Sample?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Duplicate Sample ID:	—
Bottle List:	
1 Liter Raw	4- 1L Nitric
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	
Control Settings:	
Purge:	4 Sec.
Recover:	56 Sec.
PSI:	20

FIELD READINGS											
Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate mL/Min	mL Removed	Appearance or Comment
Purge Date	Time										Clarity, Color, Odor, Ect.
	12 18	Start of Well Purge									
11 May 22	12 23	7.93	7794	6.78	0.48	185.5	101	14.22	100.0	500.0	Clear
	12 33	7.60	7407	6.79	0.75	187.3	1.80	14.25	100.0	1000.0	Clear
	12 38	7.53	7237	6.78	0.81	188.4	0.67	14.26	100.0	500.0	Clear
	12 43	7.37	7029	6.79	0.91	189.0	1.27	14.28	100.0	500.0	Clear
	12 48	7.21	6674	6.80	1.35	188.8	1.47	14.29	100.0	500.0	Clear
	12 53	7.29	6630	6.80	1.39	188.6	0.98	14.30	100.0	500.0	Clear
	12 58	7.29	6579	6.80	1.46	188.4	0.65	14.30	100.0	500.0	Clear
Well Stabilized?		YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	Total Volume Purged: 4000.0 mL							

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
11 May 22	12 58	7.29	6579	6.80	0.65	Clear

Comments:

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Account #: 2800 **Client:** Montana-Dakota Utilities - Bismarck
Workorder: MDU Lewis & Clark Fall 2022 (2822) **PO:** 190709 OP

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

CCR_APP III

Certificate of Analysis

Approval

All data reported has been reviewed and approved by:

Claudette Carroll, Lab Manager Bismarck, ND

Analyses performed under Minnesota Department of Health Accreditation conforms to the current TNI standards.

NEW ULM LAB CERTIFICATIONS:
MN LAB # 027-015-125 ND WW/DW # R-040

BISMARCK LAB CERTIFICATIONS:
MN LAB # 038-999-267 ND W/DW # ND-016

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Report Date: Friday, September 9, 2022 8:40:12 AM



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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Workorder Summary

Workorder Comments

All analytes with dilution factors greater than 1 (displayed in DF column) required dilution due to matrix or high concentration of target analyte unless otherwise noted and reporting limits (RDL column) have been adjusted accordingly.

Sample Comments

2822007 (MW120) - Sample

This sample was either unpreserved or needed additional preservation upon receipt at the laboratory. The following preservation was added by MVTL: sulfuric acid.

Analysis Results Comments

2822001 (MW103)

Sample analyzed beyond holding time.(pH)

2822002 (MW110)

Sample analyzed beyond holding time.(pH)

2822003 (MW119)

Sample analyzed beyond holding time.(pH)

2822004 (MW111)

Sample analyzed beyond holding time.(pH)

2822005 (MW117)

Sample analyzed beyond holding time.(pH)

2822006 (MW118)

Sample analyzed beyond holding time.(pH)

2822007 (MW120)

Sample analyzed beyond holding time.(pH)

2822008 (Dup 1)

Sample analyzed beyond holding time.(pH)

2822009 (Field Blank (FB))

Sample analyzed beyond holding time.(pH)

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822001 **Date Collected:** 08/16/2022 12:30 **Matrix:** Groundwater
Sample ID: MW103 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4**Method: 120.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	1450	umhos/cm	1	1	08/16/2022 12:30	08/16/2022 12:30	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	7.41	units	0.01	1	08/16/2022 12:30	08/16/2022 12:30	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	18.39	degrees C		1	08/16/2022 12:30	08/16/2022 12:30	JSM		

Method: ASTM D516-16

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	411	mg/L	10	2	08/23/2022 15:06	08/23/2022 15:06	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	1.12	mg/L	0.1	1	08/19/2022 07:36	08/26/2022 10:02	MDE	MA,NDA	
Calcium	97.8	mg/L	1	1	08/19/2022 07:36	08/19/2022 14:07	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.8	units	0.1	1	08/19/2022 12:29	08/19/2022 12:29	RAA	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	29.7	mg/L	2.0	1	08/22/2022 09:06	08/22/2022 09:06	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	0.72	mg/L	0.1	1	08/18/2022 19:06	08/18/2022 19:06	RAA		

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Report Date: Friday, September 9, 2022 8:40:12 AM



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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2822001 **Date Collected:** 08/16/2022 12:30 **Matrix:** Groundwater
Sample ID: MW103 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	1110	mg/L	10	1	08/19/2022 14:30	08/19/2022 14:30	AMC	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822002 **Date Collected:** 08/16/2022 07:48 **Matrix:** Groundwater
Sample ID: MW110 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4**Method: 120.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	963	umhos/cm	1	1	08/16/2022 07:48	08/16/2022 07:48	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	7.19	units	0.01	1	08/16/2022 07:48	08/16/2022 07:48	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	14.95	degrees C		1	08/16/2022 07:48	08/16/2022 07:48	JSM		

Method: ASTM D516-16

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	160	mg/L	10	2	08/23/2022 15:07	08/23/2022 15:07	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	0.25	mg/L	0.1	1	08/19/2022 07:36	08/26/2022 10:04	MDE	MA,NDA	
Calcium	79.9	mg/L	1	1	08/19/2022 07:36	08/19/2022 14:10	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.8	units	0.1	1	08/18/2022 16:09	08/18/2022 16:09	RAA	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	19.4	mg/L	2.0	1	08/22/2022 09:07	08/22/2022 09:07	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	0.52	mg/L	0.1	1	08/18/2022 16:09	08/18/2022 16:09	RAA		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2822002 **Date Collected:** 08/16/2022 07:48 **Matrix:** Groundwater
Sample ID: MW110 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	666	mg/L	10	1	08/19/2022 14:30	08/19/2022 14:30	AMC	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822003 **Date Collected:** 08/16/2022 09:08 **Matrix:** Groundwater
Sample ID: MW119 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4**Method: 120.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	1038	umhos/cm	1	1	08/16/2022 09:08	08/16/2022 09:08	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	7.23	units	0.01	1	08/16/2022 09:08	08/16/2022 09:08	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	15.42	degrees C		1	08/16/2022 09:08	08/16/2022 09:08	JSM		

Method: ASTM D516-16

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	172	mg/L	10	2	08/23/2022 15:09	08/23/2022 15:09	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	0.23	mg/L	0.1	1	08/19/2022 07:36	08/26/2022 10:05	MDE	MA,NDA	
Calcium	87.1	mg/L	1	1	08/19/2022 07:36	08/19/2022 14:14	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.8	units	0.1	1	08/18/2022 15:33	08/18/2022 15:33	RAA	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	24.0	mg/L	2.0	1	08/22/2022 09:08	08/22/2022 09:08	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	0.49	mg/L	0.1	1	08/18/2022 15:33	08/18/2022 15:33	RAA		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2822003 **Date Collected:** 08/16/2022 09:08 **Matrix:** Groundwater
Sample ID: MW119 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	726	mg/L	10	1	08/19/2022 14:30	08/19/2022 14:30	AMC	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822004 **Date Collected:** 08/17/2022 08:15 **Matrix:** Groundwater
Sample ID: MW111 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service
Temp @ Receipt (C): 5.4 **Received on Ice:** Yes

Method: 120.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	4584	umhos/cm	1	1	08/17/2022 08:15	08/17/2022 08:15	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	7.32	units	0.01	1	08/17/2022 08:15	08/17/2022 08:15	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	14.28	degrees C		1	08/17/2022 08:15	08/17/2022 08:15	JSM		

Method: ASTM D516-16

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	2700	mg/L	100	20	08/23/2022 15:10	08/23/2022 15:10	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	11.1	mg/L	0.5	5	08/19/2022 07:36	08/26/2022 10:06	MDE	MA,NDA	
Calcium	261	mg/L	5	5	08/19/2022 07:36	08/19/2022 14:16	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.6	units	0.1	1	08/19/2022 12:29	08/19/2022 12:29	RAA	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	45.7	mg/L	2.0	1	08/22/2022 09:14	08/22/2022 09:14	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	2.24	mg/L	0.1	1	08/18/2022 19:53	08/18/2022 19:53	RAA		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2822004 **Date Collected:** 08/17/2022 08:15 **Matrix:** Groundwater
Sample ID: MW111 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4 **Received on Ice:** Yes

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	5020	mg/L	10	1	08/19/2022 14:30	08/19/2022 14:30	AMC	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822005 **Date Collected:** 08/17/2022 06:18 **Matrix:** Groundwater
Sample ID: MW117 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4**Method: 120.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	6781	umhos/cm	1	1	08/17/2022 06:18	08/17/2022 06:18	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	7.45	units	0.01	1	08/17/2022 06:18	08/17/2022 06:18	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	15.23	degrees C		1	08/17/2022 06:18	08/17/2022 06:18	JSM		

Method: ASTM D516-16

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	4490	mg/L	200	40	08/23/2022 15:17	08/23/2022 15:17	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	9.23	mg/L	0.5	5	08/19/2022 07:36	08/26/2022 10:06	MDE	MA,NDA	
Calcium	336	mg/L	5	5	08/19/2022 07:36	08/19/2022 14:18	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.6	units	0.1	1	08/18/2022 16:19	08/18/2022 16:19	RAA	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	43.1	mg/L	2.0	1	08/22/2022 09:15	08/22/2022 09:15	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	0.26	mg/L	0.1	1	08/18/2022 16:19	08/18/2022 16:19	RAA		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2822005 **Date Collected:** 08/17/2022 06:18 **Matrix:** Groundwater
Sample ID: MW117 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	7840	mg/L	10	1	08/19/2022 14:30	08/19/2022 14:30	AMC	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822006 **Date Collected:** 08/17/2022 09:27 **Matrix:** Groundwater
Sample ID: MW118 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service
Temp @ Receipt (C): 5.4 **Received on Ice:** Yes

Method: 120.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	1760	umhos/cm	1	1	08/17/2022 09:27	08/17/2022 09:27	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	7.51	units	0.01	1	08/17/2022 09:27	08/17/2022 09:27	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	16.66	degrees C		1	08/17/2022 09:27	08/17/2022 09:27	JSM		

Method: ASTM D516-16

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	575	mg/L	25	5	08/23/2022 15:19	08/23/2022 15:19	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	1.71	mg/L	0.1	1	08/19/2022 07:36	08/26/2022 10:07	MDE	MA,NDA	
Calcium	92.3	mg/L	1	1	08/19/2022 07:36	08/19/2022 14:25	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.3	units	0.1	1	08/18/2022 16:41	08/18/2022 16:41	RAA	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	30.2	mg/L	2.0	1	08/22/2022 09:16	08/22/2022 09:16	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	1.15	mg/L	0.1	1	08/18/2022 16:41	08/18/2022 16:41	RAA		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2822006 **Date Collected:** 08/17/2022 09:27 **Matrix:** Groundwater
Sample ID: MW118 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4 **Received on Ice:** Yes

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	1400	mg/L	10	1	08/19/2022 14:30	08/19/2022 14:30	AMC	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822007 **Date Collected:** 08/16/2022 14:15 **Matrix:** Groundwater
Sample ID: MW120 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4**Method: 120.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Specific Conductance - Field	7366	umhos/cm	1	1	08/16/2022 14:15	08/16/2022 14:15	JSM		

Method: 150.2

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH - Field	6.93	units	0.01	1	08/16/2022 14:15	08/16/2022 14:15	JSM		

Method: 170.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Temperature - Field C	15.29	degrees C		1	08/16/2022 14:15	08/16/2022 14:15	JSM		

Method: ASTM D516-16

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	4850	mg/L	100	20	08/23/2022 15:20	08/23/2022 15:20	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	8.96	mg/L	0.5	5	08/19/2022 07:36	08/26/2022 10:08	MDE	MA,NDA	
Calcium	455	mg/L	5	5	08/19/2022 07:36	08/19/2022 14:27	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.1	units	0.1	1	08/18/2022 17:03	08/18/2022 17:03	RAA	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	64.8	mg/L	2.0	1	08/22/2022 09:17	08/22/2022 09:17	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	0.47	mg/L	0.1	1	08/18/2022 17:03	08/18/2022 17:03	RAA		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2822007 **Date Collected:** 08/16/2022 14:15 **Matrix:** Groundwater
Sample ID: MW120 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	8760	mg/L	10	1	08/19/2022 14:30	08/19/2022 14:30	AMC	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822008 **Date Collected:** 08/16/2022 09:08 **Matrix:** Groundwater
Sample ID: Dup 1 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4**Method: ASTM D516-16**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	158	mg/L	25	5	08/23/2022 15:22	08/23/2022 15:22	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	0.23	mg/L	0.1	1	08/19/2022 07:36	08/26/2022 10:09	MDE	MA,NDA	
Calcium	82.8	mg/L	1	1	08/19/2022 07:36	08/19/2022 14:29	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	7.7	units	0.1	1	08/18/2022 16:52	08/18/2022 16:52	RAA	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	24.0	mg/L	2.0	1	08/22/2022 09:19	08/22/2022 09:19	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	0.48	mg/L	0.1	1	08/18/2022 16:52	08/18/2022 16:52	RAA		

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	714	mg/L	10	1	08/19/2022 14:30	08/19/2022 14:30	AMC	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822009 **Date Collected:** 08/17/2022 08:50 **Matrix:** Groundwater
Sample ID: Field Blank (FB) **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service
Temp @ Receipt (C): 5.4 **Received on Ice:** Yes

Method: ASTM D516-16

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Sulfate	<5	mg/L	5	1	08/23/2022 15:23	08/23/2022 15:23	EJV	MA,NDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Boron	<0.1	mg/L	0.1	1	08/19/2022 07:36	08/26/2022 10:12	MDE	MA,NDA	
Calcium	<1	mg/L	1	1	08/19/2022 07:36	08/19/2022 14:35	SLZ	MA,NDA	

Method: SM4500 H+ B-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
pH	6.9	units	0.1	1	08/18/2022 14:27	08/18/2022 14:27	RAA	MA,NDA	*

Method: SM4500-CI-E 2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Chloride	<2.0	mg/L	2.0	1	08/22/2022 09:20	08/22/2022 09:20	EJV	MA,NDA	

Method: SM4500-F-C-2011

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Fluoride	<0.1	mg/L	0.1	1	08/18/2022 14:27	08/18/2022 14:27	RAA		

Method: USGS I-1750-85

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Total Dissolved Solids	<10	mg/L	10	1	08/19/2022 14:30	08/19/2022 14:30	AMC	MA,NDA	

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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August 19, 2022

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

RE: MDU Lewis & Clark Groundwater Sampling

Dear Mr. Peterson,

From August 16-17, 2022, MVTL Field Services division collected ground water samples at the MDU Lewis and Clark Station near Sidney, MT. A duplicate sample was collected from well 119. Samples collected were placed on ice and transported to MVTL in Bismarck, ND for analysis.

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

Sincerely,

Jeremy Meyer
MVTL Field Services Manager

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

	Minnesota Valley Testing Laboratories 2616 E. Broadway Ave Bismarck, ND 58501 (701) 258-9720	Montana - Dakota Utilities - Bis WO: 2822 	Chain of Custody Record 2822
	Report To: MDU Attn: Todd Peterson Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-425-2427 Email: Todd.Peterson@mdu.com	CC:	Project Name: MDU Lewis & Clark Event: Fall 2022 Sampled By: <i>Jeremy</i>

Lab Number	Sample ID	Sample Information		Sample Type	Sample Containers				Field Readings				Analysis Required
		Date	Time		1 Liter Raw	500 mL HNO3	500 mL HNO3 (filtered)	250 mL H2SO4	Temp (°C)	Spec. Cond.	pH	Turbidity (NTU)	
001	MW103	16 Aug 22	1230	GW	X	X	X	X	18.39	1450	7.41	9.87	MDU Lewis & Clark List
002	MW110	16 Aug 22	0740	GW	X	X	X	X	14.95	963	7.19	2.79	
003	MW119	16 Aug 22	0908	GW	X	X	X	X	15.42	1038	7.23	0.34	
004	MW111	17 Aug 22	0815	GW	X	X	X	X	14.28	4584	7.32	0.06	
005	MW117	17 Aug 22	0618	GW	X	X	X	X	15.23	6781	7.45	0.38	
006	MW118	17 Aug 22	0927	GW	X	X	X	X	16.66	1760	7.51	0.95	
007	MW120	16 Aug 22	1415	GW	X	X	X	X	15.29	7366	6.93	0.12	
008	Dup 1	16 Aug 22	0908	GW	X	X	X	X	NA	NA	NA	NA	
009	Field Blank (FB)	17 Aug 22	0850	GW	X	X	X	X	NA	NA	NA	NA	

Comments:

	Relinquished By		Sample Condition		Received By	
	Name	Date/Time	Location	Temp (°C)	Name	Date/Time
1	<i>[Signature]</i>	18 Aug 22 0600	LOG IN Walk In #2	5.4 TM562 / TM805	<i>[Signature]</i>	18 Aug 22 0800
2						

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



Field Datasheet
Surface water Assessment

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

Company: MDU Lewis & Clark

Event: Fall 2022

Sampling Personal: *[Signature]*

Weather Conditions: Temp: 75 °F Wind: N @ 10-15 Precip: Sunny / Partly Cloudy / Cloudy

Well ID	Date	Time	Casing Diameter	Water Level (ft)	Comments
MW101	17 Aug 22	0606	2"	8.60	
MW105		0837	2"	8.33	
MW106		0835	2"	9.12	
MW107		0604	2"	4.15	
MW108		0952	2"	16.10	
MW116		0609	2"	12.53	

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: Fall 2022
 Sample ID: 103
 Sampling Personal: [Signature]

Weather Conditions: Temp: 70 °F Wind: N @ 5-10 Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION		
Well Locked?	YES	NO
Well Labeled?	YES	NO
Casing Strait?	YES	NO
Well Seal Intact?	YES	NO
Repairs Necessary?	Not Visible	
Casing Diameter:	2"	
Water Level Before Purge:	10.02 ft	
Total Depth of Well:	-	
Well Volume:	-	
Depth to Top of Pump:	-	
Water Level After Sample:	10.08 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:	3	Sec.
Recover:	37	Sec.
PSI:	60	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate mL/Min	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°									Clarity, Color, Odor, Ect.
16 Aug 22	1010	Start of Well Purge									
	1015	18.89	1704	7.49	0.26	159.5	72.57	10.05	100.0	500.0	Clear
	1035	20.36	1418	7.41	0.71	167.6	55.02	10.07	100.0	2000.0	Clear
	1135	19.61	1194	7.36	0.34	162.8	15.72	10.08	100.0	6000.0	Clear
	1205	17.99	1457	7.41	0.32	120.3	15.02	10.06	100.0	3000.0	Clear
	1210	18.70	1455	7.41	0.30	116.1	14.51	10.08	100.0	500.0	Clear
	1215	18.39	1452	7.41	0.30	110.9	12.25	10.08	100.0	500.0	Clear
	1220	18.45	1454	7.40	0.31	106.4	9.75	10.08	100.0	500.0	Clear
	1225	18.38	1449	7.40	0.31	104.5	9.92	10.08	100.0	500.0	Clear
	1230	18.39	1450	7.41	0.31	101.4	9.82	10.08	100.0	500.0	Clear
Well Stabilized?		YES	NO	Total Volume Purged: 14000.0 mL							

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
16 Aug 22	1230	18.39	1450	7.41	9.87	Clear

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: Fall 2022
 Sample ID: 110
 Sampling Personal: [Signature]

Weather Conditions: Temp: 70 °F Wind: N @ 5-10 Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION		
Well Locked?	YES	NO
Well Labeled?	YES	NO
Casing Strait?	YES	NO
Well Seal Intact?	YES	NO
Repairs Necessary?	Not Visible	
Casing Diameter:	2"	
Water Level Before Purge:	8.76	ft
Total Depth of Well:	—	
Well Volume:	—	
Depth to Top of Pump:	—	
Water Level After Sample:	8.59	ft
Measurement Method:	Electric Water Level Indicator	

SAMPLING INFORMATION		
Purging Method:	Bladder	1"
Sampling Method:	Bladder	1"
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:	3 Sec.
Recover:	27 Sec.
PSI:	20

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate ml/Min	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°									clear, slightly turbid, turbid
16 Aug 22	0708	Start of Well Purge									
	0713	14.95	967	7.24	4.79	190.6	2.61	8.56	100.0	500.0	Clear
	0733	14.95	959	7.12	5.20	186.5	3.02	8.57	100.0	2000.0	Clear
	0738	14.97	960	7.14	5.28	186.0	2.42	8.57	100.0	500.0	Clear
	0743	14.99	961	7.18	5.43	187.2	2.40	8.58	100.0	500.0	Clear
	0748	14.95	963	7.19	5.50	187.4	2.79	8.58	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
16 Aug 22	0748	14.95	963	7.19	2.79	Clear

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: Fall 2022
 Sample ID: 111
 Sampling Personal: *J. H.*

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

WELL INFORMATION		SAMPLING INFORMATION	
Well Locked?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Purging Method:	Bladder
Well Labeled?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Sampling Method:	Bladder
Casing Strait?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Dedicated Equipment?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Well Seal Intact?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> <i>Not Visible</i>	Duplicate Sample?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Repairs Necessary?		Duplicate Sample ID:	
Casing Diameter:	2"	Bottle List:	
Water Level Before Purge:	7.58 ft	1 Liter Raw	4- 1L Nitric
Total Depth of Well:	— ft	500ml Nitric	
Well Volume:	— liters	500ml Nitric (filtered)	
Depth to Top of Pump:	— ft	250ml Sulfuric	
Water Level After Sample:	7.67 ft		
Measurement Method:	Electric Water Level Indicator		

FIELD READINGS											
Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate (mL/Min)	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10					Clarity, Color, Odor, Ect.
17 Aug 22	0735	Start of Well Purge									
	0740	12.71	4937	7.26	0.73	192.9	41.01	7.70	100.0	500.0	Clear
	0800	13.98	4605	7.30	2.79	189.5	0.21	7.65	100.0	200.0	Clear
	0805	14.04	4602	7.31	3.02	190.5	0.27	7.65	100.0	500.0	Clear
	0810	14.12	4589	7.32	3.22	193.7	0.08	7.66	100.0	500.0	Clear
	0815	14.28	4584	7.32	3.27	196.2	0.06	7.66	100.0	500.0	Clear
Well Stabilized?		YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	Total Volume Purged: 400.0 mL							

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
17 Aug 22	0815	14.28	4584	7.32	0.06	Clear

Comments:

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 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



Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: Fall 2022
 Sample ID: 117
 Sampling Personal: *[Signature]*

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

WELL INFORMATION	
Well Locked?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Well Labeled?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Casing Strait?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Well Seal Intact?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/> Not Visible <input checked="" type="checkbox"/>
Repairs Necessary?	
Casing Diameter:	2" ft
Water Level Before Purge:	5.25 ft
Total Depth of Well:	11.50 ft
Well Volume:	3.9 liters
Depth to Top of Pump:	9.65 ft
Water Level After Sample:	8.35 ft
Measurement Method:	Electric Water Level Indicator

SAMPLING INFORMATION		Control Settings:	
Purging Method:	Bladder / "	Purge:	3 Sec.
Sampling Method:	Bladder / "	Recover:	17 Sec.
Dedicated Equipment?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>	PSI:	20
Duplicate Sample?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>		
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. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate mL/Min	mL Removed	Appearance or Comment
Purge Date	Time										
16 Aug 22	15:08	Start of Well Purge									
	15:13	21.04	6787	7.31	6.37	170.3	1.88	6.82	100.0	500.0	Clear
	15:45	21.53	6739	7.34	6.74	185.6	14.54	6.50	100.0	3000.0	Clear
	16:13	23.37	6758	7.30	6.07	191.9	3.37	Below Pump	100.0	3000.0	Clear
17 Aug 22	06:13	Purged 5 min to clear									
	06:18	15.23	6781	7.45	7.47	157.8	0.38	6.50	100.0	500.0	Clear

Well Stabilized? YES NO Total Volume Purged: 7000.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
17 Aug 22	06:18	15.23	6781	7.45	0.38	Clear

Comments:

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Report Date: Friday, September 9, 2022 8:40:12 AM



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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
Event: Fall 2022
Sample ID: 118
Sampling Personal: [Signature]

Weather Conditions: Temp: 70°F Wind: N @ 10-15 Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION		
Well Locked?	YES	NO
Well Labeled?	YES	NO
Casing Strait?	YES	NO
Well Seal Intact?	YES	NO
Repairs Necessary?	Not Visible	
Casing Diameter:	2"	
Water Level Before Purge:	8.05	ft
Total Depth of Well:	—	
Well Volume:	—	
Depth to Top of Pump:	—	
Water Level After Sample:	8.16	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:	3	Sec.
Recover:	27	Sec.
PSI:	10	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate mL/Min	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°									Clarity, Color, Odor, Ect.
17 Aug 22	0842	Start of Well Purge									
	0847	16.29	1759	7.52	2.47	180.5	136.55	8.13	100.0	500.0	Slightly turbid
	0907	16.48	1773	7.51	2.36	184.0	6.37	8.14	100.0	2000.0	Clear
	0917	16.70	1769	7.51	2.34	185.0	2.20	8.14	100.0	1000.0	Clear
	0922	16.67	1765	7.51	2.27	185.1	1.40	8.14	100.0	500.0	Clear
	0927	16.66	1760	7.51	2.23	185.1	0.95	8.15	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
17 Aug 22	0927	16.66	1760	7.51	0.95	Clear

Comments: Collected FB @ 0850

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 www.MVTL.com



Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: Fall 2022
 Sample ID: 120
 Sampling Personal: *J. L. Clark*

Weather Conditions: Temp: 75°F Wind: N @ 5-10 Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION	
Well Locked?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Well Labeled?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Casing Strait?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Well Seal Intact?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> <i>Not Visible</i>
Repairs Necessary?	
Casing Diameter:	2" ft
Water Level Before Purge:	14.36 ft
Total Depth of Well:	ft
Well Volume:	liters
Depth to Top of Pump:	ft
Water Level After Sample:	14.57 ft
Measurement Method:	Electric Water Level Indicator

SAMPLING INFORMATION	
Purging Method:	Bladder
Sampling Method:	Bladder
Dedicated Equipment?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
Duplicate Sample?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
Duplicate Sample ID:	
Bottle List:	
1 Liter Raw	4- 1L Nitric
500ml Nitric	
500ml Nitric (filtered)	
250ml Sulfuric	
Control Settings:	
Purge:	3 Sec.
Recover:	27 Sec.
PSI:	20

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate (mL/Min)	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°									Clarity, Color, Odor, Ect.
16 Aug 22	1335	Start of Well Purge									
	1340	14.51	7405	6.96	0.31	141.5	0.64	14.53	100.0	500.0	Clear
	1400	15.52	7290	6.94	0.31	139.6	0.29	14.55	100.0	2000.0	Clear
	1405	15.35	7307	6.93	0.30	140.0	0.31	14.56	100.0	500.0	Clear
	1410	15.18	7306	6.93	0.29	140.6	0.22	14.56	100.0	500.0	Clear
	1415	15.29	7366	6.93	0.28	140.5	0.12	14.56	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
16 Aug 22	1415	15.29	7366	6.93	0.12	Clear

Comments:

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Report Date: Friday, September 9, 2022 8:40:12 AM

	MB	Chloride	08/22/2022 10:59:32	<2.0		mg/L												
	MB	Chloride	08/22/2022 10:42:59	<2.0		mg/L												
	MB	Chloride	08/22/2022 10:22:53	<2.0		mg/L												
	MB	Chloride	08/22/2022 10:05:09	<2.0		mg/L												
	MB	Chloride	08/22/2022 09:45:03	<2.0		mg/L												
	MB	Chloride	08/22/2022 09:28:30	<2.0		mg/L												
	MB	Chloride	08/22/2022 09:09:35	<2.0		mg/L												
	MB	Chloride	08/22/2022 08:53:01	<2.0		mg/L												
2822001	MS-F	Fluoride	08/18/2022 19:17:09	104	0.72	mg/L		0.5	1.24	104					80		120	
2822001	MSD-F	Fluoride	08/18/2022 19:22:54	102	0.72	mg/L					1.23	102	0.81		80		120	20
2826002	MS-F	Fluoride	08/18/2022 14:54:05	108	0.46	mg/L		0.5	1	108					80		120	
2826002	MSD-F	Fluoride	08/18/2022 15:00:04	110	0.46	mg/L					1.01	110	1.00		80		120	20
	CRM-F	Fluoride	08/18/2022 11:11:00	102		mg/L		3.39	3.45	102					83.8		111	
	LFB-F	Fluoride	08/18/2022 11:24:12	102		mg/L		0.5	0.51	102					90		110	
	LFB-F	Fluoride	08/18/2022 17:49:51	102		mg/L		0.5	0.51	102					90		110	
	LFB-F	Fluoride	08/18/2022 21:26:14	100		mg/L		0.5	0.5	100					90		110	
	MB-F	Fluoride	08/18/2022 11:17:44	<0.1		mg/L												
	MB-F	Fluoride	08/18/2022 17:43:32	<0.1		mg/L												
	MB-F	Fluoride	08/18/2022 21:19:55	<0.1		mg/L												
2788001	MS	Sulfate	08/23/2022 14:24:42	88.7	22.3	mg/L		100	111	88.7					85		115	
2788001	MSD	Sulfate	08/23/2022 14:25:47	88.2	22.3	mg/L					110	88.2	0.90		85		115	20
2788009	MS	Sulfate	08/23/2022 14:49:01	70.3	182	mg/L		200	323	70.3					85		115	
2788009	MSD	Sulfate	08/23/2022 14:50:05	72.5	182	mg/L					327	72.5	1.23		85		115	20
2789004	MS	Sulfate	08/23/2022 15:11:16	91.2	277	mg/L		500	733	91.2					85		115	
2789004	MSD	Sulfate	08/23/2022 15:12:21	91	277	mg/L					732	91	0.14		85		115	20
2822009	MS	Sulfate	08/23/2022 15:30:02	95.1	<5	mg/L		100	95.1	95.1					85		115	
2822009	MSD	Sulfate	08/23/2022 15:31:08	97.9	<5	mg/L					97.9	97.9	2.90		85		115	20
2827003	MS	Sulfate	08/23/2022 15:47:43	86.3	833	mg/L		500	1260	86.3					85		115	
2827003	MSD	Sulfate	08/23/2022 15:48:48	90.7	833	mg/L					1290	90.7	2.35		85		115	20
2827013	MS	Sulfate	08/23/2022 16:19:12	86	15.8	mg/L		100	102	86					85		115	
2827013	MSD	Sulfate	08/23/2022 16:18:05	86.2	15.8	mg/L					102	86.2	0.00		85		115	20
	LFB	Sulfate	08/23/2022 14:56:00	90.2		mg/L		100	90.2	90.2					85		115	
	LFB	Sulfate	08/23/2022 14:33:32	94.2		mg/L		100	94.2	94.2					85		115	
	LFB	Sulfate	08/23/2022 14:09:13	99.6		mg/L		100	99.6	99.6					85		115	
	LFB	Sulfate	08/23/2022 16:24:44	89.5		mg/L		100	89.5	89.5					85		115	
	LFB	Sulfate	08/23/2022 15:14:34	92.2		mg/L		100	92.2	92.2					85		115	
	LFB	Sulfate	08/23/2022 15:33:20	94		mg/L		100	94	94					85		115	
	LFB	Sulfate	08/23/2022 15:59:49	91.6		mg/L		100	91.6	91.6					85		115	
	MB	Sulfate	08/23/2022 16:23:38	<5		mg/L												
	MB	Sulfate	08/23/2022 15:58:43	<5		mg/L												
	MB	Sulfate	08/23/2022 15:32:14	<5		mg/L												
	MB	Sulfate	08/23/2022 15:13:27	<5		mg/L												
	MB	Sulfate	08/23/2022 14:53:25	<5		mg/L												
	MB	Sulfate	08/23/2022 14:32:25	<5		mg/L												
	MB	Sulfate	08/23/2022 14:08:08	<5		mg/L												
2822007	DUP	Total Dissolved Solids	08/19/2022 14:30:00	8670	8760	mg/L							1.03					20
2846001	DUP	Total Dissolved Solids	08/19/2022 14:30:00	1120	1140	mg/L							1.77					20
	CRM	Total Dissolved Solids	08/19/2022 14:30:00	102		mg/L		736	751	102					90.35		110.33	
	MB	Total Dissolved Solids	08/19/2022 14:30:00	<10		mg/L												
2813001	DUP	pH	08/19/2022 12:29:46	7.67	7.7	units							0.39					20
2826001	DUP	pH	08/18/2022 15:22:51	6.70	6.9	units							2.94					20
2827008	DUP	pH	08/18/2022 19:42:00	8.17	8.2	units							0.37					20
2827013	DUP	pH	08/18/2022 22:56:00	8.22	8.1	units							1.47					20
2827015	DUP	pH	08/19/2022 12:29:46	7.14	7.1	units							0.56					20

2827016	DUP	pH	08/19/2022 01:58:40	8.30	8.3	units				0.00			20
	CRM-PH	pH	08/19/2022 12:29:46	100		units	6	6	100		98.33	101.67	
	CRM-PH	pH	08/19/2022 11:50:00	100.17		units	6	6	100.17		98.33	101.67	
	CRM-PH	pH	08/18/2022 10:41:31	99.17		units	6	6	99.17		98.33	101.67	
	CRM-PH	pH	08/19/2022 04:35:36	98.33		units	6	5.9	98.33		98.33	101.67	
	CRM-PH	pH	08/18/2022 18:07:26	98.5		units	6	5.9	98.5		98.33	101.67	
	CRM-PH	pH	08/19/2022 12:29:46	100.67		units	6	6	100.67		98.33	101.67	
	CRM-PH	pH	08/19/2022 01:23:42	98.33		units	6	5.9	98.33		98.33	101.67	



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Account #: 2800 **Client:** Montana-Dakota Utilities - Bismarck
Workorder: MDU Lewis & Clark Fall 2022 (2822) **PO:** 190709 OP

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

CCR_APP IV

Certificate of Analysis

Approval

All data reported has been reviewed and approved by:

Claudette Carroll, Lab Manager Bismarck, ND

Analyses performed under Minnesota Department of Health Accreditation conforms to the current TNI standards.

NEW ULM LAB CERTIFICATIONS:
MN LAB # 027-015-125 ND WW/DW # R-040

BISMARCK LAB CERTIFICATIONS:
MN LAB # 038-999-267 ND W/DW # ND-016

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Workorder Summary

Workorder Comments

All analytes with dilution factors greater than 1 (displayed in DF column) required dilution due to matrix or high concentration of target analyte unless otherwise noted and reporting limits (RDL column) have been adjusted accordingly.

Sample Comments

2822007 (MW120) - Sample

This sample was either unpreserved or needed additional preservation upon receipt at the laboratory. The following preservation was added by MVTL: sulfuric acid.

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Report Date: Friday, September 9, 2022 9:30:13 AM

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822001 **Date Collected:** 08/16/2022 12:30 **Matrix:** Groundwater
Sample ID: MW103 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4**Method: EPA 245.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	08/24/2022 12:15	08/25/2022 09:19	AMC	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.0515	mg/L	0.02	1	08/19/2022 07:36	08/31/2022 14:27	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	0.0049	mg/L	0.001	5	08/19/2022 07:36	08/23/2022 18:22	MDE	MA,NDA	
Arsenic	0.0030	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:22	MDE	MA,NDA	
Barium	0.0385	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:22	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:22	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:22	MDE	MA,NDA	
Chromium	0.0022	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:22	MDE	MA,NDA	
Cobalt	0.0046	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:22	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:22	MDE	MA,NDA	
Molybdenum	0.0246	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:22	MDE	MA,NDA	
Selenium	0.0463	mg/L	0.005	5	08/19/2022 07:36	08/23/2022 18:22	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:22	MDE	MA,NDA	

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Report Date: Friday, September 9, 2022 9:30:13 AM

**MINNESOTA VALLEY TESTING LABORATORIES, INC.**

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822002 **Date Collected:** 08/16/2022 07:48 **Matrix:** Groundwater
Sample ID: MW110 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4**Method: EPA 245.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	08/24/2022 12:15	08/25/2022 09:19	AMC	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.0368	mg/L	0.02	1	08/19/2022 07:36	08/31/2022 14:29	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	08/19/2022 07:36	08/23/2022 18:34	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:34	MDE	MA,NDA	
Barium	0.0333	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:34	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:34	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:34	MDE	MA,NDA	
Chromium	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:34	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:34	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:34	MDE	MA,NDA	
Molybdenum	0.0042	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:34	MDE	MA,NDA	
Selenium	<0.005	mg/L	0.005	5	08/19/2022 07:36	08/23/2022 18:34	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:34	MDE	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822003 **Date Collected:** 08/16/2022 09:08 **Matrix:** Groundwater
Sample ID: MW119 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4**Method: EPA 245.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	08/24/2022 12:15	08/25/2022 09:19	AMC	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.0393	mg/L	0.02	1	08/19/2022 07:36	08/31/2022 14:29	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	08/19/2022 07:36	08/23/2022 18:38	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:38	MDE	MA,NDA	
Barium	0.0341	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:38	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:38	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:38	MDE	MA,NDA	
Chromium	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:38	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:38	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:38	MDE	MA,NDA	
Molybdenum	0.0042	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:38	MDE	MA,NDA	
Selenium	<0.005	mg/L	0.005	5	08/19/2022 07:36	08/23/2022 18:38	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:38	MDE	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822004 **Date Collected:** 08/17/2022 08:15 **Matrix:** Groundwater
Sample ID: MW111 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4 **Received on Ice:** Yes

Method: EPA 245.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	08/24/2022 12:15	08/25/2022 09:19	AMC	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.225	mg/L	0.02	1	08/19/2022 07:36	08/31/2022 14:30	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	08/19/2022 07:36	08/23/2022 18:42	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:42	MDE	MA,NDA	
Barium	0.0338	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:42	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:42	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:42	MDE	MA,NDA	
Chromium	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:42	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:42	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:42	MDE	MA,NDA	
Molybdenum	0.0817	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:42	MDE	MA,NDA	
Selenium	0.0612	mg/L	0.005	5	08/19/2022 07:36	08/23/2022 18:42	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:42	MDE	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822005 **Date Collected:** 08/17/2022 06:18 **Matrix:** Groundwater
Sample ID: MW117 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4**Method: EPA 245.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	08/24/2022 12:15	08/25/2022 09:19	AMC	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.122	mg/L	0.1	5	08/19/2022 07:36	08/31/2022 14:30	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	08/19/2022 07:36	08/23/2022 18:46	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:46	MDE	MA,NDA	
Barium	0.0181	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:46	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:46	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:46	MDE	MA,NDA	
Chromium	0.0029	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:46	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:46	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:46	MDE	MA,NDA	
Molybdenum	0.0057	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:46	MDE	MA,NDA	
Selenium	0.0332	mg/L	0.005	5	08/19/2022 07:36	08/23/2022 18:46	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:46	MDE	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822006 **Date Collected:** 08/17/2022 09:27 **Matrix:** Groundwater
Sample ID: MW118 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4 **Received on Ice:** Yes

Method: EPA 245.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	08/24/2022 12:15	08/25/2022 09:19	AMC	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.0840	mg/L	0.02	1	08/19/2022 07:36	08/31/2022 14:31	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	08/19/2022 07:36	08/23/2022 18:51	MDE	MA,NDA	
Arsenic	0.0026	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:51	MDE	MA,NDA	
Barium	0.0317	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:51	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:51	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:51	MDE	MA,NDA	
Chromium	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:51	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:51	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:51	MDE	MA,NDA	
Molybdenum	0.0431	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:51	MDE	MA,NDA	
Selenium	0.0494	mg/L	0.005	5	08/19/2022 07:36	08/23/2022 18:51	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:51	MDE	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822007 **Date Collected:** 08/16/2022 14:15 **Matrix:** Groundwater
Sample ID: MW120 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4**Method: EPA 245.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	08/24/2022 12:15	08/25/2022 09:19	AMC	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.176	mg/L	0.1	5	08/19/2022 07:36	08/31/2022 14:32	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	08/19/2022 07:36	08/23/2022 18:55	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:55	MDE	MA,NDA	
Barium	0.0197	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:55	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:55	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:55	MDE	MA,NDA	
Chromium	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:55	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:55	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:55	MDE	MA,NDA	
Molybdenum	0.0030	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:55	MDE	MA,NDA	
Selenium	<0.005	mg/L	0.005	5	08/19/2022 07:36	08/23/2022 18:55	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:55	MDE	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822008 **Date Collected:** 08/16/2022 09:08 **Matrix:** Groundwater
Sample ID: Dup 1 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 5.4**Method: EPA 245.1**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	08/24/2022 12:15	08/25/2022 09:19	AMC	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	0.0388	mg/L	0.02	1	08/19/2022 07:36	08/31/2022 14:32	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	08/19/2022 07:36	08/23/2022 18:59	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:59	MDE	MA,NDA	
Barium	0.0329	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:59	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:59	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:59	MDE	MA,NDA	
Chromium	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:59	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:59	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:59	MDE	MA,NDA	
Molybdenum	0.0040	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 18:59	MDE	MA,NDA	
Selenium	<0.005	mg/L	0.005	5	08/19/2022 07:36	08/23/2022 18:59	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 18:59	MDE	MA,NDA	

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**Account #:** 2800**Client:** Montana-Dakota Utilities - Bismarck**Analytical Results**

Lab ID: 2822009 **Date Collected:** 08/17/2022 08:50 **Matrix:** Groundwater
Sample ID: Field Blank (FB) **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service
Temp @ Receipt (C): 5.4 **Received on Ice:** Yes

Method: EPA 245.1

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Mercury	<0.0002	mg/L	0.0002	1	08/24/2022 12:15	08/25/2022 09:19	AMC	MA,NDA, SDA	

Method: EPA 6010D

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Lithium	<0.02	mg/L	0.02	1	08/19/2022 07:36	08/31/2022 14:34	SLZ	NDA	

Method: EPA 6020B

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Antimony	<0.001	mg/L	0.001	5	08/19/2022 07:36	08/23/2022 19:27	MDE	MA,NDA	
Arsenic	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 19:27	MDE	MA,NDA	
Barium	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 19:27	MDE	MA,NDA	
Beryllium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 19:27	MDE	MA,NDA	
Cadmium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 19:27	MDE	MA,NDA	
Chromium	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 19:27	MDE	MA,NDA	
Cobalt	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 19:27	MDE	MA,NDA	
Lead	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 19:27	MDE	MA,NDA	
Molybdenum	<0.002	mg/L	0.002	5	08/19/2022 07:36	08/23/2022 19:27	MDE	MA,NDA	
Selenium	<0.005	mg/L	0.005	5	08/19/2022 07:36	08/23/2022 19:27	MDE	MA,NDA	
Thallium	<0.0005	mg/L	0.0005	5	08/19/2022 07:36	08/23/2022 19:27	MDE	MA,NDA	

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Report Date: Friday, September 9, 2022 9:30:13 AM



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



Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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August 19, 2022

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

RE: MDU Lewis & Clark Groundwater Sampling

Dear Mr. Peterson,

From August 16-17, 2022, MVTL Field Services division collected ground water samples at the MDU Lewis and Clark Station near Sidney, MT. A duplicate sample was collected from well 119. Samples collected were placed on ice and transported to MVTL in Bismarck, ND for analysis.

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

Sincerely,

Jeremy Meyer
MVTL Field Services Manager

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

	Minnesota Valley Testing Laboratories 2616 E. Broadway Ave Bismarck, ND 58501 (701) 258-9720	Montana - Dakota Utilities - Bis WO: 2822 	Chain of Custody Record 2822
	Report To: MDU Attn: Todd Peterson Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-425-2427 Email: Todd.Peterson@mdu.com	CC:	Project Name: MDU Lewis & Clark Event: Fall 2022 Sampled By: <i>Jeremy</i>

Lab Number	Sample Information				Sample Containers				Field Readings				Analysis Required
	Sample ID	Date	Time	Sample Type	1 Liter Raw	500 mL HNO3	500 mL HNO3 (filtered)	250 mL H2SO4	Temp (°C)	Spec. Cond.	pH	Turbidity (NTU)	
001	MW103	16 Aug 22	1230	GW	X	X	X	X	18.39	1450	7.41	9.87	MDU Lewis & Clark List
002	MW110	16 Aug 22	0740	GW	X	X	X	X	14.95	963	7.19	2.79	
003	MW119	16 Aug 22	0908	GW	X	X	X	X	15.42	1038	7.23	0.34	
004	MW111	17 Aug 22	0815	GW	X	X	X	X	14.28	4584	7.32	0.06	
005	MW117	17 Aug 22	0618	GW	X	X	X	X	15.23	6781	7.45	0.38	
006	MW118	17 Aug 22	0927	GW	X	X	X	X	16.66	1760	7.51	0.95	
007	MW120	16 Aug 22	1415	GW	X	X	X	X	15.29	7366	6.93	0.12	
008	Dup 1	16 Aug 22	0908	GW	X	X	X	X	NA	NA	NA	NA	
009	Field Blank (FB)	17 Aug 22	0850	GW	X	X	X	X	NA	NA	NA	NA	

Comments:

	Relinquished By		Sample Condition		Received By	
	Name	Date/Time	Location	Temp (°C)	Name	Date/Time
1	<i>[Signature]</i>	18 Aug 22 0600	LOG IN Walk In #2	5.4 TM562 / TM805	<i>[Signature]</i>	18 Aug 22 0800
2						

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



Field Datasheet
Surface water Assessment

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

Company: MDU Lewis & Clark

Event: Fall 2022

Sampling Personal: *[Signature]*

Weather Conditions: Temp: 75 °F Wind: N @ 10-15 Precip: Sunny / Partly Cloudy / Cloudy

Well ID	Date	Time	Casing Diameter	Water Level (ft)	Comments
MW101	17 Aug 22	0606	2"	8.60	
MW105		0837	2"	8.33	
MW106		0835	2"	9.12	
MW107		0604	2"	4.15	
MW108		0952	2"	16.10	
MW116		0609	2"	12.53	

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: Fall 2022
 Sample ID: 103
 Sampling Personal: *[Signature]*

Weather Conditions: Temp: 70 °F Wind: N @ 5-10 Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION				SAMPLING INFORMATION			
Well Locked?	YES	NO		Purging Method:	Bladder	Control Settings:	
Well Labeled?	YES	NO		Sampling Method:	Bladder	Purge:	3 Sec.
Casing Strait?	YES	NO		Dedicated Equipment?	YES	NO	Recover:
Well Seal Intact?	YES	NO	Not Visible	Duplicate Sample?	YES	NO	PSI:
Repairs Necessary?				Duplicate Sample ID:			0.0
Casing Diameter:	2"			Bottle List:			
Water Level Before Purge:	10.02 ft			1 Liter Raw 4- 1L Nitric			
Total Depth of Well:	-			500mL Nitric			
Well Volume:	-			500mL Nitric (filtered)			
Depth to Top of Pump:	-			250mL Sulfuric			
Water Level After Sample:	10.00 ft						
Measurement Method:	Electric Water Level Indicator						

FIELD READINGS

Stabilization Parameters (3 Consecutive)			Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate mL/Min	mL Removed	Appearance or Comment Clarity, Color, Odor, Ect.	
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10						clear, slightly turbid, turbid	
16 Aug 22	1010	Start of Well Purge											
	1015	18.89	1704	7.49	0.26	159.5	72.57	10.05	100.0	500.0	Clear		
	1035	20.36	1410	7.41	0.71	167.6	55.02	10.07	100.0	2000.0	Clear		
	1135	19.61	1194	7.36	0.34	162.6	15.72	10.08	100.0	6000.0	Clear		
	1205	17.99	1457	7.41	0.32	120.3	15.02	10.06	100.0	3000.0	Clear		
	1210	18.70	1455	7.41	0.30	116.1	14.51	10.08	100.0	500.0	Clear		
	1215	18.39	1452	7.41	0.30	110.9	12.25	10.08	100.0	500.0	Clear		
	1220	18.45	1454	7.40	0.31	106.4	9.75	10.08	100.0	500.0	Clear		
	1225	18.38	1449	7.40	0.31	104.5	9.92	10.08	100.0	500.0	Clear		
	1230	18.39	1450	7.41	0.31	101.4	9.82	10.08	100.0	500.0	Clear		
Well Stabilized?											YES	NO	Total Volume Purged: 14000.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment Clarity, Color, Odor, Ect.
16 Aug 22	1230	18.39	1450	7.41	9.87	Clear

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: **MDU Lewis & Clark**
 Event: Fall 2022
 Sample ID: 110
 Sampling Personal: [Signature]

Weather Conditions: Temp: 70 °F Wind: N @ 5-10 Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION		
Well Locked?	YES	<input checked="" type="checkbox"/> NO
Well Labeled?	<input checked="" type="checkbox"/> YES	NO
Casing Strait?	<input checked="" type="checkbox"/> YES	NO
Well Seal Intact?	<input checked="" type="checkbox"/> YES	NO Not Visible
Repairs Necessary?		
Casing Diameter:	<u>2"</u>	
Water Level Before Purge:	<u>8.76</u>	ft
Total Depth of Well:	<u>—</u>	ft
Well Volume:	<u>—</u>	liters
Depth to Top of Pump:	<u>—</u>	ft
Water Level After Sample:	<u>8.59</u>	ft
Measurement Method:	<u>Electric Water Level Indicator</u>	

SAMPLING INFORMATION		
Purging Method:	Bladder	<u>1"</u>
Sampling Method:	Bladder	<u>1"</u>
Dedicated Equipment?	YES	<input checked="" type="checkbox"/> NO
Duplicate Sample?	YES	<input checked="" type="checkbox"/> NO
Duplicate Sample ID:	<u>—</u>	
Bottle List:		
1 Liter Raw	4- 1L Nitric	
500mL Nitric		
500mL Nitric (filtered)		
250mL Sulfuric		
Control Settings:		
Purge:	<u>3</u>	Sec.
Recover:	<u>27</u>	Sec.
PSI:	<u>20</u>	

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate ml/Min	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°									clear, slightly turbid, turbid
16 Aug 22											
	<u>0708</u>	Start of Well Purge									
	<u>0713</u>	<u>14.96</u>	<u>967</u>	<u>7.24</u>	<u>4.79</u>	<u>190.6</u>	<u>2.61</u>	<u>8.56</u>	<u>100.0</u>	<u>500.0</u>	<u>Clear</u>
	<u>0733</u>	<u>14.95</u>	<u>959</u>	<u>7.12</u>	<u>5.20</u>	<u>186.5</u>	<u>3.02</u>	<u>8.57</u>	<u>100.0</u>	<u>2000.0</u>	<u>Clear</u>
	<u>0738</u>	<u>14.97</u>	<u>960</u>	<u>7.14</u>	<u>5.28</u>	<u>186.0</u>	<u>2.42</u>	<u>8.57</u>	<u>100.0</u>	<u>500.0</u>	<u>Clear</u>
	<u>0743</u>	<u>14.99</u>	<u>961</u>	<u>7.18</u>	<u>5.43</u>	<u>187.2</u>	<u>2.40</u>	<u>8.58</u>	<u>100.0</u>	<u>500.0</u>	<u>Clear</u>
	<u>0748</u>	<u>14.99</u>	<u>963</u>	<u>7.19</u>	<u>5.50</u>	<u>187.4</u>	<u>2.79</u>	<u>8.58</u>	<u>100.0</u>	<u>500.0</u>	<u>Clear</u>
Well Stabilized?		<input checked="" type="checkbox"/> YES	NO	Total Volume Purged: <u>4000.0</u> mL							

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
<u>16 Aug 22</u>	<u>0748</u>	<u>14.99</u>	<u>963</u>	<u>7.19</u>	<u>2.79</u>	<u>Clear</u>

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet Groundwater Assessment

Company: MDU Lewis & Clark
 Event: Fall 2022
 Sample ID:
 Sampling Personal: *J. M.*

Weather Conditions: Temp: 70 °F Wind: N @ 5-10 Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION			
Well Locked?	YES	NO	
Well Labeled?	YES	NO	
Casing Strait?	YES	NO	
Well Seal Intact?	YES	NO	Not Visible
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	8.35	ft	
Total Depth of Well:		ft	
Well Volume:		liters	
Depth to Top of Pump:		ft	
Water Level After Sample:	8.47	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:	<i>Dup 1</i>	
Bottle List:		
1 Liter Raw	4- 1L Nitric	
500mL Nitric		
500mL Nitric (filtered)		
250mL Sulfuric		
Control Settings:		
Purge:	3	Sec.
Recover:	27	Sec.
PSI:	20	

FIELD READINGS

Purge Date	Time	Temp. (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate (mL/Min)	mL Removed	Appearance or Comment
											Clarity, Color, Odor, Ect.
Start of Well Purge											
<i>16 Aug 22</i>	<i>0828</i>										
	<i>0833</i>	<i>15.14</i>	<i>1038</i>	<i>7.20</i>	<i>1.70</i>	<i>178.7</i>	<i>43.67</i>	<i>8.45</i>	<i>100.0</i>	<i>500.0</i>	<i>Clear</i>
	<i>0853</i>	<i>15.35</i>	<i>1036</i>	<i>7.21</i>	<i>1.88</i>	<i>184.9</i>	<i>3.26</i>	<i>8.46</i>	<i>100.0</i>	<i>200.0</i>	<i>Clear</i>
	<i>0858</i>	<i>15.34</i>	<i>1037</i>	<i>7.22</i>	<i>1.90</i>	<i>186.6</i>	<i>1.19</i>	<i>8.46</i>	<i>100.0</i>	<i>500.0</i>	<i>Clear</i>
	<i>0903</i>	<i>15.41</i>	<i>1036</i>	<i>7.22</i>	<i>1.93</i>	<i>187.9</i>	<i>0.81</i>	<i>8.46</i>	<i>100.0</i>	<i>500.0</i>	<i>Clear</i>
	<i>0908</i>	<i>15.42</i>	<i>1036</i>	<i>7.23</i>	<i>1.96</i>	<i>188.9</i>	<i>0.34</i>	<i>8.46</i>	<i>100.0</i>	<i>500.0</i>	<i>Clear</i>
Well Stabilized? <i>(YES)</i> NO Total Volume Purged: <i>4000.0</i> mL											

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
<i>16 Aug 22</i>	<i>0908</i>	<i>15.42</i>	<i>1038</i>	<i>7.23</i>	<i>0.34</i>	<i>Clear</i>

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
Groundwater Assessment

Company: MDU Lewis & Clark
Event: Fall 2022
Sample ID:
Sampling Personal: [Signature]

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

WELL INFORMATION and SAMPLING INFORMATION sections containing various checkboxes and data entry fields.

FIELD READINGS

Table with columns: Purge Date, Time, Temp, Spec. Cond., pH, DO, ORP, Turbidity, Water Level, Pumping Rate, mL Removed, Appearance or Comment.

Well Stabilized? YES NO Total Volume Purged: 400.0 mL

Summary table with columns: Sample Date, Time, Temp, Spec. Cond., pH, Turbidity, Appearance or Comment.

Comments:

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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: Fall 2022
 Sample ID: 117
 Sampling Personal: *[Signature]*

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

WELL INFORMATION	
Well Locked?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Well Labeled?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Casing Strait?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Well Seal Intact?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Not Visible <input checked="" type="checkbox"/>
Repairs Necessary?	
Casing Diameter:	2" ft
Water Level Before Purge:	5.25 ft
Total Depth of Well:	11.50 ft
Well Volume:	3.9 liters
Depth to Top of Pump:	9.65 ft
Water Level After Sample:	8.35 ft
Measurement Method:	Electric Water Level Indicator

SAMPLING INFORMATION	
Purging Method:	Bladder / "
Sampling Method:	Bladder / "
Dedicated Equipment?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Duplicate Sample?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
Duplicate Sample ID:	
Bottle List:	
1 Liter Raw	4- 1L Nitric
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	
Control Settings:	
Purge:	3 Sec.
Recover:	17 Sec.
PSI:	20

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate mL/Min	mL Removed	Appearance or Comment
Purge Date	Time										Clarity, Color, Odor, Ect.
16 Aug 22	15:08	Start of Well Purge									
	15:13	21.04	6787	7.31	6.37	170.3	1.88	6.82	100.0	500.0	Clear
	15:45	21.53	6739	7.34	6.74	185.6	14.54	6.50	100.0	3000.0	Clear
	16:13	23.37	6758	7.30	6.07	191.9	3.37	Below Pump	100.0	3000.0	Clear
17 Aug 22	06:13	Purged 5 min to clear line									
	06:18	15.23	6781	7.45	7.47	157.8	0.38	6.50	100.0	500.0	Clear

Well Stabilized? YES NO Total Volume Purged: 7000.0 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
17 Aug 22	06:18	15.23	6781	7.45	0.38	Clear

Comments:

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Report Date: Friday, September 9, 2022 9:30:13 AM



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



Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
Groundwater Assessment

Company: MDU Lewis & Clark
Event: Fall 2022
Sample ID:
Sampling Personal: HB

Weather Conditions: Temp: 70°F Wind: N @ 10-15 Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION table with fields: Well Locked?, Well Labeled?, Casing Strait?, Well Seal Intact?, Repairs Necessary?, Casing Diameter, Water Level Before Purge, Total Depth of Well, Well Volume, Depth to Top of Pump, Water Level After Sample, Measurement Method.

SAMPLING INFORMATION table with fields: Purging Method, Sampling Method, Dedicated Equipment?, Duplicate Sample?, Duplicate Sample ID, Bottle List.

Control Settings table with fields: Purge, Recover, PSI.

FIELD READINGS

Table with columns: Purge Date, Time, Temp, Spec. Cond., pH, DO, ORP, Turbidity, Water Level, Pumping Rate, mL Removed, Appearance or Comment.

Well Stabilized? YES NO Total Volume Purged: 4500.0 mL

Table with columns: Sample Date, Time, Temp, Spec. Cond., pH, Turbidity, Appearance or Comment.

Comments: Collected FB @ 0850

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL.

Report Date: Friday, September 9, 2022 9:30:13 AM



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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: Fall 2022
 Sample ID: 120
 Sampling Personal: *J. L. Clark*

Weather Conditions: Temp: 75°F Wind: N @ 5-10 Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION	
Well Locked?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Well Labeled?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Casing Strait?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Well Seal Intact?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> <i>Not Visible</i>
Repairs Necessary?	
Casing Diameter:	2" ft
Water Level Before Purge:	14.36 ft
Total Depth of Well:	ft
Well Volume:	liters
Depth to Top of Pump:	ft
Water Level After Sample:	14.57 ft
Measurement Method:	Electric Water Level Indicator

SAMPLING INFORMATION	
Purging Method:	Bladder
Sampling Method:	Bladder
Dedicated Equipment?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
Duplicate Sample?	YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
Duplicate Sample ID:	
Bottle List:	
1 Liter Raw	4- 1L Nitric
500ml Nitric	
500ml Nitric (filtered)	
250ml Sulfuric	
Control Settings:	
Purge:	3 Sec.
Recover:	27 Sec.
PSI:	20

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate ml/Min	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°									Clarity, Color, Odor, Ect.
16 Aug 22	1335	Start of Well Purge									
	1340	14.51	7405	6.96	0.31	141.5	0.64	14.53	100.0	500.0	Clear
	1400	15.52	7290	6.94	0.31	139.6	0.29	14.55	100.0	2000.0	Clear
	1405	15.35	7307	6.93	0.30	140.0	0.31	14.56	100.0	500.0	Clear
	1410	15.18	7306	6.93	0.29	140.6	0.22	14.56	100.0	500.0	Clear
	1415	15.29	7366	6.93	0.28	140.5	0.12	14.56	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
16 Aug 22	1415	15.29	7366	6.93	0.12	Clear

Comments:

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Report Date: Friday, September 9, 2022 9:30:13 AM

Original Sample	QC Type	Analyte	Analysis Date	QC Result	Original Sample Re	Units	Spike Amount	Spike Resu	Spike % Recov	Spike Duplicate	Spike Duplicate	RPD (%)	Lower Control Limi	Upper Control Limi	RPD Limit (%)
2807001	SPK	Antimony	08/23/2022 17:58:00	106	<0.001	mg/L	0.1	0.1063	106				75	125	
2807001	SPKD	Antimony	08/23/2022 18:02:00	106	<0.001	mg/L				0.1061	106	0.19	75	125	20
2822001	MS	Antimony	08/23/2022 16:52:58	101	0.0049	mg/L	0.4	0.41	101				75	125	
2822001	MSD	Antimony	08/23/2022 18:26:34	102	0.0049	mg/L				0.415	102	1.21	75	125	20
2822008	MS	Antimony	08/23/2022 19:03:16	99.7	<0.001	mg/L	0.4	0.399	99.7				75	125	
2822008	MSD	Antimony	08/23/2022 19:07:21	102	<0.001	mg/L				0.406	102	1.74	75	125	20
2826001	MS	Antimony	08/23/2022 19:47:51	100		mg/L	0.4	0.4	100				75	125	
2826001	MSD	Antimony	08/23/2022 19:51:57	103		mg/L				0.413	103	3.20	75	125	20
2826001	SPK	Antimony	08/23/2022 19:43:00	106		mg/L	0.1	0.1057	106				75	125	
	LFB-MS	Antimony	08/23/2022 18:14:23	102		mg/L	0.1	0.102	102				80	120	
	MB	Antimony	08/23/2022 18:10:18	<0.001		mg/L									
2807001	SPK	Arsenic	08/23/2022 17:58:00	106	0.0020	mg/L	0.1	0.1077	106				75	125	
2807001	SPKD	Arsenic	08/23/2022 18:02:00	105	0.0020	mg/L				0.1072	105	0.46	75	125	20
2822001	MS	Arsenic	08/23/2022 16:52:58	102	0.0030	mg/L	0.4	0.41	102				75	125	
2822001	MSD	Arsenic	08/23/2022 18:26:34	102	0.0030	mg/L				0.413	102	0.73	75	125	20
2822008	MS	Arsenic	08/23/2022 19:03:16	99.2	<0.002	mg/L	0.4	0.397	99.2				75	125	
2822008	MSD	Arsenic	08/23/2022 19:07:21	104	<0.002	mg/L				0.418	104	5.15	75	125	20
2826001	MS	Arsenic	08/23/2022 19:47:51	105		mg/L	0.4	0.432	105				75	125	
2826001	MSD	Arsenic	08/23/2022 19:51:57	106		mg/L				0.436	106	0.92	75	125	20
2826001	SPK	Arsenic	08/23/2022 19:43:00	103		mg/L	0.1	0.1131	103				75	125	
	LFB-MS	Arsenic	08/23/2022 18:14:23	107		mg/L	0.1	0.107	107				80	120	
	MB	Arsenic	08/23/2022 18:10:18	<0.002		mg/L									
2807001	SPK	Barium	08/23/2022 17:58:00	105	<0.1	mg/L	0.1	0.1577	105				75	125	
2807001	SPKD	Barium	08/23/2022 18:02:00	104	<0.1	mg/L				0.1566	104	0.70	75	125	20
2822001	MS	Barium	08/23/2022 16:52:58	99.8	0.0385	mg/L	0.4	0.438	99.8				75	125	
2822001	MSD	Barium	08/23/2022 18:26:34	103	0.0385	mg/L				0.452	103	3.15	75	125	20
2822008	MS	Barium	08/23/2022 19:03:16	99	0.0329	mg/L	0.4	0.429	99				75	125	
2822008	MSD	Barium	08/23/2022 19:07:21	101	0.0329	mg/L				0.438	101	2.08	75	125	20
2826001	MS	Barium	08/23/2022 19:47:51	103		mg/L	0.4	0.496	103				75	125	
2826001	MSD	Barium	08/23/2022 19:51:57	105		mg/L				0.506	105	2.00	75	125	20
2826001	SPK	Barium	08/23/2022 19:43:00	101		mg/L	0.1	0.1867	101				75	125	
	LFB-MS	Barium	08/23/2022 18:14:23	104		mg/L	0.1	0.104	104				80	120	
	MB	Barium	08/23/2022 18:10:18	<0.002		mg/L									
2807001	SPK	Beryllium	08/23/2022 17:58:00	106	<0.0005	mg/L	0.1	0.1059	106				75	125	
2807001	SPKD	Beryllium	08/23/2022 18:02:00	105	<0.0005	mg/L				0.105	105	0.85	75	125	20
2822001	MS	Beryllium	08/23/2022 16:52:58	101	<0.0005	mg/L	0.4	0.405	101				75	125	
2822001	MSD	Beryllium	08/23/2022 18:26:34	104	<0.0005	mg/L				0.418	104	3.16	75	125	20
2822008	MS	Beryllium	08/23/2022 19:03:16	106	<0.0005	mg/L	0.4	0.422	106				75	125	
2822008	MSD	Beryllium	08/23/2022 19:07:21	108	<0.0005	mg/L				0.431	108	2.11	75	125	20
2826001	MS	Beryllium	08/23/2022 19:47:51	105		mg/L	0.4	0.419	105				75	125	
2826001	MSD	Beryllium	08/23/2022 19:51:57	104		mg/L				0.415	104	0.96	75	125	20
2826001	SPK	Beryllium	08/23/2022 19:43:00	104		mg/L	0.1	0.1044	104				75	125	
	LFB-MS	Beryllium	08/23/2022 18:14:23	106		mg/L	0.1	0.106	106				80	120	
	MB	Beryllium	08/23/2022 18:10:18	<0.0005		mg/L									
2807001	SPK	Cadmium	08/23/2022 17:58:00	103	<0.0005	mg/L	0.1	0.1033	103				75	125	
2807001	SPKD	Cadmium	08/23/2022 18:02:00	103	<0.0005	mg/L				0.1034	103	0.10	75	125	20
2822001	MS	Cadmium	08/23/2022 16:52:58	100	<0.0005	mg/L	0.4	0.402	100				75	125	
2822001	MSD	Cadmium	08/23/2022 18:26:34	101	<0.0005	mg/L				0.406	101	0.99	75	125	20
2822008	MS	Cadmium	08/23/2022 19:03:16	98	<0.0005	mg/L	0.4	0.392	98				75	125	
2822008	MSD	Cadmium	08/23/2022 19:07:21	100	<0.0005	mg/L				0.4	100	2.02	75	125	20
2826001	MS	Cadmium	08/23/2022 19:47:51	99.3		mg/L	0.4	0.397	99.3				75	125	
2826001	MSD	Cadmium	08/23/2022 19:51:57	103		mg/L				0.411	103	3.46	75	125	20

2826001	SPK	Cadmium	08/23/2022 19:43:00	100		mg/L	0.1	0.1001	100		75	125	
	LFB-MS	Cadmium	08/23/2022 18:14:23	103		mg/L	0.1	0.103	103		80	120	
	MB	Cadmium	08/23/2022 18:10:18	<0.0005		mg/L							
2807001	SPK	Chromium	08/23/2022 17:58:00	104	<0.002	mg/L	0.1	0.1042	104		75	125	
2807001	SPKD	Chromium	08/23/2022 18:02:00	105	<0.002	mg/L				0.1051	105	0.86	20
2822001	MS	Chromium	08/23/2022 16:52:58	98.3	0.0022	mg/L	0.4	0.395	98.3		75	125	
2822001	MSD	Chromium	08/23/2022 18:26:34	101	0.0022	mg/L				0.405	101	2.50	20
2822008	MS	Chromium	08/23/2022 19:03:16	99.1	<0.002	mg/L	0.4	0.396	99.1		75	125	
2822008	MSD	Chromium	08/23/2022 19:07:21	102	<0.002	mg/L				0.407	102	2.74	20
2826001	MS	Chromium	08/23/2022 19:47:51	100		mg/L	0.4	0.4	100		75	125	
2826001	MSD	Chromium	08/23/2022 19:51:57	102		mg/L				0.409	102	2.22	20
2826001	SPK	Chromium	08/23/2022 19:43:00	107		mg/L	0.1	0.1073	107		75	125	
	LFB-MS	Chromium	08/23/2022 18:14:23	109		mg/L	0.1	0.109	109		80	120	
	MB	Chromium	08/23/2022 18:10:18	<0.002		mg/L							
2807001	SPK	Cobalt	08/23/2022 17:58:00	104		mg/L	0.1	0.1046	104		75	125	
2807001	SPKD	Cobalt	08/23/2022 18:02:00	104		mg/L				0.1045	104	0.10	20
2822001	MS	Cobalt	08/23/2022 16:52:58	99	0.0046	mg/L	0.4	0.401	99		75	125	
2822001	MSD	Cobalt	08/23/2022 18:26:34	100	0.0046	mg/L				0.407	100	1.48	20
2822008	MS	Cobalt	08/23/2022 19:03:16	97.4	<0.002	mg/L	0.4	0.39	97.4		75	125	
2822008	MSD	Cobalt	08/23/2022 19:07:21	100	<0.002	mg/L				0.402	100	3.03	20
2826001	MS	Cobalt	08/23/2022 19:47:51	98.3		mg/L	0.4	0.4	98.3		75	125	
2826001	MSD	Cobalt	08/23/2022 19:51:57	99.9		mg/L				0.406	99.9	1.49	20
2826001	SPK	Cobalt	08/23/2022 19:43:00	103		mg/L	0.1	0.109	103		75	125	
	LFB-MS	Cobalt	08/23/2022 18:14:23	110		mg/L	0.1	0.11	110		80	120	
	MB	Cobalt	08/23/2022 18:10:18	<0.002		mg/L							
2807001	SPK	Lead	08/23/2022 17:58:00	104	<0.0005	mg/L	0.1	0.104	104		75	125	
2807001	SPKD	Lead	08/23/2022 18:02:00	104	<0.0005	mg/L				0.1036	104	0.38	20
2822001	MS	Lead	08/23/2022 16:52:58	101	<0.0005	mg/L	0.4	0.404	101		75	125	
2822001	MSD	Lead	08/23/2022 18:26:34	102	<0.0005	mg/L				0.407	102	0.74	20
2822008	MS	Lead	08/23/2022 19:03:16	101	<0.0005	mg/L	0.4	0.405	101		75	125	
2822008	MSD	Lead	08/23/2022 19:07:21	103	<0.0005	mg/L				0.411	103	1.47	20
2826001	MS	Lead	08/23/2022 19:47:51	100		mg/L	0.4	0.401	100		75	125	
2826001	MSD	Lead	08/23/2022 19:51:57	102		mg/L				0.411	102	2.46	20
2826001	SPK	Lead	08/23/2022 19:43:00	96.8		mg/L	0.1	0.098	96.8		75	125	
	LFB-MS	Lead	08/23/2022 18:14:23	103		mg/L	0.1	0.103	103		80	120	
	MB	Lead	08/23/2022 18:10:18	<0.0005		mg/L							
2822001	MS	Lithium	08/31/2022 14:28:02	96.4	0.0515	mg/L	0.4	0.4371	96.4		70	130	
2822001	MSD	Lithium	08/31/2022 14:28:39	98.3	0.0515	mg/L				0.4448	98.3	1.75	20
2822008	MS	Lithium	08/31/2022 14:33:07	95.4	0.0388	mg/L	0.4	0.4206	95.4		70	130	
2822008	MSD	Lithium	08/31/2022 14:33:44	98.1	0.0388	mg/L				0.4312	98.1	2.49	20
2899003	PDS	Lithium	08/31/2022 14:40:04	91.8	0.0486	mg/L	0.4	0.4158	91.8		75	125	
2899003	PDS	Lithium	08/31/2022 14:40:41	94.3	0.0486	mg/L				0.4256	94.3	2.69	20
	LFB-OE	Lithium	08/31/2022 14:26:51	103		mg/L	0.4	0.4115	103		85	115	
	MB	Lithium	08/31/2022 14:26:18	<0.04		mg/L							
2822004	MS	Mercury	08/25/2022 09:19:00	88.9	<0.2	ug/L	2	1.778	88.9		70	130	
2822004	MSD	Mercury	08/25/2022 09:19:00	85.5	<0.2	ug/L				1.71	85.5	3.90	20
	LFB	Mercury	08/25/2022 09:19:00	101		ug/L	2	2.02	101		85	115	
	LFB	Mercury	08/25/2022 09:19:00	104		ug/L	2	2.088	104		85	115	
	LRB	Mercury	08/25/2022 09:19:00	<0.2		ug/L							
	MB	Mercury	08/25/2022 09:19:00	<0.2		ug/L							
2807001	SPK	Molybdenum	08/23/2022 17:58:00	115		mg/L	0.1	0.1185	115		75	125	
2807001	SPKD	Molybdenum	08/23/2022 18:02:00	116		mg/L				0.1192	116	0.59	20
2822001	MS	Molybdenum	08/23/2022 16:52:58	106	0.0246	mg/L	0.4	0.447	106		75	125	
2822001	MSD	Molybdenum	08/23/2022 18:26:34	106	0.0246	mg/L				0.45	106	0.67	20



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Account #: 2800 **Client:** Montana-Dakota Utilities - Bismarck
Workorder: MDU Lewis & Clark Fall 2022 (2823) **PO:** 190709 OP

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

Certificate of Analysis

Approval

All data reported has been reviewed and approved by:

Claudette Carroll, Lab Manager Bismarck, ND

Analyses performed under Minnesota Department of Health Accreditation conforms to the current TNI standards.

NEW ULM LAB CERTIFICATIONS:
MN LAB # 027-015-125 ND WW/DW # R-040

BISMARCK LAB CERTIFICATIONS:
MN LAB # 038-999-267 ND W/DW # ND-016 SD SDWA

Subcontracted Analyses

Analyzed By	Company	Address	Phone	Certification
SUBu	GEL Laboratories	2040, Charleston. SC 29407	843-556-8171	CERT

MVT L guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Report Date: Tuesday, September 20, 2022 4:41:25 PM



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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Workorder Summary

Workorder Comments

All analytes with dilution factors greater than 1 (displayed in DF column) required dilution due to matrix or high concentration of target analyte unless otherwise noted and reporting limits (RDL column) have been adjusted accordingly.

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Report Date: Tuesday, September 20, 2022 4:41:25 PM

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2823001 **Date Collected:** 08/16/2022 12:30 **Matrix:** Groundwater
Sample ID: MW103 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 21.6

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	09/20/2022 13:14	09/20/2022 13:14	SUBu		
Radium 228	See Attached			1	09/20/2022 13:14	09/20/2022 13:14	CC		

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Report Date: Tuesday, September 20, 2022 4:41:25 PM



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1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.MVTL.com



Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2823002 **Date Collected:** 08/16/2022 07:48 **Matrix:** Groundwater
Sample ID: MW110 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 21.6

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	09/20/2022 13:14	09/20/2022 13:14	CC		
Radium 228	See Attached			1	09/20/2022 13:14	09/20/2022 13:14	CC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2823003 **Date Collected:** 08/16/2022 09:08 **Matrix:** Groundwater
Sample ID: MW119 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 21.6

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See			1	09/20/2022	09/20/2022	CC		
	Attached				13:14	13:14			
Radium 228	See			1	09/20/2022	09/20/2022	CC		
	Attached				13:14	13:14			

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2823004 **Date Collected:** 08/17/2022 08:15 **Matrix:** Groundwater
Sample ID: MW111 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 21.6

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	09/20/2022 13:14	09/20/2022 13:14	CC		
Radium 228	See Attached			1	09/20/2022 13:14	09/20/2022 13:14	CC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2823005 **Date Collected:** 08/17/2022 06:18 **Matrix:** Groundwater
Sample ID: MW117 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 21.6

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	09/20/2022 13:14	09/20/2022 13:14	CC		
Radium 228	See Attached			1	09/20/2022 13:14	09/20/2022 13:14	CC		

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 www.MVTl.com



Account #: 2800 **Client:** Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2823006 **Date Collected:** 08/17/2022 09:27 **Matrix:** Groundwater
Sample ID: MW118 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 21.6

Contract Lab**Method: Contracted Result**

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See			1	09/20/2022	09/20/2022	CC		
	Attached				13:14	13:14			
Radium 228	See			1	09/20/2022	09/20/2022	CC		
	Attached				13:14	13:14			

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www.MVTL.com



Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2823007 **Date Collected:** 08/16/2022 14:15 **Matrix:** Groundwater
Sample ID: MW120 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 21.6

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	09/20/2022 13:14	09/20/2022 13:14	CC		
Radium 228	See Attached			1	09/20/2022 13:14	09/20/2022 13:14	CC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2823008 **Date Collected:** 08/16/2022 09:08 **Matrix:** Groundwater
Sample ID: Dup 1 **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 21.6

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See Attached			1	09/20/2022 13:14	09/20/2022 13:14	CC		
Radium 228	See Attached			1	09/20/2022 13:14	09/20/2022 13:14	CC		

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Results

Lab ID: 2823009 **Date Collected:** 08/17/2022 08:50 **Matrix:** Groundwater
Sample ID: Field Blank (FB) **Date Received:** 08/18/2022 08:00 **Collector:** MVTL Field Service

Temp @ Receipt (C): 21.6

Contract Lab

Method: Contracted Result

Parameter	Results	Units	RDL	DF	Prepared	Analyzed	By	Cert	Qual
Radium 226	See			1	09/20/2022	09/20/2022	CC		
	Attached				13:14	13:14			
Radium 228	See			1	09/20/2022	09/20/2022	CC		
	Attached				13:14	13:14			

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August 19, 2022

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

RE: MDU Lewis & Clark Groundwater Sampling

Dear Mr. Peterson,

From August 16-17, 2022, MVTL Field Services division collected ground water samples at the MDU Lewis and Clark Station near Sidney, MT. A duplicate sample was collected from well 119. Samples collected were placed on ice and transported to MVTL in Bismarck, ND for analysis.

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

Sincerely,

Jeremy Meyer
MVTL Field Services Manager

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



September 19, 2022

Claudette Carroll

2616 E Broadway Ave
Bismarck, North Dakota 58501

Re: Routine Analysis - Radiochemistry
Work Order: 590701
SDG: 2823

Dear Claudette Carroll:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on August 23, 2022. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 1614.

Sincerely,

Delaney Stone
Project Manager

Purchase Order: BL6585
Enclosures





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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

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Case Narrative



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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Receipt Narrative
for
Minnesota Valley Testing Laboratories, Inc.
SDG: 2823
Work Order: 590701

September 19, 2022

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on August 23, 2022 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification: The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
590701001	MW103
590701002	MW110
590701003	MW119
590701004	MW111
590701005	MW117
590701006	MW118
590701007	MW120
590701008	DUP1
590701009	FIELD BLANK

Case Narrative:

Sample analyses were conducted using methodology as outlined in GEL's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

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Client: Montana-Dakota Utilities - Bismarck

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Radiochemistry.

A handwritten signature in black ink that reads "Delaney Stone".

Delaney Stone
Project Manager



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Chain of Custody and Supporting Documentation

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

590701

Chain of Custody Record

Page 1 of 1

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

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

WO #2823

Company Name and Address: MVTL 2616 E Broadway Bismarck, ND 58501		Account #:	Phone #: 701-258-9720
Billing Address (indicate if different from above): PO Box 249 New Ulm, MN 56073		Contact: Claudette	Fax #: For faxed report check box <input type="checkbox"/>
		Name of Sampler:	E-mail: ccarroll@mvtl.com For e-mail report check box <input type="checkbox"/>
		Quote Number	Date Submitted: 18-Aug-22
		Project Name/Number:	Purchase Order #: BL6585

IML Lab Number	MVTL Lab Number	Client Sample ID	Sample Type	Date Sampled	Time Sampled	Bottle Type					Analysis Required
						Untreated	1000 ml HNO3	VOC Vials	Unpreserved	Glass Jar	
	2823001	MW103	GW	16-Aug-22	1230	4					Ra226 & Ra228
	2823002	MW110	GW	16-Aug-22	748	4					Ra226 & Ra228
	2823003	MW119	GW	16-Aug-22	908	4					Ra226 & Ra228
	2823004	MW111	GW	17-Aug-22	815	4					Ra226 & Ra228
	2823005	MW117	GW	17-Aug-22	618	4					Ra226 & Ra228
	2823006	MW118	GW	17-Aug-22	927	4					Ra226 & Ra228
	2823007	MW120	GW	16-Aug-22	1415	4					Ra226 & Ra228
	2823008	Dup 1	GW	16-Aug-22	908	4					Ra226 & Ra228
	2823009	Field Blank	GW	17-Aug-22	850	4					Ra226 & Ra228

All results must be reported as a numerical value

Transferred by:	Date:	Time:	Sample Condition:	Received by:	Date:	Temp:
E. Schauer	18-Aug-22	1700	OK	<i>[Signature]</i>	8/27/22 10/10.	
2.						

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

GEL Laboratories LLC SAMPLE RECEIPT & REVIEW FORM
Client: MVTL SDG/AR/COC/Work Order: 590701
Received By: Shanequa Patterson Date Received: 8/23/22
Carrier and Tracking Number: 12555 901 03 6881 9021 24
Suspected Hazard Information: If Net Counts > 100cpm on samples not marked 'radioactive', contact the Radiation Safety Group for further investigation.
Sample Receipt Criteria: Shipping containers received intact and sealed? Chain of custody documents included with shipment? Samples requiring cold preservation within (0 <= 6 deg. C)? Daily check performed and passed on IR temperature gun? Sample containers intact and sealed? Samples requiring chemical preservation at proper pH? Do any samples require Volatile Analysis? Samples received within holding time? Sample ID's on COC match ID's on bottles? Date & time on COC match date & time on bottles? Number of containers received match number indicated on COC? Are sample containers identifiable as GEL provided by use of GEL labels? COC form is properly signed in relinquished/received sections?
Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials [Signature] Date 8/24/22 Page 1 of 1

GL-CHL-SR-001 Rev 7

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Client: Montana-Dakota Utilities - Bismarck

Laboratory Certifications



MINNESOTA VALLEY TESTING LABORATORIES, INC.

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1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

List of current GEL Certifications as of 19 September 2022

State	Certification
Alabama	42200
Alaska	17-018
Alaska Drinking Water	SC00012
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (A133904)
Maine	2019020
Maryland	270
Massachusetts	M-SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122023-3
New Hampshire NELAP	2054
New Jersey NELAP	SC0002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2022-137
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-22-20
Utah NELAP	SC000122021-36
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Radiological Analysis

Page 9 of 26 SDG: 2823

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Case Narrative



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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Radiochemistry
Technical Case Narrative
Minnesota Valley Testing Laboratories, Inc.
SDG #: 2823
Work Order #: 590701

Product: GFPC Ra228, Liquid
Analytical Method: EPA 904.0/SW846 9320 Modified
Analytical Procedure: GL-RAD-A-063 REV# 5
Analytical Batch: 2307801

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
590701001	MW103
590701002	MW110
590701003	MW119
590701004	MW111
590701005	MW117
590701006	MW118
590701007	MW120
590701008	DUP1
590701009	FIELD BLANK
1205173620	Method Blank (MB)
1205173621	590616001(NonSDG) Sample Duplicate (DUP)
1205173622	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

RDL Met

The following RDL was met with rounding.

Sample	Analyte	Value
590701001 (MW103)	Radium-228	Result 0.528 < MDA 3.09 > RDL 3 pCi/L

Product: Lucas Cell, Ra226, Liquid
Analytical Method: EPA 903.1 Modified
Analytical Procedure: GL-RAD-A-008 REV# 15

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Analytical Batch: 2307794

The following samples were analyzed using the above methods and analytical procedure(s).

<u>GEL Sample ID#</u>	<u>Client Sample Identification</u>
590701001	MW103
590701002	MW110
590701003	MW119
590701004	MW111
590701005	MW117
590701006	MW118
590701007	MW120
590701008	DUP1
590701009	FIELD BLANK
1205173597	Method Blank (MB)
1205173598	590616001(NonSDG) Sample Duplicate (DUP)
1205173599	590616001(NonSDG) Matrix Spike (MS)
1205173600	Laboratory Control Sample (LCS)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Technical Information

Recounts

Sample 1205173597 (MB) was recounted due to a suspected blank false positive. The recount is reported.

Miscellaneous Information

Additional Comments

The matrix spike, 1205173599 (Non SDG 590616001MS), aliquot was reduced to conserve sample volume.

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.



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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

**Qualifier Definition Report
for**

MVTL001 Minnesota Valley Testing Laboratories, Inc.
Client SDG: 2823 GEL Work Order: 590701

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Review/Validation

GEL requires all analytical data to be verified by a qualified data reviewer. In addition, all CLP-like deliverables receive a third level review of the fractional data package.

The following data validator verified the information presented in this data report:

Signature: 	Name: Kate Gellatly
Date: 20 SEP 2022	Title: Analyst I



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Sample Data Summary

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 20, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: MW103 Project: MVTL00121
Sample ID: 590701001 Client ID: MVTL001
Matrix: Ground Water
Collect Date: 16-AUG-22 12:30
Receive Date: 23-AUG-22
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Rad Gas Flow Proportional Counting												
GFPC Ra228, Liquid "As Received"												
Radium-228	U	0.528	+/-1.71	3.09	3.00	pCi/L		JXC9	09/15/22	0910	2307801	1
Radium-226+Radium-228 Calculation "See Parent Products"												
Radium-226+228 Sum		1.06	+/-1.76			pCi/L		NXL1	09/19/22	1252	2307802	2
Rad Radium-226												
Lucas Cell, Ra226, Liquid "As Received"												
Radium-226	U	0.533	+/-0.418	0.628	1.00	pCi/L		LXP1	09/09/22	0755	2307794	3

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	Calculation	
3	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC Ra228, Liquid "As Received"			50.1	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

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Certificate of Analysis

Report Date: September 20, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: MW110 Project: MVTL00121
Sample ID: 590701002 Client ID: MVTL001
Matrix: Ground Water
Collect Date: 16-AUG-22 07:48
Receive Date: 23-AUG-22
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Rad Gas Flow Proportional Counting												
GFPC Ra228, Liquid "As Received"												
Radium-228	U	0.468	+/-0.892	1.58	3.00	pCi/L		JXC9	09/15/22	0910	2307801	1
Radium-226+Radium-228 Calculation "See Parent Products"												
Radium-226+228 Sum		3.60	+/-1.21			pCi/L		NXL1	09/19/22	1252	2307802	2
Rad Radium-226												
Lucas Cell, Ra226, Liquid "As Received"												
Radium-226		3.14	+/-0.816	0.674	1.00	pCi/L		LXP1	09/09/22	0755	2307794	3

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	Calculation	
3	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC Ra228, Liquid "As Received"			88.1	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 20, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: MW119 Project: MVTL00121
Sample ID: 590701003 Client ID: MVTL001
Matrix: Ground Water
Collect Date: 16-AUG-22 09:08
Receive Date: 23-AUG-22
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Rad Gas Flow Proportional Counting												
GFPC Ra228, Liquid "As Received"												
Radium-228	U	-0.165	+/-1.28	2.35	3.00	pCi/L		JXC9	09/15/22	0910	2307801	1
Radium-226+Radium-228 Calculation "See Parent Products"												
Radium-226+228 Sum		4.24	+/-1.54			pCi/L		NXL1	09/19/22	1252	2307802	2
Rad Radium-226												
Lucas Cell, Ra226, Liquid "As Received"												
Radium-226		4.24	+/-0.859	0.612	1.00	pCi/L		LXP1	09/09/22	0755	2307794	3

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	Calculation	
3	EPA 903.1 Modified	

Surrogate/Tracer	Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer		GFPC Ra228, Liquid "As Received"			85.9	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 20, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: MW111
Sample ID: 590701004
Matrix: Ground Water
Collect Date: 17-AUG-22 08:15
Receive Date: 23-AUG-22
Collector: Client

Project: MVTL00121
Client ID: MVTL001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Rad Gas Flow Proportional Counting												
GFPC Ra228, Liquid "As Received"												
Radium-228		2.38	+/-1.33	2.00	3.00	pCi/L		JXC9	09/15/22	0910	2307801	1
Radium-226+Radium-228 Calculation "See Parent Products"												
Radium-226+228 Sum		2.76	+/-1.37			pCi/L		NXL1	09/19/22	1252	2307802	2
Rad Radium-226												
Lucas Cell, Ra226, Liquid "As Received"												
Radium-226	U	0.384	+/-0.345	0.525	1.00	pCi/L		LXP1	09/09/22	0755	2307794	3

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	Calculation	
3	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC Ra228, Liquid "As Received"			78.5	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 20, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: MW117 Project: MVTL00121
Sample ID: 590701005 Client ID: MVTL001
Matrix: Ground Water
Collect Date: 17-AUG-22 06:18
Receive Date: 23-AUG-22
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Rad Gas Flow Proportional Counting												
GFPC Ra228, Liquid "As Received"												
Radium-228		2.49	+/-1.47	2.27	3.00	pCi/L		JXC9	09/15/22	0910	2307801	1
Radium-226+Radium-228 Calculation "See Parent Products"												
Radium-226+228 Sum		3.31	+/-1.54			pCi/L		NXL1	09/19/22	1252	2307802	2
Rad Radium-226												
Lucas Cell, Ra226, Liquid "As Received"												
Radium-226		0.822	+/-0.457	0.580	1.00	pCi/L		LXP1	09/09/22	0755	2307794	3

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	Calculation	
3	EPA 903.1 Modified	

Surrogate/Tracer	Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer		GFPC Ra228, Liquid "As Received"			86.3	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Certificate of Analysis

Report Date: September 20, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: MW118
Sample ID: 590701006
Matrix: Ground Water
Collect Date: 17-AUG-22 09:27
Receive Date: 23-AUG-22
Collector: Client

Project: MVTL00121
Client ID: MVTL001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Rad Gas Flow Proportional Counting												
GFPC Ra228, Liquid "As Received"												
Radium-228	U	0.519	+/-1.07	1.88	3.00	pCi/L		JXC9	09/15/22	0910	2307801	1
Radium-226+Radium-228 Calculation "See Parent Products"												
Radium-226+228 Sum		1.14	+/-1.14			pCi/L		NXL1	09/19/22	1252	2307802	2
Rad Radium-226												
Lucas Cell, Ra226, Liquid "As Received"												
Radium-226		0.617	+/-0.400	0.555	1.00	pCi/L		LXP1	09/09/22	0755	2307794	3

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	Calculation	
3	EPA 903.1 Modified	

Surrogate/Tracer	Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer		GFPC Ra228, Liquid "As Received"			82.8	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: September 20, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: MW120 Project: MVTL00121
Sample ID: 590701007 Client ID: MVTL001
Matrix: Ground Water
Collect Date: 16-AUG-22 14:15
Receive Date: 23-AUG-22
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Rad Gas Flow Proportional Counting												
GFPC Ra228, Liquid "As Received"												
Radium-228		1.42	+/-0.902	1.34	3.00	pCi/L		JXC9	09/15/22	0910	2307801	1
Radium-226+Radium-228 Calculation "See Parent Products"												
Radium-226+228 Sum		2.11	+/-0.984			pCi/L		NXL1	09/19/22	1252	2307802	2
Rad Radium-226												
Lucas Cell, Ra226, Liquid "As Received"												
Radium-226		0.691	+/-0.394	0.441	1.00	pCi/L		LXP1	09/09/22	0830	2307794	3

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	Calculation	
3	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC Ra228, Liquid "As Received"			86	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

GEL LABORATORIES LLC

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Certificate of Analysis

Report Date: September 20, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: DUP1 Project: MVTL00121
Sample ID: 590701008 Client ID: MVTL001
Matrix: Ground Water
Collect Date: 16-AUG-22 09:08
Receive Date: 23-AUG-22
Collector: Client

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Rad Gas Flow Proportional Counting												
GFPC Ra228, Liquid "As Received"												
Radium-228	U	0.849	+/-1.03	1.74	3.00	pCi/L		JXC9	09/15/22	0910	2307801	1
Radium-226+Radium-228 Calculation "See Parent Products"												
Radium-226+228 Sum		1.09	+/-1.07			pCi/L		NXL1	09/19/22	1252	2307802	2
Rad Radium-226												
Lucas Cell, Ra226, Liquid "As Received"												
Radium-226	U	0.239	+/-0.292	0.491	1.00	pCi/L		LXP1	09/09/22	0830	2307794	3

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	Calculation	
3	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC Ra228, Liquid "As Received"			86.2	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor Lc/LC: Critical Level
DL: Detection Limit PF: Prep Factor
MDA: Minimum Detectable Activity RL: Reporting Limit
MDC: Minimum Detectable Concentration SQL: Sample Quantitation Limit

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: September 20, 2022

Company :
Address : 2616 E Broadway Ave

Bismarck, North Dakota 58501
Contact: Claudette Carroll
Project: Routine Analysis - Radiochemistry

Client Sample ID: FIELD BLANK
Sample ID: 590701009
Matrix: Ground Water
Collect Date: 17-AUG-22 08:50
Receive Date: 23-AUG-22
Collector: Client

Project: MVTL00121
Client ID: MVTL001

Parameter	Qualifier	Result	Uncertainty	MDC	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
Rad Gas Flow Proportional Counting												
GFPC Ra228, Liquid "As Received"												
Radium-228	U	0.414	+/-1.13	2.03	3.00	pCi/L		JXC9	09/15/22	0910	2307801	1
Radium-226+Radium-228 Calculation "See Parent Products"												
Radium-226+228 Sum		1.03	+/-1.19			pCi/L		NXL1	09/19/22	1252	2307802	2
Rad Radium-226												
Lucas Cell, Ra226, Liquid "As Received"												
Radium-226		0.611	+/-0.357	0.360	1.00	pCi/L		LXP1	09/09/22	0830	2307794	3

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 904.0/SW846 9320 Modified	
2	Calculation	
3	EPA 903.1 Modified	

Surrogate/Tracer Recovery	Test	Result	Nominal	Recovery%	Acceptable Limits
Barium-133 Tracer	GFPC Ra228, Liquid "As Received"			77.2	(15%-125%)

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

Column headers are defined as follows:

DF: Dilution Factor
DL: Detection Limit
MDA: Minimum Detectable Activity
MDC: Minimum Detectable Concentration
Lc/LC: Critical Level
PF: Prep Factor
RL: Reporting Limit
SQL: Sample Quantitation Limit

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Quality Control Summary

Page 24 of 26 SDG: 2823

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

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QC Summary

Report Date: September 20, 2022

Page 1 of 2

Contact: 2616 E Broadway Ave
Bismarck, North Dakota
Claudette Carroll

Workorder: 590701

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
Rad Gas Flow											
Batch	2307801										
QC1205173621	590616001	DUP									
Radium-228	U	1.26		3.27	pCi/L	88.9		(0% - 100%)	JXC9	09/15/22	09:10
	Uncertainty	+/-1.55		+/-1.21							
QC1205173622	LCS										
Radium-228	44.3			41.8	pCi/L		94.4	(75%-125%)		09/15/22	09:10
	Uncertainty			+/-3.50							
QC1205173620	MB										
Radium-228			U	1.07	pCi/L					09/15/22	09:10
	Uncertainty			+/-0.831							
Rad Ra-226											
Batch	2307794										
QC1205173598	590616001	DUP									
Radium-226	U	0.495	U	0.537	pCi/L	N/A		N/A	LXP1	09/09/22	08:30
	Uncertainty	+/-0.455		+/-0.436							
QC1205173600	LCS										
Radium-226	26.5			26.2	pCi/L		98.7	(75%-125%)		09/09/22	08:30
	Uncertainty			+/-1.93							
QC1205173597	MB										
Radium-226			U	0.357	pCi/L					09/09/22	12:00
	Uncertainty			+/-0.301							
QC1205173599	590616001	MS									
Radium-226	132 U	0.495		102	pCi/L		77.6	(75%-125%)		09/09/22	08:30
	Uncertainty	+/-0.455		+/-9.09							

Notes:

Counting Uncertainty is calculated at the 95% confidence level (1.96-sigma).

The Qualifiers in this report are defined as follows:

- ** Analyte is a Tracer compound
- < Result is less than value reported
- > Result is greater than value reported
- BD Results are either below the MDC or tracer recovery is low
- FA Failed analysis.
- H Analytical holding time was exceeded

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

GEL LABORATORIES LLC

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QC Summary

Workorder: 590701

Page 2 of 2

Parname	NOM	Sample	Qual	QC	Units	RPD%	REC%	Range	Anlst	Date	Time
J											
J											
K											
L											
M											
M											
N/A											
N1											
ND											
NJ											
Q											
R											
U											
UI											
UJ											
UL											
X											
Y											
^											
h											

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where the duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck

Minnesota Valley Testing Laboratories 2616 E. Broadway Ave Bismarck, ND 58501 (701) 258-9720	Montana - Dakota Utilities - Bis WO: 2823 	Chain of Custody Record 2823
	Report To: MDU Attn: Todd Peterson Address: 400 N. 4th St Bismarck, ND 58501 Phone: 701-425-2427 Email: Todd.Peterson@mdu.com	CC:

Lab Number	Sample Information			Sample Type	Sample Containers										Field Readings			Analysis Required
	Sample ID	Date	Time		1 Liter Nitric													
001	MW103	16 Aug 22	1230	GW	4													
002	MW110	16 Aug 22	0748	GW	4													
003	MW119	16 Aug 22	0908	GW	4													
004	MW111	17 Aug 22	0815	GW	4													
005	MW117	17 Aug 22	0618	GW	4													
006	MW118	17 Aug 22	0927	GW	4													
007	MW120	16 Aug 22	1415	GW	4													
008	Dup 1	16 Aug 22	0908	GW	4													
009	Field Blank (FB)	17 Aug 22	0850	GW	4													

Comments:

1	Relinquished By		Sample Condition		Received By	
	Name	Date/Time	Location	Temp (°C)	Name	Date/Time
1	<i>[Signature]</i>	18 Aug 22 0600	Log In Walk In #2	21.6 TM562 / TM805	<i>[Signature]</i>	18 Aug 22 0800
2						

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
Surface water Assessment

Company: **MDU Lewis & Clark**
Event: Fall 2022
Sampling Personal: [Signature]

Weather Conditions: Temp: 75 °F Wind: N @ 10-15 Precip: Sunny / Partly Cloudy / Cloudy

Well ID	Date	Time	Casing Diameter	Water Level (ft)	Comments
MW101	7 Aug 22	0606	2"	8.60	
MW105		0837	2"	8.33	
MW106		0835	2"	9.12	
MW107		0604	2"	4.15	
MW108		0952	2"	16.10	
MW116		0609	2"	12.53	

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: Fall 2022
 Sample ID: 103
 Sampling Personal: *[Signature]*

Weather Conditions: Temp: 70 °F Wind: N @ 5-10 Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION			
Well Locked?	YES	(NO)	
Well Labeled?	YES	NO	
Casing Strait?	YES	NO	
Well Seal Intact?	YES	NO	Not Visible
Repairs Necessary?			
Casing Diameter:	2"		
Water Level Before Purge:	10.02	ft	
Total Depth of Well:		ft	
Well Volume:		liters	
Depth to Top of Pump:		ft	
Water Level After Sample:	10.08	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			

FIELD READINGS											
Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate ml/Min	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°									Clarity, Color, Odor, Ect.
16 Aug 22	1010	Start of Well Purge									
	1015	18.89	1704	7.49	0.26	159.5	72.57	10.05	100.0	500.0	Clear
	1035	20.36	1418	7.41	0.71	167.16	55.02	10.07	100.0	2000.0	Clear
	1135	19.61	1194	7.36	0.34	167.6	15.72	10.08	100.0	6000.0	Clear
	1205	17.99	1457	7.41	0.32	120.3	15.02	10.08	100.0	3000.0	Clear
	1210	18.70	1455	7.41	0.30	116.1	14.51	10.08	100.0	500.0	Clear
	1215	18.39	1452	7.41	0.30	110.9	12.25	10.08	100.0	500.0	Clear
	1220	18.45	1454	7.40	0.31	108.4	9.75	10.08	100.0	500.0	Clear
	1225	18.38	1449	7.40	0.31	104.5	9.92	10.08	100.0	500.0	Clear
	1230	18.39	1450	7.41	0.31	101.4	9.87	10.08	100.0	500.0	Clear
Well Stabilized?		YES	NO	Total Volume Purged: 14000.0 ml							

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
16 Aug 22	1230	18.39	1450	7.41	9.87	Clear

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
Groundwater Assessment

Company: MDU Lewis & Clark
Event: Fall 2022
Sample ID: 110
Sampling Personal: [Signature]

Weather Conditions: Temp: 70 F Wind: N @ 5-10 Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION table with fields: Well Locked?, Well Labeled?, Casing Strait?, Well Seal Intact?, Repairs Necessary?, Casing Diameter, Water Level Before Purge, Total Depth of Well, Well Volume, Depth to Top of Pump, Water Level After Sample, Measurement Method.

SAMPLING INFORMATION table with fields: Purging Method, Sampling Method, Dedicated Equipment?, Duplicate Sample?, Duplicate Sample ID, Bottle List.

Control Settings table with fields: Purge, Recover, PSI.

FIELD READINGS

Table with columns: Purge Date, Time, Temp. (C), Spec. Cond., pH, DO (mg/L), ORP (mV), Turbidity (NTU), Water Level (ft), Pumping Rate (ml/Min), mL Removed, Appearance or Comment.

Well Stabilized? YES NO Total Volume Purged: 4000.0 ml

Summary table with columns: Sample Date, Time, Temp. (C), Spec. Cond., pH, Turbidity (NTU), Appearance or Comment.

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
Groundwater Assessment

Company: MDU Lewis & Clark
Event: Fall 2022
Sample ID: 119
Sampling Personal: [Signature]

Weather Conditions: Temp: 70 °F Wind: N @ S-10 Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION table with fields: Well Locked?, Well Labeled?, Casing Strait?, Well Seal Intact?, Repairs Necessary?, Casing Diameter, Water Level Before Purge, Total Depth of Well, Well Volume, Depth to Top of Pump, Water Level After Sample, Measurement Method.

SAMPLING INFORMATION table with fields: Purging Method, Sampling Method, Dedicated Equipment?, Duplicate Sample?, Duplicate Sample ID, Bottle List.

Control Settings table with fields: Purge, Recover, PSI.

FIELD READINGS

Table with columns: Purge Date, Time, Temp, Spec. Cond., pH, DO, ORP, Turbidity, Water Level, Pumping Rate, mL Removed, Appearance or Comment. Includes data for 16 Aug 22.

Well Stabilized? YES NO Total Volume Purged: 4000.0 mL

Summary table with columns: Sample Date, Time, Temp, Spec. Cond., pH, Turbidity, Appearance or Comment.

Comments:

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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



Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
Groundwater Assessment

Company: MDU Lewis & Clark
Event: Fall 2022
Sample ID: 111
Sampling Personal: J. Clark

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

WELL INFORMATION table with fields: Well Locked?, Well Labeled?, Casing Strait?, Well Seal Intact?, Repairs Necessary?, Casing Diameter, Water Level Before Purge, Total Depth of Well, Well Volume, Depth to Top of Pump, Water Level After Sample, Measurement Method.

SAMPLING INFORMATION table with fields: Purging Method, Sampling Method, Dedicated Equipment?, Duplicate Sample?, Duplicate Sample ID, Bottle List, Control Settings.

FIELD READINGS

Table with columns: Purge Date, Time, Temp. (°C), Spec. Cond., pH, DO (mg/L), ORP (mV), Turbidity (NTU), Water Level (ft), Pumping Rate (mL/Min), mL Removed, Appearance or Comment.

Summary row for field readings including 'Well Stabilized?' (YES) and 'Total Volume Purged: 4000.0 mL'.

Sample Date table with columns: Sample Date, Time, Temp. (°C), Spec. Cond., pH, Turbidity (NTU), Appearance or Comment.

Comments:

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL.

Report Date: Tuesday, September 20, 2022 4:41:25 PM



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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
Event: Fall 2022
Sample ID: 117
Sampling Personal: [Signature]

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

WELL INFORMATION	
Well Locked?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Well Labeled?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Casing Strait?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Well Seal Intact?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/> Not Visible <input checked="" type="checkbox"/>
Repairs Necessary?	
Casing Diameter:	2"
Water Level Before Purge:	5.25 ft
Total Depth of Well:	11.50 ft
Well Volume:	3.9 liters
Depth to Top of Pump:	9.65 ft
Water Level After Sample:	8.35 ft
Measurement Method:	Electric Water Level Indicator

SAMPLING INFORMATION	
Purging Method:	Bladder 1"
Sampling Method:	Bladder 1"
Dedicated Equipment?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Duplicate Sample?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Duplicate Sample ID:	
Bottle List:	
1 Liter Raw	4- 1L Nitric
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	
Control Settings:	
Purge:	3 Sec.
Recover:	17 Sec.
PSI:	20

FIELD READINGS											
Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate (ml/Min)	mL Removed	Appearance or Comment
Purge Date	Time										
16 Aug 22	15:08	Start of Well Purge									
	15:13	21.04	6787	7.31	6.37	170.3	1.80	6.82	100.0	500.0	Clear
	15:18	21.53	6739	7.34	6.74	185.6	14.54	8.60	100.0	3000.0	Clear
17 Aug 22	16:13	23.57	6758	7.30	6.07	191.9	3.37	8.10	100.0	3000.0	Clear
	06:13	15.23	6781	7.45	7.47	152.8	0.38	5.35	100.0	500.0	Clear

Well Stabilized? YES NO Total Volume Purged: 7000.0 ml

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
17 Aug 22	06:18	15.23	6781	7.45	0.38	Clear

Comments:

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Account #: 2800

Client: Montana-Dakota Utilities - Bismarck



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

Field Datasheet
Groundwater Assessment

Company: MDU Lewis & Clark
Event: Fall 2022
Sample ID: 118
Sampling Personal: J. May

Weather Conditions: Temp: 70°F Wind: N @ 10-15 Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION table with fields: Well Locked?, Well Labeled?, Casing Strait?, Well Seal Intact?, Repairs Necessary?, Casing Diameter, Water Level Before Purge, Total Depth of Well, Well Volume, Depth to Top of Pump, Water Level After Sample, Measurement Method.

SAMPLING INFORMATION table with fields: Purging Method, Sampling Method, Dedicated Equipment?, Duplicate Sample?, Duplicate Sample ID, Bottle List, Control Settings.

FIELD READINGS table with columns: Purge Date, Time, Temp. (°C), Spec. Cond., pH, DO (mg/L), ORP (mV), Turbidity (NTU), Water Level (ft), Pumping Rate (ml/Min), ml Removed, Appearance or Comment.

Summary table with columns: Sample Date, Time, Temp. (°C), Spec. Cond., pH, Turbidity (NTU), Appearance or Comment.

Comments: Collected FB @ 0850

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

Field Datasheet

Groundwater Assessment

Company: MDU Lewis & Clark
 Event: Fall 2022
 Sample ID: 120
 Sampling Personal: J. H. H.

Weather Conditions: Temp: 75°F Wind: N @ 5-10 Precip: Sunny / Partly Cloudy / Cloudy

WELL INFORMATION	
Well Locked?	YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/>
Well Labeled?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Casing Strait?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Well Seal Intact?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> <u>Not Visible</u>
Repairs Necessary?	
Casing Diameter:	2"
Water Level Before Purge:	14.36 ft
Total Depth of Well:	— ft
Well Volume:	— liters
Depth to Top of Pump:	— ft
Water Level After Sample:	14.57 ft
Measurement Method:	Electric Water Level Indicator

SAMPLING INFORMATION	
Purging Method:	Bladder
Sampling Method:	Bladder
Dedicated Equipment?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Duplicate Sample?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Duplicate Sample ID:	—
Bottle List:	
1 Liter Raw	4- 1L Nitric
500mL Nitric	
500mL Nitric (filtered)	
250mL Sulfuric	
Control Settings:	
Purge:	3 Sec.
Recover:	27 Sec.
PSI:	20

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±10	Turbidity (NTU)	Water Level (ft)	Pumping Rate (ml/Min)	mL Removed	Appearance or Comment
Purge Date	Time	±0.5°									Clarity, Color, Odor, Ect. clear, slightly turbid, turbid
16 Aug 22	1335	Start of Well Purge									
	1340	14.51	7485	6.96	0.31	141.5	0.64	14.53	100.0	500.0	Clear
	1400	15.52	7290	6.94	0.31	139.6	0.29	14.55	100.0	200.0	Clear
	1405	15.35	7307	6.93	0.30	140.0	0.31	14.56	100.0	500.0	Clear
	1410	15.16	7306	6.93	0.29	140.6	0.22	14.56	100.0	500.0	Clear
	1415	15.29	7366	6.93	0.26	140.5	0.12	14.56	100.0	500.0	Clear
Well Stabilized?		YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	Total Volume Purged: 4000.0 mL							

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH	Turbidity (NTU)	Appearance or Comment
16 Aug 22	1415	15.29	7366	6.93	0.12	Clear

Comments:

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Appendix B

Alternative Source Demonstrations – Scrubber Ponds



Alternative Source Demonstration (ASD) for Lithium, Fall 2021

Lewis & Clark Station

Prepared for
Montana-Dakota Utilities Co.

April 2022

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

April 2022

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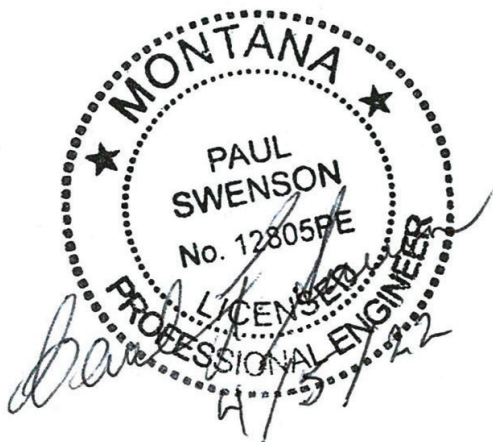
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Certifications

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

April 5, 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 fall 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 fall 2021 assessment monitoring event in September 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 groundwater protection standards (GWPS) in downgradient wells.

Exceedances of GWPS were identified at the following monitoring wells downgradient of the Scrubber Ponds during the fall 2021 semi-annual assessment monitoring event completed between September 13 and September 14, 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 #2 (Fall)	MW111	0.194	0.0631*
	MW117	0.115	
	MW118	0.082	
	MW120	0.135	
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 included 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 is 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.

As shown in Table 4, SPE leachate analyses of carbonaceous samples for lithium 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)	Fall 2021 Lithium Concentration in Groundwater (mg/L)	Distance to Closest Boring with Documented Carbonaceous Material (ft)
MW-111	0.227	0.194	within boring
MW-120	0.175	0.135	125
MW-117	0.155	0.115	160
MW-118	0.102	0.082	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:

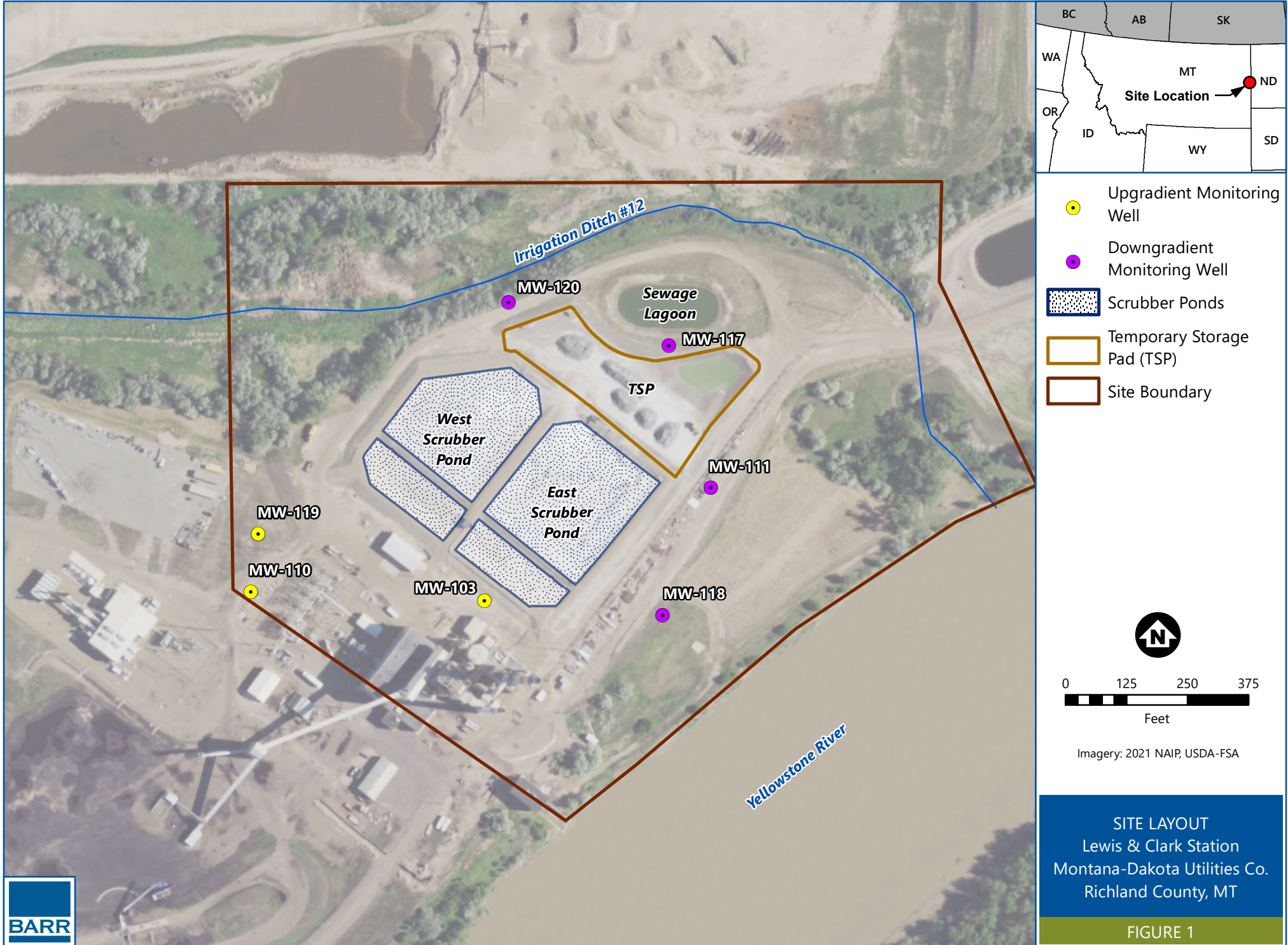
- **Hypothesis No. 1:** Due to the natural variability between sediments in which upgradient and downgradient wells are screened, the observed downgradient concentrations are due to the natural variation in lithium content of the sediments.
- **Hypothesis No. 2:** The GWPS based on upgradient wells is 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.

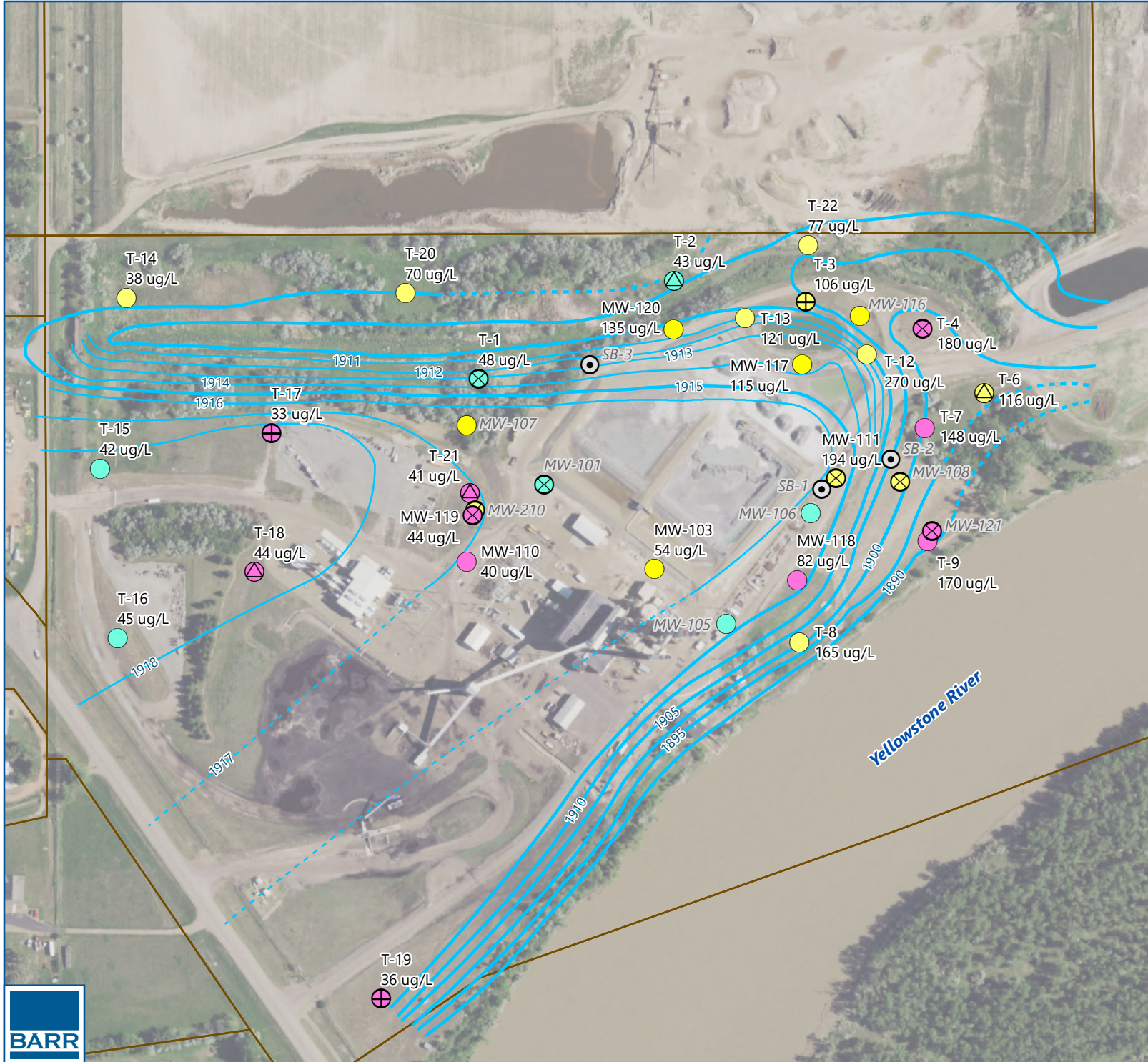
Taken individually or together, the lines of evidence presented above provide adequate documentation and support that an alternative source is responsible for the presence of lithium at statistically significant concentrations above the GWPS and there does not appear to be a release from the Scrubber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

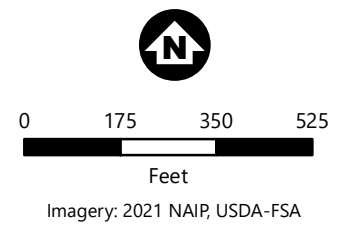
Figures





- 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 September 2021. Additional monitoring wells were not sampled for lithium and were used only to develop contours and evaluate flow direction.



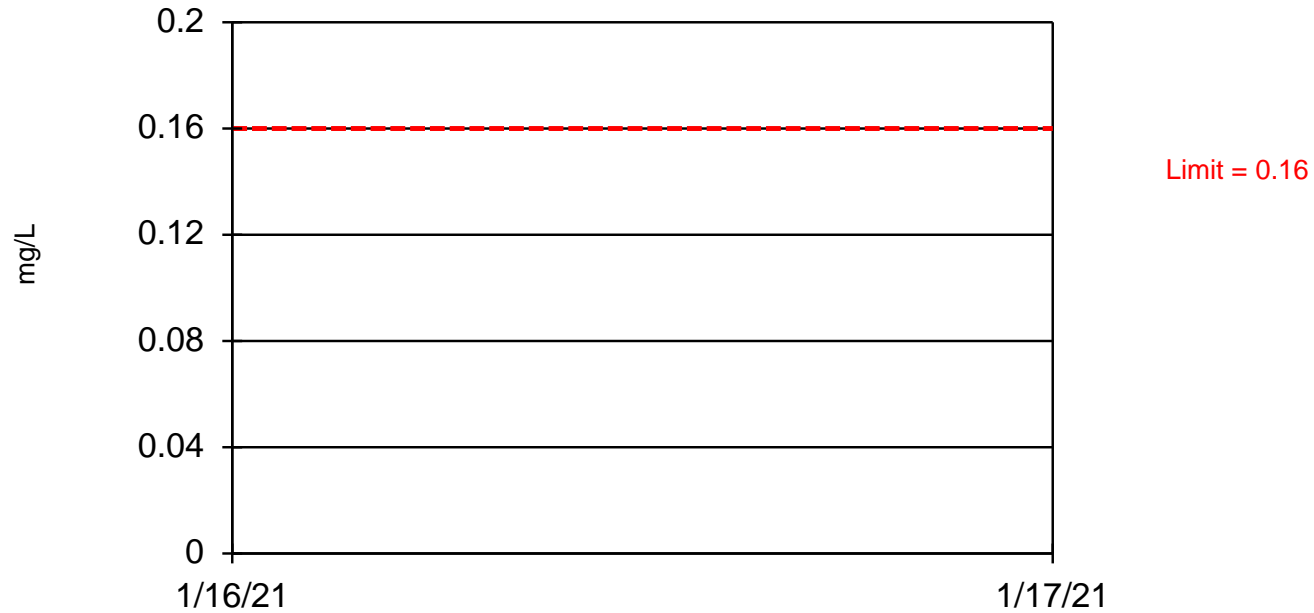
WELL MATERIAL TYPES AND LITHIUM CONCENTRATIONS FALL 2021
 Lewis & Clark Station
 Montana-Dakota Utilities Co.
 Richland County, MT

FIGURE 2



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

Appendices

Appendix A
Site Boring Logs

LOG OF BORING



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						
22.7	.5		GRAVEL surfacing			gp
19.7	3½	CL	SILTY CLAY, low to medium plasticity, dark brown to grayish brown, moist, very stiff (fine alluvium)	21		4+
16.7	6½	CL	SANDY CLAY, low plasticity, brown, moist, rather stiff (fine alluvium)	10		2
		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					
06.2	17	ML	SANDY SILT, nonplastic, light gray, moist, very dense (siltstone)	52		1 3/4
		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			

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 1/4 NW 1/4 SW 1/4 Section 9
Township 22 Range 59 County Richland
Gov'n'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.
PERFORATIONS: 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.

ROUTED: 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 1/2 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, 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.

Date 1 Dec 91
Firm Name Water Supply Inc
Address 2501 Twin City Dr
Mandan, ND 58504
Signature [Signature] License No. 296/004

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.	SCSU	Graphic Log	LITHOLOGIC DESCRIPTION	MAJOR UNIT	WELL OR PIEZOMETER CONSTRUCTION DETAIL	Elevation, feet
0.0			CL		TOPSOIL - SANDY CLAY (CL): fine grained; brown; frozen.	Fill	PRO. CASING Diameter: 6" Type: Steel Interval: Surface + 3'	1917.5
2.5			CL/ML		FILL - SILTY CLAY (CL/ML): yellow; moist; medium to high plasticity; strong HCl reaction; 0% gravel, 5% sand, 95% fines, orange staining.			1915.0
5.0			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:	1912.5
7.5			CL/ML					GROUT Type: Concrete Interval: 0-1' bgs
10.0			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, occurrence of silty clay, low to high plasticity.	Fort Union	SEAL Type: Bentonite chips Interval: 1-4.5' bgs	1907.5
12.5			CL		13': Dry, no oxidation, non-plastic.		SANDPACK Type: 20/40 Interval: 4.5-10' bgs	1905.0
15.0			CL			SCREEN Diameter: 2" Type: No. 10 Sch 40 Interval: PVC 5-10' bgs	1902.5	
17.5								1900.0
19.0					End of well 19.0 feet			

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

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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.	SCSU	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		
2.5			SW		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.	Alluvium	PRO. CASING Diameter: 6" Type: Steel Interval: Surface + 3' RISER CASING Diameter: 2" Type: Sch 40 PVC Interval:	1920.0
5.0							Type: Concrete Interval: 0-1' bgs	1917.5
7.5							GROUT Type: Concrete Interval: 0-1' bgs SEAL Type: Bentonite chips Interval: 1-5' bgs	1915.0
10.0					8: Medium/coarse grained, subangular sand with small to large subangular cobbles and gravels.	Fort Union	SANDPACK Type: 20/40 Interval: 5-12' bgs	1912.5
12.5			ML		Rusty brown water at contact. SILT (ML): very pale brown; moist; low plasticity; some brown layers within.		SCREEN Diameter: 2" Type: No. 10 Sch 40 Interval: PVC 6-11' bgs	1910.0
12.5			CL		CLAY (CL): gray; moist; very hard, homogenous, Fort Union Formation, non-plastic. End of well 12.0 feet			

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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

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.:

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Depth, feet	Sample Type & Recovery	Sample No.	SCSC	Graphic Log	LITHOLOGIC DESCRIPTION	MAJOR UNIT	WELL OR PIEZOMETER CONSTRUCTION DETAIL	Elevation, feet
0.0					TOPSOIL - SANDY CLAY MIX: black; dry; less than 1".			
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' RISER CASING Diameter: 2" Type: Sch 40 PCV Interval:	1922.5 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	Interval: GROUT Type: Neat Cement Interval: 3-5' bgs SEAL Type: Bentonite chips Interval: 5-7' bgs	1917.5 1915.0
7.5					7': Some orange/black oxidation in sand.			SANDPACK Type: 20/40 Interval: 7-16' bgs
10.0					10': Some heaving sand.		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					15.75: Lignite lense.			
16.0					End of well 16.0 feet			

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

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				

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Depth, feet	Sample Type & Recovery	Sample No.	Blows/6in.	ENVIRONMENTAL DATA	U C S S	Graphic Log	LITHOLOGIC DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL	Elevation, feet
0.0							CLAY FILL (CL-CH): yellowish brown (10YR 5/4); frozen; hard; roots.		
2.5			7-9-14-18.	G/S/F:0%/ 0%/ 100% G/S/F:15%/ 60%/ 25%			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
5.0			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
7.5			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. 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
10.0			2-4-3-0.	G/S/F:5%/ 20%/ 75%			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
12.5			1-2-3-0.	G/S/F:10%/ 20%/ 70%	CL-CH		At 11': Color change to dark grayish brown (10YR 4/2), softer. At 12': Sample, wet.	SANDPACK Type: 10/20 Interval: 9-16' bgs	1907.5
15.0			1-3-3-0.	G/S/F:10%/ 20%/ 70%				SCREEN Diameter: 2" Type: No. 12 Sch 40 PVC Interval: 11-16' bgs	1905.0
17.5			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.		
20.0							End of well 16.0 feet		

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.

Project: Lewis and Clark Station	Surface Elevation: 1902.4 ft	Top of Casing Elev.: 1904.6 ft
Project No.: 26411007.14 Boundary Well	Drilling Method: Hollow Stem Auger	
Location: Sidney, Montana	Sampling Method:	
Coordinates: UTM 13N N:17326179m, E:1848702m	Completion Depth: 14.0 ft	
Datum:		

Depth, feet	Sample Type & Recovery	Sample No.	Blows/6in.	ENVIRONMENTAL DATA	S C S U	Graphic Log	LITHOLOGIC DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL	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.	<p>-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</p>	1900.0
2.5		2	1-1-4-6.	G/S/F:0%/ 60%/ 40%	SM		SILTY SAND (SM): olive brown (2.5Y 4/3); moist to wet; roots; fine grained sand within; few sandy lenses.		1897.5
5.0		3	2-2-3-3.	G/S/F:0%/ 90%/ 10%	SP		SAND (SP): fine grained sand; trace fines, loose; light olive brown (2.5Y 5/3); moist.		1895.0
7.5		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.		1892.5
		5	1-5-4-.	G/S/F:0%/ 95%/ 5%			At 8 ft, trace fine grained orange terracotta fragments.		
		6	W-3-5-3.	G/S/F:0%/ 90%/ 10%			At 9 ft, saturated.		
10.0		7	2-2-3-.	G/S/F:0%/ 90%/ 10% G/S/F:90%/ 10%/ 0%	GP		GRAVEL (GP): fine to coarse grained; subrounded; trace fine to coarse grained sand.		1890.0
12.5		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		

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.

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LOG OF BORING SB-2

DRAFT
 SHEET 1 OF 1

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

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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.	
5			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
10			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
15			SP			1900
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.	1895
					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.	
25					End of boring 25.0 feet	1890

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.



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LOG OF BORING SB-3

DRAFT
 SHEET 1 OF 1

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		

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Depth, feet	Sample Type & Recovery	Sample No.	U S C S	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			CL		SANDY CLAY (CL): dark gray; moist to wet; with fine to coarse sand and few gravels within, trace roots.	1915
			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	Remarks:	WL: 10.20' bgs, not allowed to equilibrate
Date Boring Completed:	1/31/19 2:25 pm	Weather:	25°F, clear/sunny, windy
Logged By:	DJZ		
Drilling Contractor:	AET		
Drill Rig:	6620 DT		Additional data may have been collected in the field which is not included on this log.



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LOG OF BORING T-1

DRAFT
 SHEET 1 OF 1

Project:	GeoProbe Investigation	Surface Elevation:	1914.6 ft
Project No.:	26411007.10	Drilling Method:	GeoProbe Direct-Push
Location:	Lewis & Clark Station, Sidney, MT	Sampling Method:	GeoProbe
Coordinates:	N 2,248,474.2 ft E 3,584,051.4 ft	Completion Depth:	25.0 ft
Datum:	NAVD88		

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Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0						1914.6
0 - 2.5			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.	
2.5 - 4.5			CL		SILTY CLAY (CL): dark grayish brown; moist; 0% gravel, 0% sand, 100% fines.	1910
4.5 - 8.5			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 - 9.0					8.5': color change to gray and dark gray.	
9.0 - 13.0					9.0': wet, fragments of black organics and lignite coal within.	1905
13.0 - 15.0					13': color change to grayish brown with mottles.	
15.0 - 20.0			CL		CLAY WITH SAND (CL): fine to medium grained; grayish brown; subrounded to subangular; wet to moist; 0% gravel, 25% sand, 75% fines.	1900
20.0 - 23.0			SW		SAND (SW): fine to coarse grained; wet; subrounded to subangular; well graded with gravels at contact.	1895
23.0 - 25.0			CL-CH		CLAY (CL-CH): Fort Union Formation; gray; moist; silt laminations as fractures within.	1890
25.0					End of boring 25.0 feet	

Date Boring Started:	1/31/19 3:10 pm	Remarks:	WL: 0.99' bgs
Date Boring Completed:	1/31/19 4:20 pm	Weather:	25°F, partly cloudy, windy
Logged By:	DJZ		
Drilling Contractor:	AET		
Drill Rig:	6620 DT		
		Additional data may have been collected in the field which is not included on this log.	



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LOG OF BORING T-2

DRAFT
 SHEET 1 OF 1

Project:	GeoProbe Investigation	Surface Elevation:	1911.9 ft
Project No.:	26411007.10	Drilling Method:	GeoProbe Direct-Push
Location:	Lewis & Clark Station, Sidney, MT	Sampling Method:	GeoProbe
Coordinates:	N 2,248,725.2 ft E 3,584,548.7 ft	Completion Depth:	30.0 ft
Datum:	NAVD88		

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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
18			CL-CH		CLAY (CL-CH): grayish brown; moist to wet; trace medium grained sand, mottled with gray spots; high plasticity.	
20			SM		SILTY SAND (SM): very fine to fine grained; grayish brown; trace medium to coarse grained sand; 0% gravel, 60% sand, 40% fines.	
22			SW		WELL GRADED SAND (SW): fine to coarse grained; subrounded to subangular; small to large gravels, subrounded to subangular.	1890
24			CL-CH		CLAY (CL-CH): olive brown; wet; soft; fragments of wood/roots within.	
25			CH		LIGNITE: black; wet; horizontal layering. CLAY (CH): Fort Union Formation; gray to dark gray; moist; hard.	
28			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 occurred.
 Weather: 25°F, partly cloudy
 Additional data may have been collected in the field which is not included on this log.



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LOG OF BORING T-3

DRAFT
 SHEET 1 OF 1

Project:	GeoProbe Investigation	Surface Elevation:	1915.0 ft
Project No.:	26411007.10	Drilling Method:	GeoProbe Direct-Push
Location:	Lewis & Clark Station, Sidney, MT	Sampling Method:	GeoProbe
Coordinates:	N 2,248,671.5 ft E 3,584,884.7 ft	Completion Depth:	32.5 ft
Datum:	NAVD88		

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Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0					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			CL			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
25			SP		SAND (SP): fine grained with trace medium to coarse grained; brown; wet; subrounded; trace small subrounded gravels.	1890
			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.	
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.



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LOG OF BORING T-5

DRAFT
 SHEET 1 OF 1

Project:	GeoProbe Investigation	Surface Elevation:	1912.8 ft
Project No.:	26411007.10	Drilling Method:	GeoProbe Direct-Push
Location:	Lewis & Clark Station, Sidney, MT	Sampling Method:	GeoProbe
Coordinates:	N 2,248,649.6 ft E 3,585,434.0 ft	Completion Depth:	20.0 ft
Datum:	NAVD88		

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Depth, feet	Sample Type & Recovery	Sample No.	SSCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0						1912.8
0 - 5			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 - 10			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 - 11			SP		SAND (SP): fine grained; brown; wet.	
11 - 15			ML-CL		SILTY CLAY & CLAYEY SILT (ML-CL): brown; wet; areas of gray and rusty mottles; weak HCl reaction.	1900
15 - 18			ML		SILT (ML): dark grayish brown; wet; soft; 0% gravel, 0% sand, 100% fines.	1895
18 - 20			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	Remarks:	WL: 14.36' bgs
Date Boring Completed:	1/30/19 1:35 pm	Weather:	5°F, clear/sunny, windy
Logged By:	DJZ	Additional data may have been collected in the field which is not included on this log.	
Drilling Contractor:	AET		
Drill Rig:	6620 DT		



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LOG OF BORING T-6

DRAFT
 SHEET 1 OF 1

Project:	GeoProbe Investigation	Surface Elevation:	1916.8 ft
Project No.:	26411007.10	Drilling Method:	GeoProbe Direct-Push
Location:	Lewis & Clark Station, Sidney, MT	Sampling Method:	GeoProbe
Coordinates:	N 2,248,437.8 ft E 3,585,340.5 ft	Completion Depth:	20.0 ft
Datum:	NAVD88		

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Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0					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.	
			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'.	1900
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.



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LOG OF BORING T-13

DRAFT
 SHEET 1 OF 1

Project: GeoProbe Investigation Surface Elevation: 1916.9 ft
 Project No.: 26411007.10 Drilling Method: GeoProbe Direct-Push
 Location: Lewis & Clark Station, Sidney, MT Sampling Method: GeoProbe
 Coordinates: N 2,248,629.2 ft E 3,584,730.4 ft
 Datum: NAVD88 Completion Depth: 22.5 ft

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Depth, feet	Sample Type & Recovery	Sample No.	SSUS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0					CLAY (CL-CH): brown; frozen; few fine to coarse sand and gravel, subrounded; 10% gravel, 10% sand, 80% fines.	1915
			CL-CH			
			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			CL-CH		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.



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LOG OF BORING T-14

DRAFT
 SHEET 1 OF 1

Project:	Supplemental ASD	Surface Elevation:	1917.1 ft
Project No.:	26411007.15	Drilling Method:	Geoprobe Direct-Push
Location:	Lewis and Clark Station, Sidney, MT	Sampling Method:	Geoprobe
Coordinates:	N 2,248,679.6 ft E 3,583,153.0 ft	Completion Depth:	13.5 ft
Datum:	NAVD88		

Depth, feet	Sample Type & Recovery	Sample No.	U C S	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0					TOPSOIL (OL): black; frozen; roots, clayey mix; 0% gravel, 0% sand, 100% fines.	1917.1
2.5		1			LEAN TO FAT CLAY (CL-CH): very dark gray; frozen to moist; soft; roots, organics; 0% gravel, 0% sand, 100% fines.	1915.0
5.0					FAT CLAY (CH): dark grayish brown to gray; moist to wet; dense to hard; 0% gravel, 2% sand, 98% fines.	1912.5
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.	1910.0
10.0						1907.5
12.5		3			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.	1905.0
15.0					End of boring 13.5 feet	1902.5
17.5						1900.0
20.0						1897.5

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_BARR\LIBRARY\GLB_ENVIRO\LOG_BARR_TEMPLATE.GDT

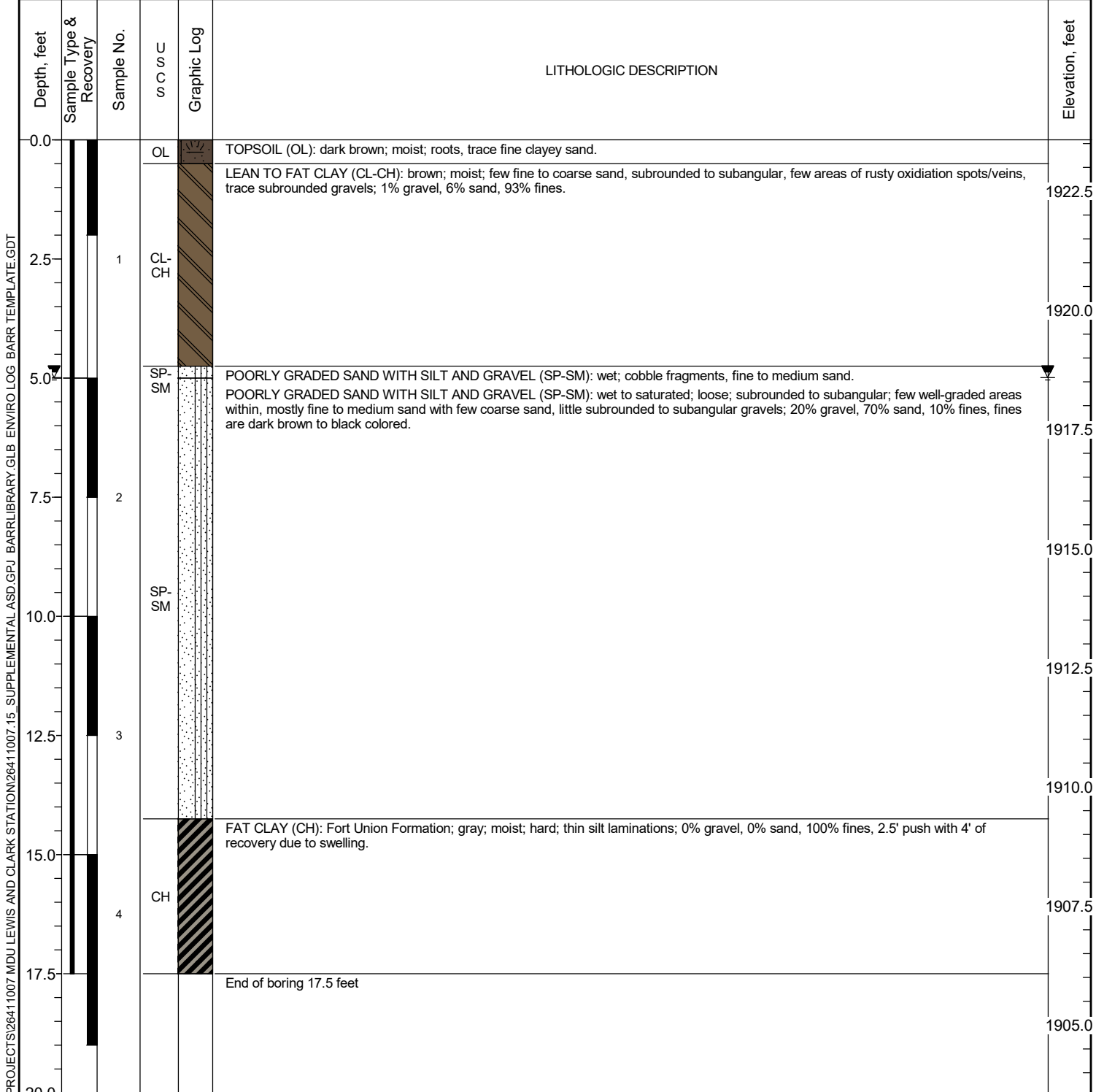


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LOG OF BORING T-15

DRAFT
 SHEET 1 OF 1

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		



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.

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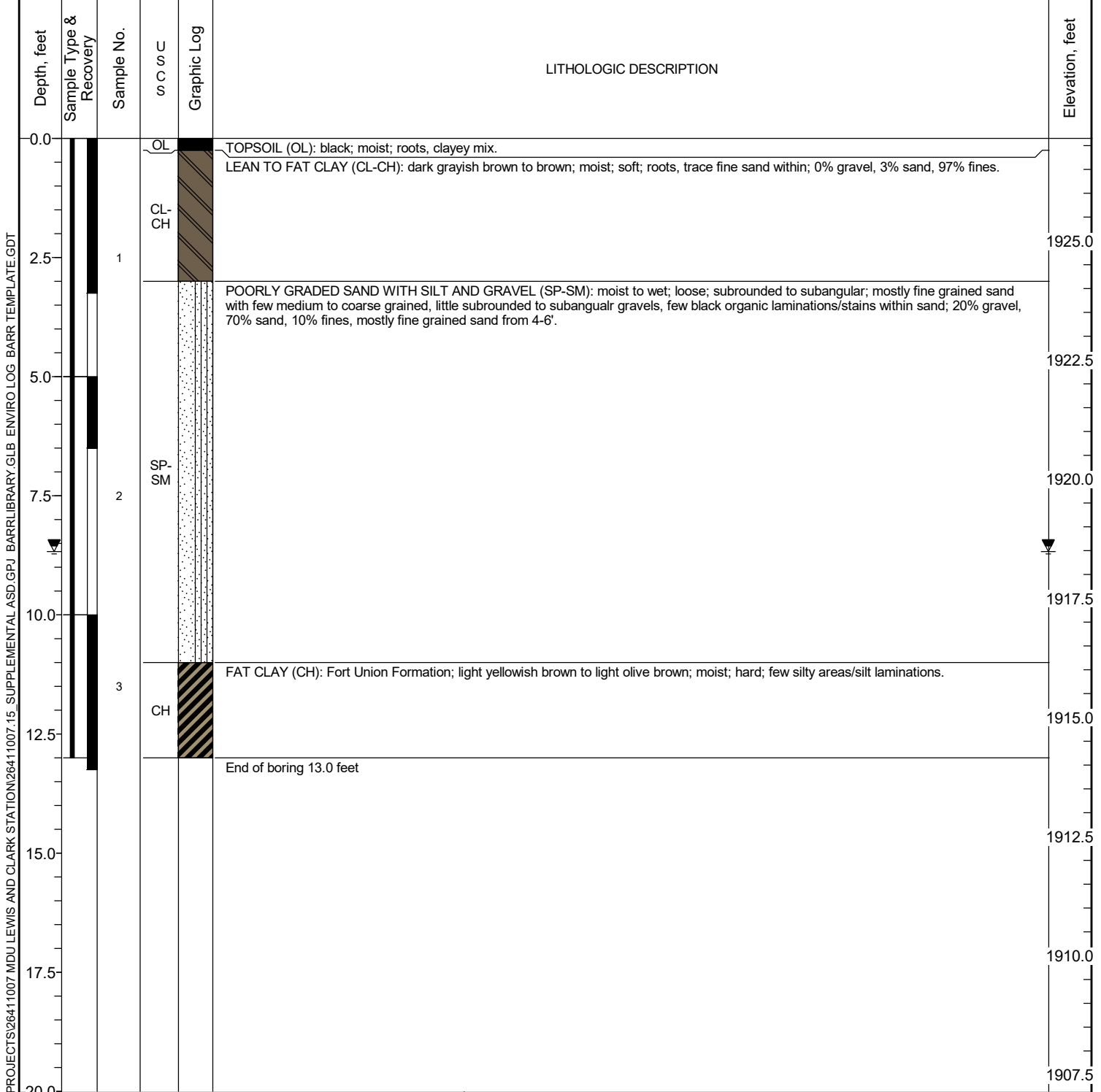


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LOG OF BORING T-16

DRAFT
 SHEET 1 OF 1

Project:	Supplemental ASD	Surface Elevation:	1927.2 ft
Project No.:	26411007.15	Drilling Method:	Geoprobe Direct-Push
Location:	Lewis and Clark Station, Sidney, MT	Sampling Method:	Geoprobe
Coordinates:	N 2,247,812.4 ft E 3,583,130.0 ft	Completion Depth:	13.0 ft
Datum:	NAVD88		



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.

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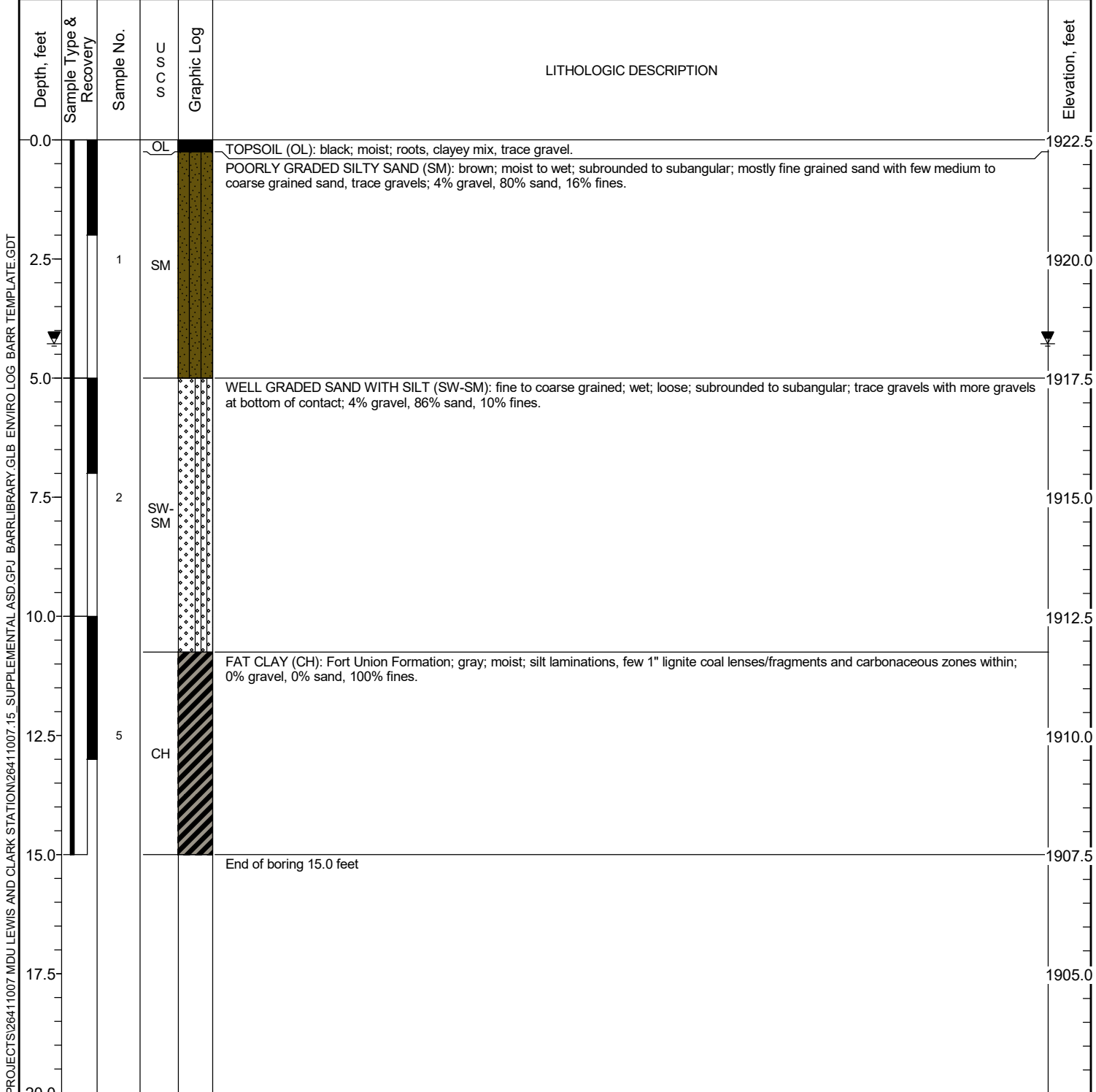


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LOG OF BORING T-17

DRAFT
 SHEET 1 OF 1

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		



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.

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LOG OF BORING T-18

DRAFT
 SHEET 1 OF 1

Project: Supplemental ASD Surface Elevation: 1923.1 ft
 Project No.: 26411007.15 Drilling Method: Geoprobe Direct-Push
 Location: Lewis and Clark Station, Sidney, MT Sampling Method: Geoprobe
 Coordinates: N 2,247,982.1 ft E 3,583,479.1 ft
 Datum: NAVD88 Completion Depth: 14.5 ft

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Depth, feet	Sample Type & Recovery	Sample No.	SSCSU	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.

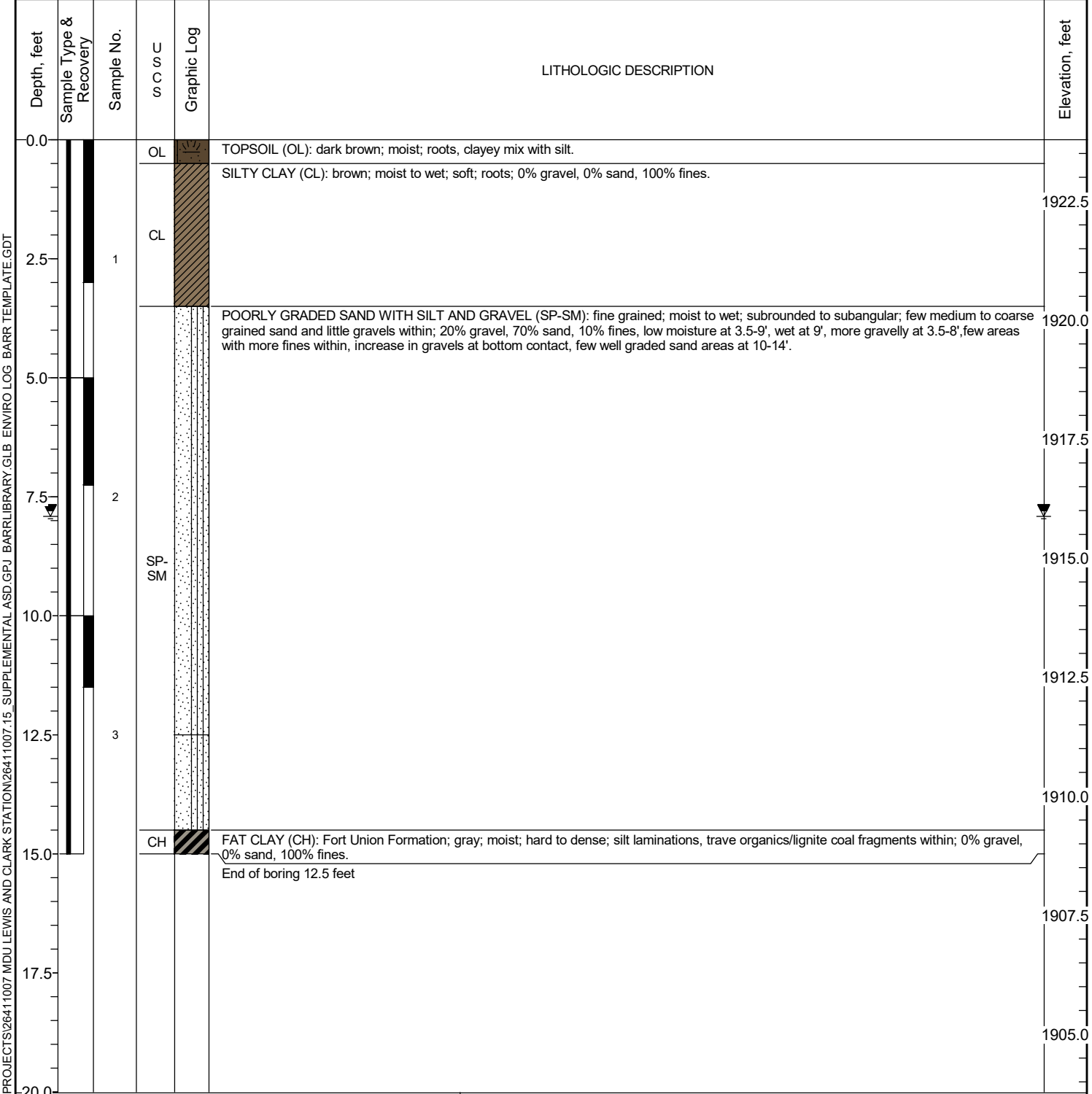


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LOG OF BORING T-19

DRAFT
 SHEET 1 OF 1

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 2,246,894.0 ft E 3,583,802.3 ft
 Datum: NAVD88 Completion Depth: 12.5 ft



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.

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LOG OF BORING T-20

DRAFT
 SHEET 1 OF 1

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

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Depth, feet	Sample Type & Recovery	Sample No.	U S C S	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0			OL		TOPSOIL (OL): dark grayish brown; moist; roots, clayey mix.	1920.0
2.5		1	CL		SANDY LEAN CLAY (CL): fine to coarse grained; brown; moist; subrounded to subangular; trace gravels within; 5% gravel, 20% sand, 75% fines.	1917.5
5.0			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.	1915.0
7.5		2	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.	1912.5
10.0		3	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.	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.



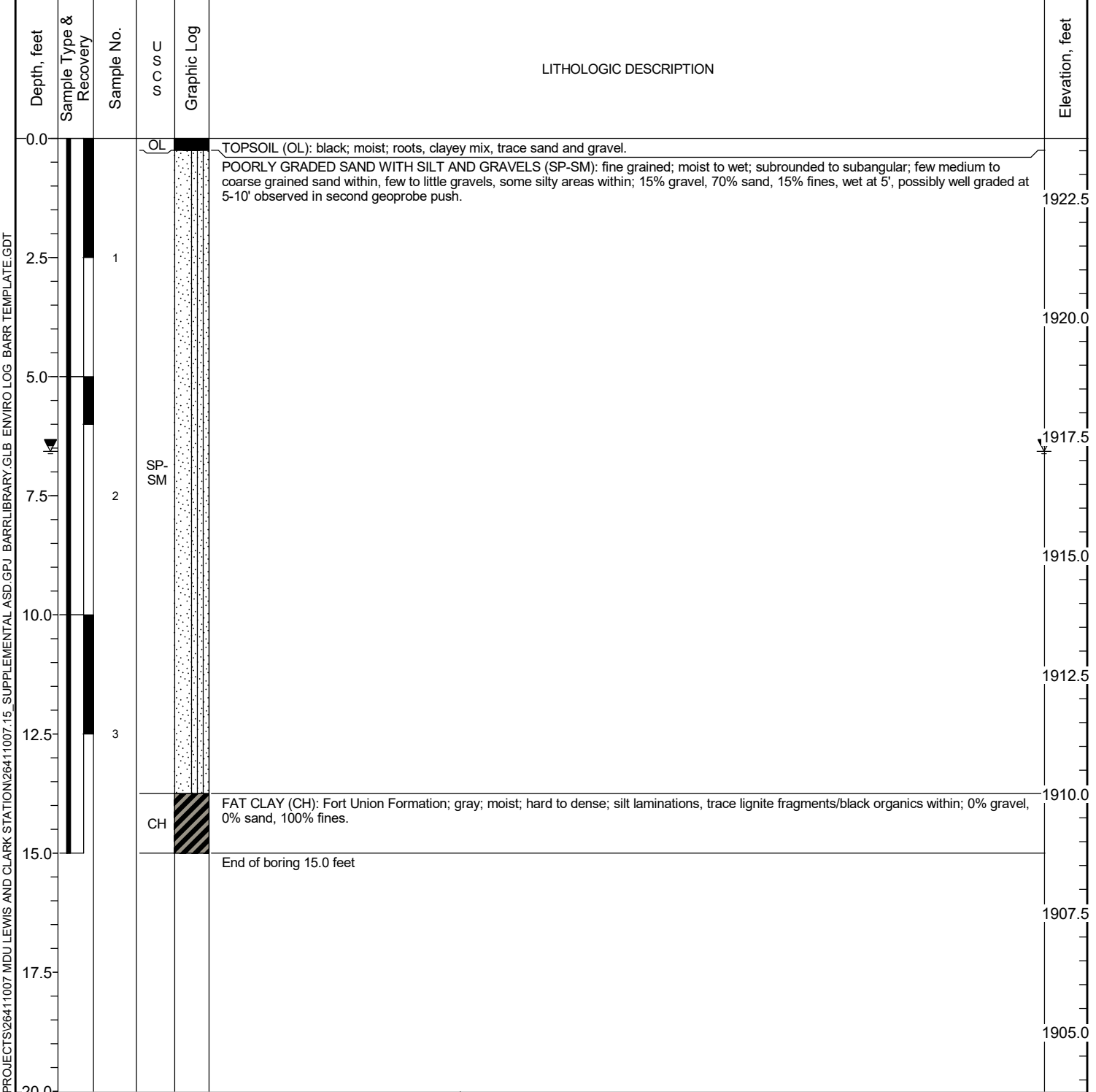
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LOG OF BORING T-21

DRAFT
 SHEET 1 OF 1

Project: Supplemental ASD
 Project No.: 26411007.15
 Location: Lewis and Clark Station, Sidney, MT
 Coordinates: N 2,248,182.0 ft E 3,584,028.4 ft
 Datum: NAVD88

Surface Elevation: 1923.8 ft
 Drilling Method: Geoprobe Direct-Push
 Sampling Method: Geoprobe
 Completion Depth: 15.0 ft



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.

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LOG OF BORING T-22

DRAFT
 SHEET 1 OF 1

Project: Supplemental ASD
 Project No.: 26411007.15
 Location: Lewis and Clark Station, Sidney, MT
 Coordinates: N 2,248,814.6 ft E 3,584,890.5 ft
 Datum: NAVD88

Surface Elevation: 1912.6 ft
 Drilling Method: Geoprobe Direct-Push
 Sampling Method: Geoprobe
 Completion Depth: 20.0 ft

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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		1	CL			1910
5					FAT CLAY (CH): moist to wet; dense; hard and softer areas within, black organics and roots within; 0% gravel, 0% sand, 100% fines.	
2		2			8-9'; olive brown; more silty and saturated.	1905
10					9-12.5'; same as 3.5-8' but harder, soft at 12.5'; high plasticity.	
3		3	CH		12.5-14.5'; gray/dark gray to black; black organic/peat area with roots and shell fragments.	1900
15					14.5-15.5'; fine sand within the fat clay.	
4		4			15.5-20'; dark gray; wet, soft; high plasticity.	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.



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LOG OF BORING T-23

DRAFT
 SHEET 1 OF 1

Project:	Supplemental ASD	Surface Elevation:	1917.9 ft
Project No.:	26411007.15	Drilling Method:	Geoprobe Direct-Push
Location:	Lewis and Clark Station, Sidney, MT	Sampling Method:	Geoprobe
Coordinates:	N 2,248,816.0 ft E 3,585,392.7 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): 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					SANDY SILT (ML): pale olive to light yellowish brown; moist to wet; 0% gravel, 40% sand, 60% fines. 4.5-5.5'; dry/low moisture with areas of rusty oxidation stains throughout.	1912.5
7.5		2			6.5-8'; wet to saturated; gray mottles.	1910.0
10.0			ML		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.	1902.5
15.0					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.

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Appendix B

Analytical Results



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



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

Project: 2641 1007
Lab ID: S1912224-001
Client Sample ID: SB-2
Depths: 2 - 5 Feet

Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

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



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

Project: 2641 1007
Lab ID: S1912224-002
Client Sample ID: SB-2
Depths: 10 - 20 Feet

Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

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



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

Project: 2641 1007
Lab ID: S1912224-003
Client Sample ID: T-1
Depths: 19 - 23 Feet

Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

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



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

Project: 2641 1007
Lab ID: S1912224-004
Client Sample ID: T-2
Depths: 23.5 - 30 Feet

Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

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



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

Project: 2641 1007
Lab ID: S1912224-005
Client Sample ID: T-13
Depths: 3.5 - 10 Feet

Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

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



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

Project: 2641 1007
Lab ID: S1912224-006
Client Sample ID: T-13
Depths: 15 - 20 Feet

Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

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



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

Barr Engineering Co. Chain of Custody

Ann Arbor Duluth Hibbing Minneapolis
 Bismarck Grand Rapids Jefferson City Salt Lake City

Sample Origination State:

KS MO UT
 MI ND WI
 MN SD Other: **MT**

Analysis Requested	Water	Soil

COC Number: **58192**
 COC 1 of 1

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 = HNO₃
 D = H₂SO₄
 E = NaOH
 F = MeOH
 G = NaHSO₄
 H = Na₂S₂O₃
 I = Ascorbic Acid
 J = NH₄Cl
 K = Zn Acetate
 O = Other

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 Li/se	Barr Project No: 26411007

Location	Sample Depth			Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y/N	Total Number Of Containers	Analysis Requested	% Solids	Preservative Code	Field Filtered Y/N	
	Start	Stop	Unit (m./ft. or in.)										
1. SB-2 (2-5')	2	5	ft	01/31/2019	1000	S	N	1				Analyze Lithium/Selenium per attached letter	
2. SB-2 (10-20')	10	20	ft	01/31/2019	1005	S	N	1					
3. T-1 (18-23')	18	23	ft	01/31/2019	1520	S	N	1					
4. T-2 (23.5-30')	23.5	30	ft	02/01/2019	1215	S	N	1					Send Level 2 QC Report
5. T-13 (3.5-10')	3.5	10	ft	01/30/2019	0920	S	N	1					Report
6. T-13 (15-20')	15	20	ft	01/30/2019	1010	S	N	1					
7.													
8.													
9.												Contact Scott Korom	
10.												w/questions 701-221-5420	

BARR USE ONLY		Relinquished by: [Signature]	On Ice? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	Date: 02-09	Time: 1700	Received by: [Signature]	Date: 12/1/19	Time:
Sampled by: DJZ	Barr Proj. Manager: SFK	Relinquished by: [Signature]	On Ice? <input type="checkbox"/> Y <input type="checkbox"/> N	Date:	Time:	Received by:	Date:	Time:
Barr DQ Manager: TAD	Lab Name: Pace	Samples Shipped VIA: <input type="checkbox"/> Courier <input checked="" type="checkbox"/> Federal Express <input type="checkbox"/> Sampler	Air Bill Number: 7772-0595-1120		Requested Due Date: <input checked="" type="checkbox"/> Standard Turn Around Time			
Lab Location: Sheridan WY	Lab WO:	Temperature on Receipt (°C):	Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None		<input type="checkbox"/> Rush (mm/dd/yyyy)			

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.



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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Project: Sediment Saturated Paste Extracts
Lab ID: S2007298-001
Client Sample ID: T-14 (5-7)
Depths: 5 - 7 Feet

Work Order: S2007298
Collection Date:
Date Received: 7/21/2020
Sampler:
Matrix: Sediment
COC: 50061

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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Project: Sediment Saturated Paste Extracts
Lab ID: S2007298-002
Client Sample ID: T-14 (7-10)
Depths: 7 - 10 Feet

Work Order: S2007298
Collection Date:
Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Project: Sediment Saturated Paste Extracts
Lab ID: S2007298-003
Client Sample ID: T-14 (10-13)
Depths: 10 - 13 Feet

Work Order: S2007298
Collection Date:
Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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.

- 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

RL - Reporting 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



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
Lab ID: S2007298-004
Client Sample ID: T-15 (5-10)
Depths: 5 - 10 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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.

- 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

RL - Reporting 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



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: S2007298-005
Client Sample ID: T-15 (10-14.25)
Depths: 10 - 14.25 Feet

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



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: S2007298-006
Client Sample ID: T-16 (11-13)
Depths: 11 - 13 Feet

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
 - 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



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
Lab ID: S2007298-007
Client Sample ID: T-17 (5-10.75)
Depths: 5 - 10.75 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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
 - 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



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: S2007298-008
Client Sample ID: T-17 (10.75-15)
Depths: 10.75 - 15 Feet

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



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: S2007298-009
Client Sample ID: T-18 (5-10)
Depths: 5 - 10 Feet

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



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: S2007298-010
Client Sample ID: T-18 (10-12.5)
Depths: 10 - 12.5 Feet

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



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
Lab ID: S2007298-011
Client Sample ID: T-18 (12.5-14.5)
Depths: 12.5 - 14.5 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
COC: 50062

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



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: S2007298-012
Client Sample ID: T-19 (3.5-5)
Depths: 3.5 - 5 Feet

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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Project: Sediment Saturated Paste Extracts
Lab ID: S2007298-013
Client Sample ID: T-19 (5-10)
Depths: 5 - 10 Feet

Work Order: S2007298
Collection Date:
Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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



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: S2007298-014
Client Sample ID: T-19 (10-14.5)
Depths: 10 - 14.5 Feet

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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Project: Sediment Saturated Paste Extracts
Lab ID: S2007298-015
Client Sample ID: T-20 (3.5-5.5)
Depths: 3.5 - 5.5 Feet

Work Order: S2007298
Collection Date:
Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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



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: S2007298-016
Client Sample ID: T-20 (8.25-12.5)
Depths: 8.25 - 12.5 Feet

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



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
Lab ID: S2007298-017
Client Sample ID: T-20 (12.5-15)
Depths: 12.5 - 15 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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



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: S2007298-018
Client Sample ID: T-21 (5-13.75)
Depths: 5 - 13.75 Feet

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



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
Lab ID: S2007298-019
Client Sample ID: T-21 (13.75-15)
Depths: 13.75 - 15 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
COC: 50062

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



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: S2007298-020
Client Sample ID: T-22 (3.5-10)
Depths: 3.5 - 10 Feet

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
 - 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



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
Lab ID: S2007298-021
Client Sample ID: T-22 (10-15)
Depths: 10 - 15 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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.

- 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

RL - Reporting 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



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: S2007298-022
Client Sample ID: T-22 (15-20)
Depths: 15 - 20 Feet

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
 - 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



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
Lab ID: S2007298-023
Client Sample ID: T-23 (4.5-10)
Depths: 4.5 - 10 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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
 - 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



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
Lab ID: S2007298-024
Client Sample ID: T-23 (10-13.5)
Depths: 10 - 13.5 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
COC: 50063

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



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
Lab ID: S2007298-025
Client Sample ID: T-23 (13.5-15)
Depths: 13.5 - 15 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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



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
Lab ID: S2007298-026
Client Sample ID: T-15 (14.25-17.5)
Depths: 14.25 - 17.5 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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



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
Lab ID: S2007298-027
Client Sample ID: T-16 (3-11)
Depths: 3 - 11 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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
 - 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



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
Lab ID: S2007298-028
Client Sample ID: T-20 (5.5-8.25)
Depths: 5.5 - 8.25 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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

**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 ICPSample 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 ICPSample 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
 E Value above quantitation range
 H Holding times for preparation or analysis exceeded
 L Analyzed by another laboratory
 O Outside the Range of Dilutions
 S Spike Recovery outside accepted recovery limits

D Report limit raised due to dilution
 G Analyzed at IML Gillette laboratory
 J Analyte detected below quantitation limits
 ND Not Detected at the Reporting Limit
 R RPD outside accepted recovery limits
 X Matrix Effect

Chain of Custody for Air Canisters

Sample Origination State:

- Ann Arbor Duluth Jefferson City
 Bismarck Hibbing Minneapolis

- KS MO WI
 MI ND Other: MT
 MN SD

- Analysis Requested:
 TO-14 TO-15 TO-15SIM
 3C Other

COC Number: **No 50061**
 COC 1 of 3

- 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: _____

SEDIMENT 3 = SD

REPORT TO	INVOICE TO
Company: <u>BARR ENGINEERING</u>	Company:
Address: <u>234 W. CENTURY</u>	Address:
Name: <u>SCOTT KOROM</u>	Name: <u>SAME</u>
email: <u>SKOROM@barr.com</u>	email:
Copy to: <u>datamgt@barr.com</u>	P.O.:
Project Name:	Barr Project No.:

Location	Canister		Flow Controller Serial #	Vacuum		Collection Date (mm/dd/yyyy)	Collection Time		Total Time	Matrix Code	PID Reading (ppm/ppb)	Sample Comments
	Serial #	Size		Initial	Final		Start (hh:mm)	Stop (hh:mm)				
1. <u>T-14 (5-7')</u>	<u>52007298</u>		<u>001</u>			<u>4/2020</u>				<u>SD</u>		<u>SEE ATTACHED LETTER FOR DETAILS</u>
2. <u>T-14 (7-10')</u>			<u>002</u>							<u>SD</u>		
3. <u>T-14 (10-13')</u>			<u>003</u>							<u>SD</u>		
4. <u>T-15 (5-10')</u>			<u>004</u>							<u>SD</u>		
5. <u>T-15 (10-14.25')</u>			<u>005</u>							<u>SD</u>		
6. <u>T-16 (11-13')</u>			<u>006</u>							<u>SD</u>		
7. <u>T-17 (5-10.75')</u>			<u>007</u>							<u>SD</u>		
8. <u>T-17 (10.75-15')</u>			<u>008</u>							<u>SD</u>		
9. <u>T-18 (5-10')</u>			<u>009</u>							<u>SD</u>		
10. <u>T-18 (10-12.5')</u>			<u>010</u>							<u>SD</u>		

BARR USE ONLY		Relinquished by:		Date	Time	Received by:		Date	Time
Sampled by:		<u>SCOTT KOROM</u>		<u>7/17/20</u>		<u>KAREN SECN</u>		<u>7/20/20</u>	<u>1030</u>
Barr Proj. Manager:	<u>JEREMY GACNIK</u>	Relinquished by:		Date	Time	Received by:		Date	Time
Barr DQ Manager:		Samples Shipped VIA:				Air Bill Number:		Requested Due Date:	
Lab Name:		<input type="checkbox"/> Courier <input checked="" type="checkbox"/> Federal Express <input type="checkbox"/> Sampler						<input type="checkbox"/> Standard Turn Around Time	
Lab Location:		<input type="checkbox"/> Other: _____						<input type="checkbox"/> Rush _____	
		Lab WO:		Custody Seal Intact ? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None				(mm/dd/yyyy)	

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.

H:\RUG\STDFORMS\Chain of Custody for Air Canisters Form 2015 RLG Rev. 06/16/15

Chain of Custody for Air Canisters

Sample Origination State:



- Ann Arbor Duluth Jefferson City
 Bismarck Hibbing Minneapolis

- KS MO WI
 MI ND Other: MT
 MN SD

- Analysis Requested:
 TO-14 TO-15 TO-15SIM
 3C Other

COC Number: **No 50062**
 COC 2 of 3

- 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

REPORT TO	INVOICE TO
Company: <u>BARR</u>	Company:
Address: <u>234 W. CENTURY</u>	Address:
Name: <u>SA SCOTT KOROM</u>	Name: <u>SCOTT KOROM</u>
email: <u>SKOROM@BARR.COM</u>	email:
Copy to: <u>datamgt@barr.com</u>	P.O.:
Project Name:	Barr Project No:

Location	Canister		Flow Controller Serial #	Vacuum		Collection Date (mm/dd/yyyy)	Collection Time		Total Time	Matrix Code	PID Reading (ppm/ppb)	Sample Comments
	Serial #	Size		Initial	Final		Start (hh:mm)	Stop (hh:mm)				
<u>2.11 T-18 (12.5-14.5')</u>	<u>520</u>	<u>07298</u>	<u>011</u>			<u>04/2020</u>				<u>SD</u>		<u>SEE ATTACHED LETTER</u>
<u>2.12 T-19 (3.5-5')</u>			<u>012</u>							<u>SD</u>		
<u>3.13 T-19 (5-10')</u>			<u>013</u>							<u>SD</u>		
<u>4.14 T-19 (10-14.5')</u>			<u>014</u>							<u>SD</u>		
<u>5.15 T-20 (3.5-5.5')</u>			<u>015</u>							<u>SD</u>		
<u>6.16 T-20 (8.25-12.5')</u>			<u>016</u>							<u>SD</u>		
<u>7.17 T-20 (12.5-15')</u>			<u>017</u>							<u>SD</u>		
<u>8.18 T-21 (5-13.75')</u>			<u>018</u>							<u>SD</u>		
<u>8.19 T-21 (13.75-15')</u>			<u>019</u>							<u>SD</u>		
<u>10.20 T-22 (3.5-10')</u>			<u>020</u>							<u>SD</u>		

BARR USE ONLY		Relinquished by:		Date	Time	Received by:		Date	Time
Sampled by:		<u>SCOTT KOROM</u>		<u>7/7/20</u>		<u>Karen</u>		<u>7600</u>	<u>1030</u>
Barr Proj. Manager:	<u>J. GACHIR</u>	Relinquished by:		Date	Time	Received by:		Date	Time
Barr DQ Manager:		Samples Shipped VIA:				Air Bill Number:		Requested Due Date:	
Lab Name:		<input type="checkbox"/> Courier <input type="checkbox"/> Federal Express <input type="checkbox"/> Sampler <input type="checkbox"/> Other: _____						<input type="checkbox"/> Standard Turn Around Time <input type="checkbox"/> Rush _____ (mm/dd/yyyy)	
Lab Location:		Lab WO:		Custody Seal Intact ?					
				<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None					

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

Sample Origination State:



- Ann Arbor
 Bismarck
 Duluth
 Hibbing
 Jefferson City
 Minneapolis

- KS MO WI
 MI ND Other: MT
 MN SD

- Analysis Requested:
 TO-14 TO-15 TO-15SIM
 3C Other

COC Number: **No 50063**
 COC 3 of 3

- 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

REPORT TO	INVOICE TO
Company: <u>BARR</u>	Company:
Address: <u>234 W. CENTURY</u>	Address: <u>SAME</u>
Name: <u>SCOTT KORDON</u>	Name:
email: <u>SKORDON@BARR.COM</u>	email:
Copy to: <u>datamgt@barr.com</u>	P.O.:
Project Name:	Barr Project No.:

Location	Canister		Flow Controller Serial #	Vacuum		Collection Date (mm/dd/yyyy)	Collection Time		Total Time	Matrix Code	PID Reading (ppm/ppb)	Sample Comments
	Serial #	Size		Initial	Final		Start (hh:mm)	Stop (hh:mm)				
<u>2.21 T-22(10-15')</u>	<u>520072</u>	<u>98-021</u>			<u>04/20/20</u>					<u>SD</u>		<u>SEE ATTACHED LETTER</u>
<u>2.22 T-22(15-20')</u>				<u>022</u>						<u>SD</u>		
<u>2.23 T-23(4.5-10')</u>				<u>023</u>						<u>SD</u>		
<u>2.24 T-23(10-13.5')</u>				<u>024</u>						<u>SD</u>		
<u>2.25 T-23(13.5-15')</u>				<u>025</u>						<u>SD</u>		
6.												<u>SCOTT KORDON 701-335-3125</u>
7.												
8.												
9.												
10.												

BARR USE ONLY		Relinquished by:		Date	Time	Received by:		Date	Time
Sampled by:		<u>SCOTT KORDON</u>		<u>3/17/20</u>		<u>Karen Sea</u>		<u>7/20/20</u>	<u>1030</u>
Barr Proj. Manager:	<u>J. CASNIK</u>	Relinquished by:		Date	Time	Received by:		Date	Time
Barr DQ Manager:		Samples Shipped VIA:				Air Bill Number:		Requested Due Date:	
Lab Name:		<input type="checkbox"/> Courier <input type="checkbox"/> Federal Express <input type="checkbox"/> Sampler <input type="checkbox"/> Other: _____						<input type="checkbox"/> Standard Turn Around Time <input type="checkbox"/> Rush _____ (mm/dd/yyyy)	
Lab Location:		Lab WO:	Custody Seal Intact ?		<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None				

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.



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Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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

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



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Page: 1 of 1

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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

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.

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Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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:

C
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



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Page: 1 of 1

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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:

C
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.

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1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
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Page: 1 of 1

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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



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Page: 1 of 1

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

Project Name: MDU Lewis & Clark

PO #: 26411007.10

Sample Description: T-1

Temp at Receipt: 2.5C

Table with 6 columns: As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include Metal Digestion, pH - Field, Lithium - Total, and Selenium - Total.

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

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.



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Page: 1 of 1

Terri Olson
 Barr Engineering Company
 4300 MarketPointe Drive, Suite 200
 Minneapolis MN 55435

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

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:

Cc
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.

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 1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
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Terri Olson
 Barr Engineering Company
 4300 MarketPointe Drive, Suite 200
 Minneapolis MN 55435

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

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. 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



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Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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



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Page: 1 of 1

Terri Olson
 Barr Engineering Company
 4300 MarketPointe Drive, Suite 200
 Minneapolis MN 55435

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

Project Name: MDU Lewis & Clark

Sample Description: Equipment Blank

PO #: 26411007.10

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:

CC
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

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	19-W187	0.148	0.567	105	75-125	0.567	0.552	101	2.7	20	-	-	< 0.02
				0.400	19-W197	0.048	0.453	101	75-125	0.453	0.466	104	2.8	20	-	-	< 0.02
Selenium - Total mg/l	0.1000	106	80-120	0.400	19-W187	0.0959	0.5280	108	75-125	0.5280	0.5252	107	0.5	20	-	-	< 0.005
				0.100	19-W195	< 0.005	0.0968	97	75-125	0.0968	0.0939	94	3.0	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. Crutcher
 12 Feb 19

* Rush Li and Se Samples!

Barr Engineering Co. Chain of Custody

Sample Origination State:



- Ann Arbor Duluth Jefferson City
 Bismarck Hibbing Minneapolis

- KS MO WI
 MI ND Other:
 MN SD MT

COC Number: **52677**

COC 1 of 1

- 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 = HNO₃
 D = H₂SO₄
 E = NaOH
 F = MeOH
 G = NaHSO₄
 H = Na₂S₂O₃
 I = Ascorbic Acid
 J = NH₄Cl
 K = Zn Acetate
 O = Other

REPORT TO	INVOICE TO
Company: <u>Barr Engineering</u>	Company: <u>Same</u>
Address: <u>234 W. Century Ave</u>	Address: <u>Same</u>
Name: <u>Terri Olson</u>	Name: <u>Same</u>
email: <u>Tolson@Barr.com</u>	email: <u>Same</u>
Copy to: <u>datamgt@barr.com</u>	P.O.
Project Name: <u>MDU Lewis and Clark</u>	Barr Project No: <u>26411007.10</u>

Location	Sample Depth			Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD	Y	N	Total Number of Containers	% Solids
	Start	Stop	Unit (m./ft. or in.)								
1. T-1	<u>W192</u>	<u>N/A</u>	<u>1</u>	<u>02/01/2019</u>	<u>09:25</u>	<u>GW</u>	<u>N</u>	<u>1</u>	<u>1</u>	<u>1</u>	
2. T-2	<u>W193</u>	<u>N/A</u>	<u>1</u>		<u>11:40</u>		<u>N</u>	<u>1</u>	<u>1</u>	<u>1</u>	
3. T-5	<u>W194</u>	<u>N/A</u>	<u>1</u>		<u>10:15/14:50</u>		<u>N</u>	<u>1</u>	<u>1</u>	<u>1</u>	
4. T-6	<u>W195</u>	<u>N/A</u>	<u>1</u>		<u>14:15/17:20</u>		<u>N</u>	<u>1</u>	<u>1</u>	<u>1</u>	
5. T-12	<u>W196</u>	<u>N/A</u>	<u>1</u>		<u>15:10/17:00</u>		<u>N</u>	<u>1</u>	<u>1</u>	<u>1</u>	
6. Duplicate	<u>W197</u>	<u>N/A</u>	<u>1</u>		<u>-</u>		<u>N</u>	<u>1</u>	<u>1</u>	<u>1</u>	
7. Field Blank	<u>W198</u>	<u>N/A</u>	<u>1</u>		<u>14:20</u>		<u>N</u>	<u>1</u>	<u>1</u>	<u>1</u>	
8. Equipment Blank	<u>W199</u>	<u>N/A</u>	<u>1</u>		<u>14:30</u>		<u>N</u>	<u>1</u>	<u>1</u>	<u>1</u>	
9.											
10.											

Preservative Code
 Field Filtered Y/N
 • see attached Table 1 for requested analysis
 Contact Terri Olson with questions.
 • Low Sample Volume

BARR USE ONLY		Relinquished by: <u>MVTL</u>	On Ice? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	Date: <u>2-4-19</u>	Time	Received by: <u>[Signature]</u>	Date: <u>4/</u>	Time
Sampled by: <u>MLJ2</u>		Relinquished by:	On Ice? <input type="checkbox"/> Y <input type="checkbox"/> N	Date	Time	Received by:	Date	Time
Barr Proj. Manager: <u>JLS4</u>		Samples Shipped VIA: <input type="checkbox"/> Courier <input type="checkbox"/> Federal Express <input checked="" type="checkbox"/> Sampler			Air Bill Number:		Requested Due Date:	
Barr DQ Manager: <u>TAD</u>		<input type="checkbox"/> Other:					<input checked="" type="checkbox"/> Standard Turn Around Time	
Lab Name: <u>MVTL</u>		Lab WO:			Temperature on Receipt (°C):		<input checked="" type="checkbox"/> Rush (mm/dd/yyyy)	
Lab Location: <u>Bismarck, ND</u>		Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None						

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.



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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

Approved by:

CC
Claudette K. Carroll | 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



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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 Carroll ^{CC} 1 Jul 2020

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016



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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

Table with 6 columns: As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include Metal Digestion, Lithium - Total, Boron - Total, and Selenium - Total.

Approved by:

Cc
Claudette K. Carroll 1 JUL 2020

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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



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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



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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. Carroll

CC
1 JUL 2020

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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

CERTIFICATION: ND # ND-00016



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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. Carrö ^{CL} 1 JUL 2020

Claudette K. Carrö, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016



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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. 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



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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. 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



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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

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



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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:

CC
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



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



Page: 1 of 1

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

Approved by:

CC
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

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
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
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	-	-	< 0.005

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. Cantello

1 Jul 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.



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If you no longer wish to receive marketing e-mails from Barr, respond to communications@barr.com and we will be happy to honor your request.

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

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

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



**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.



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If you no longer wish to receive marketing e-mails from Barr, respond to communications@barr.com and we will be happy to honor your request.

82-0830

Barr Engineering Co. Chain of Custody

Sample Origination State:

- Ann Arbor Duluth Jefferson City
 Bismarck Hibbing Minneapolis

- KS MO WI
 MI ND Other: MT
 MN SD

REPORT TO	INVOICE TO
Company: <u>Barr Engineering</u>	Company: <u>Same</u>
Address: <u>234 W Century Ave</u>	Address: <u>Same</u>
Name: <u>Terri Olson</u>	Name: <u>Same</u>
email: <u>T.Olson@barr.com</u>	email: <u>Same</u>
Copy to: <u>datamgt@barr.com</u>	P.O. <u>Same</u>
Project Name: <u>MDU L4C</u>	Barr Project No: <u>26411007.15</u>

Perform MS/MSD Y/N	Total Number of Containers	Analysis Requested		% Solids
		Water	Soil	
N	1			
Total 1:4:1:1:1 + baron (1-liter plastic)				

COC Number: **54259**
 COC 1 of 2

Matrix Code:	Preservative Code:
GW = Groundwater	A = None
SW = Surface Water	B = HCl
WW = Waste Water	C = HNO ₃
DW = Drinking Water	D = H ₂ SO ₄
S = Soil/Solid	E = NaOH
SD = Sediment	F = MeOH
O = Other	G = NaHSO ₄
	H = Na ₂ S ₂ O ₃
	I = Ascorbic Acid
	J = NH ₄ Cl
	K = Zn Acetate
	O = Other

Location	Sample Depth			Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y/N	Total Number of Containers	Total 1:4:1:1:1 + baron (1-liter plastic)	% Solids
	Start	Stop	Unit (m./ft. or in.)							
1. T-15 W635				04/06/2020	12:02	GW	N	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					

Preservative Code _____
 Field Filtered Y/N _____

• Contact Terri Olson w/ Questions.

BARR USE ONLY		Relinquished by: <u>Martin Row</u>	On Ice? <input checked="" type="checkbox"/> N	Date: <u>4-9-2020</u>	Time: <u>15:05</u>	Received by: <u>Terri Olson</u>	Date: <u>9/20/20</u>	Time: <u>15:05</u>
Sampled by: <u>MWJ</u>	Barr Proj. Manager: <u>Jeremy Gachnick</u>	Relinquished by:	On Ice? <input type="checkbox"/> Y <input type="checkbox"/> N	Date:	Time:	Received by:	Date:	Time:
Barr DQ Manager: <u>Terri Olson</u>	Lab Name: <u>MVTL</u>	Samples Shipped VIA: <input type="checkbox"/> Courier <input type="checkbox"/> Federal Express <input checked="" type="checkbox"/> Sampler	Air Bill Number:		Requested Due Date: <input checked="" type="checkbox"/> Standard Turn Around Time			
Lab Location: <u>Bismarck</u>	Lab WO:	Temperature on Receipt (°C): <u>0.4</u>		Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None		<input type="checkbox"/> Rush (mm/dd/yyyy)		

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.

TM 562

HARRISFORMS/Chain of Custody Form 2015 RLG Rev. 06/16/15

82-0830

Barr Engineering Co. Chain of Custody

Sample Origination State:
 KS MO WI
 MI ND Other: MT
 MN SD

Ann Arbor Duluth Jefferson City
 Bismarck Hibbing Minneapolis

REPORT TO		INVOICE TO	
Company: <u>Barr Engineering</u>		Company: <u>Same</u>	
Address: <u>234 W Century Ave</u>		Address: <u>Same</u>	
Name: <u>Terrj Olson</u>		Name: <u>Same</u>	
email: <u>Tolson @ Barr.com</u>		email: <u>Same</u>	
Copy to: <u>datamgt@barr.com</u>		P.O. <u>Same</u>	
Project Name: <u>MDU LLC</u>		Barr Project No: <u>26411007.15</u>	

COC Number: **54258**
COC 2 of 2

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 = HNO₃
D = H₂SO₄
E = NaOH
F = MeOH
G = NaHSO₄
H = Na₂S₂O₃
I = Ascorbic Acid
J = NH₄Cl
K = Zn Acetate
O = Other

Location	Sample Depth			Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y/N	Total Number Of Containers	Analysis Requested		% Solids
	Start	Stop	Unit (m./ft. or in.)						Water	Soil	
1. T-D W645	---	---	---	---	---	GW	N	1			
2. T-RB W646	---	---	---	---	---	L	N	1			
3.											
4.											
5.											
6.											
7.											
8.											
9.											
10.											

BARR USE ONLY		Relinquished by: <u>Monte</u>	On Ice? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	Date: <u>4-9-2020</u>	Time: <u>15:05</u>	Received by: <u>[Signature]</u>	Date: <u>4-9-2020</u>	Time: <u>15:05</u>
Sampled by: <u>MJR</u>		Relinquished by:	On Ice? <input type="checkbox"/> Y <input type="checkbox"/> N	Date:	Time:	Received by:	Date:	Time:
Barr Proj. Manager: <u>Jeremy Gacick</u>		Samples Shipped VIA: <input type="checkbox"/> Courier <input type="checkbox"/> Federal Express <input checked="" type="checkbox"/> Sampler			Air Bill Number:		Requested Due Date:	
Barr DQ Manager: <u>Terrj Olson</u>		<input type="checkbox"/> Other: _____					<input checked="" type="checkbox"/> Standard Turn Around Time	
Lab Name: <u>MVTL</u>		Temperature on Receipt (°C): <u>0.4</u>			Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None		<input type="checkbox"/> Rush _____ (mm/dd/yyyy)	
Lab Location: <u>Bismarck, ND</u>		Lab WO: _____						

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.

TMS02



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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-001
Client Sample ID: SB-2 20.5-21
Depths: 20.5 - 21 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-002
Client Sample ID: T-2 22.5-23.5
Depths: 22.5 - 23.5 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-003
Client Sample ID: T-3 30-32.5
Depths: 30 - 32.5 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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
 - 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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-004
Client Sample ID: T-5 10-15
Depths: 10 - 15 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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.

- 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

RL - Reporting 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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-005
Client Sample ID: T-6 19.5-20
Depths: 19.5 - 20 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-006
Client Sample ID: T-17 10.75-15
Depths: 10.75 - 15 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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
 - 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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-007
Client Sample ID: T-18 12.5-14.5
Depths: 12.5 - 14.5 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-008
Client Sample ID: T-22 10-15
Depths: 10 - 15 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-009
Client Sample ID: COAL PILE COAL 2
Depths: 0 - 0 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
COC: 58270

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:**
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- 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



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
 - E Value above quantitation range
 - H Holding times for preparation or analysis exceeded
 - L Analyzed by another laboratory
 - O Outside the Range of Dilutions
 - S Spike Recovery outside accepted recovery limits

- D Report limit raised due to dilution
- G Analyzed at IML Gillette laboratory
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- X Matrix Effect



ANALYTICAL QC SUMMARY REPORT

CLIENT: Barr Engineering
Work Order: S2008131
Project:

Date: 8/26/2020
Report ID: S2008131001

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:**
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 - E Value above quantitation range
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 - G Analyzed at IML Gillette laboratory
 - J Analyte detected below quantitation limits
 - ND Not Detected at the Reporting Limit
 - R RPD outside accepted recovery limits
 - X Matrix Effect

Barr Engineering Co. Chain of Custody

Sample Origination State:

- Ann Arbor Duluth Hibbing Minneapolis
 Bismarck Grand Rapids Jefferson City Salt Lake City

- KS MO UT
 MI ND WI
 MN SD Other: MT

Analysis Requested

Water Soil

SEPARATE PASTE
 TOTAL METALS (B, H, S)

COC Number: **58270**

COC / of /

Matrix Code: Preservative Code:

- | | |
|---------------------|---|
| GW = Groundwater | A = None |
| SW = Surface Water | B = HCl |
| WW = Waste Water | C = HNO ₃ |
| DW = Drinking Water | D = H ₂ SO ₄ |
| S = Soil/Solid | E = NaOH |
| SD = Sediment | F = MeOH |
| O = Other | G = NaHSO ₄ |
| | H = Na ₂ S ₂ O ₃ |
| | I = Ascorbic Acid |
| | J = NH ₄ Cl |
| | K = Zn Acetate |
| | O = Other |

REPORT TO	INVOICE TO
Company: <u>BARR ENGINEERING</u>	Company:
Address: <u>234 W. CENTURY</u>	Address:
Name: <u>SCOTT KOROM</u>	Name: <u>SAME</u>
email: <u>skorom@barr.com</u>	email:
Copy to: <u>datamgt@barr.com</u>	P.O.:
Project Name: <u>[REDACTED]</u>	Barr Project No: <u>26411007.15</u>

Location	Sample Depth			Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD	Y	N	Total Number Of Containers	% Solids
	Start	Stop	Unit (m./ft. or in.)								
1. <u>SB-2 20.5-21'</u>				<u>IN BARR RECORDS</u>	<u>IN BARR RECORDS</u>	<u>SD</u>					<u>52008131-001</u>
2. <u>T-2 22.5-23.5'</u>				↓	↓						<u>002</u>
3. <u>T-3 30-32.5'</u>				↓	↓						<u>003</u>
4. <u>T-5 10-15'</u>				↓	↓						<u>004</u>
5. <u>T-6 19.5-20'</u>				↓	↓						<u>005</u>
6. <u>T-17 10.75-15'</u>				↓	↓						<u>006</u>
7. <u>T-18 12.5'-14.5'</u>				↓	↓						<u>007</u>
8. <u>T-22 10-15'</u>				↓	↓						<u>008</u>
9. <u>COAL PILE COAL 2</u>				↓	↓						<u>009</u>
10.											

Preservative Code

Field Filtered Y/N

SEE ATTACHED LETTER FOR DETAILS

CONTACT SCOTT KOROM W/ QUESTIONS 701-335-3125

BARR USE ONLY		Relinquished by:	On Ice?	Date	Time	Received by:	Date	Time	
Sampled by: <u>DJE</u>	Relinquished by: <u>Donk Zandy</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N	<u>8-4-20</u>	<u>1300</u>	<u>Fedex</u>				
Barr Proj. Manager: <u>JJG3</u>	Relinquished by: <u>Fedex</u>	<input type="checkbox"/> Y <input checked="" type="checkbox"/> N			<u>Karen A Sec</u>	<u>8/6/20</u>	<u>1030</u>		
Barr DQ Manager: <u>TAO</u>	Samples Shipped VIA:	<input type="checkbox"/> Courier	<input checked="" type="checkbox"/> Federal Express	<input type="checkbox"/> Sampler	Air Bill Number:	<u>771172168518</u>	Requested Due Date:		
Lab Name: <u>PACE</u>	<input type="checkbox"/> Other: _____	Temperature on Receipt (°C): _____				Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None		<input checked="" type="checkbox"/> Standard Turn Around Time	
Lab Location: <u>Sheridan WY</u>	Lab WO: _____							<input type="checkbox"/> 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:\RUG\STDFORMS\Chain Of Custody Form 2015 RLG Rev. 01/02/18



Alternative Source Demonstration (ASD) for Lithium, Spring 2022

Lewis & Clark Station

Prepared for
Montana-Dakota Utilities Co.

January 2023

Alternative Source Demonstration (ASD) for Lithium, Spring 2022 Lewis & Clark Station

January 2023

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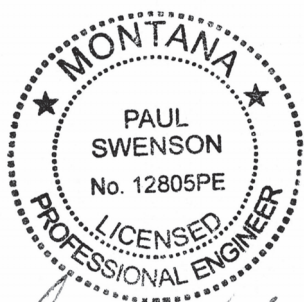
Figure 1	Site Layout
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Appendix A	Site Boring Logs
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Certifications

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.



A handwritten signature in cursive script, appearing to read "Paul Swenson".

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

January 10, 2023
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.

Statistically significant increases of appendix III parameters were detected under the detection monitoring program and the site transitioned to assessment monitoring on April 14, 2018. A determination was made on January 2, 2019, that selenium and lithium were detected in downgradient wells at statistically significant levels above groundwater protection standards (GWPS). An assessment of corrective measures was initiated on April 2, 2019. A downward trend in selenium concentrations was observed in monitoring

results. Selenium has not been detected at statistically significant levels above GWPS since April 2020. MDU continued to pursue an ASD for these constituents in parallel with ongoing corrective action measures. A successful ASD was published in January 2021 addressing both lithium and selenium. Each monitoring event since has been evaluated under the same approach as was used for the 2020 ASD, but recent ASDs have not evaluated selenium as it is no longer measured at statistically significant levels above GWPS. This ASD has been prepared for the results obtained during the Spring 2022 monitoring event.

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 2022 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 assessment monitoring event in May 2022 (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 groundwater protection standards (GWPS) in downgradient wells.

Exceedances of GWPS were identified at the following monitoring wells downgradient of the Scrubber Ponds during the spring 2022 semi-annual assessment monitoring event completed between May 11 and May 12, 2022:

- 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 – 2022 #1 (Spring)	MW111	0.166	0.0631*
	MW117	0.118	
	MW118	0.068	
	MW120	0.129	
Assessment Monitoring – 2021 #2 (Fall)	MW111	0.194	0.0631*
	MW117	0.115	
	MW118	0.082	
	MW120	0.135	
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 2022.

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 included 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 tolerance 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 upper 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 from fine-grained sediments resulted in a statistical upper limit of natural variability that is more than 2.5 times the GWPS. Based on these geologic relationships, elevated concentrations of lithium in downgradient wells are to be expected due to the upper limit of natural variability for the Site, and exceedances of the GWPS in these wells are the result in part due to natural variation in groundwater quality. Lithium concentrations in MW117, MW118, and MW120 are lower than the statistical upper limit of natural variability.

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.

As shown in Table 4, SPE leachate analyses of carbonaceous samples for lithium 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, raising the potential upper range for lithium concentration due to natural variability when compared to fine-grained sediments without carbonaceous material. 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 2022 Lithium Concentration in Groundwater (mg/L)	Distance to Closest Boring with Documented Carbonaceous Material (ft)
MW-111	0.227	0.166	within boring
MW-120	0.175	0.129	125
MW-117	0.155	0.118	160
MW-118	0.102	0.0683	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 concentration for the Spring 2022 event (0.166 mg/L) and is the only downgradient well with carbonaceous material documented in the well's boring log. The detected lithium concentration appears to be within the range of natural variability when carbonaceous material is present. 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:

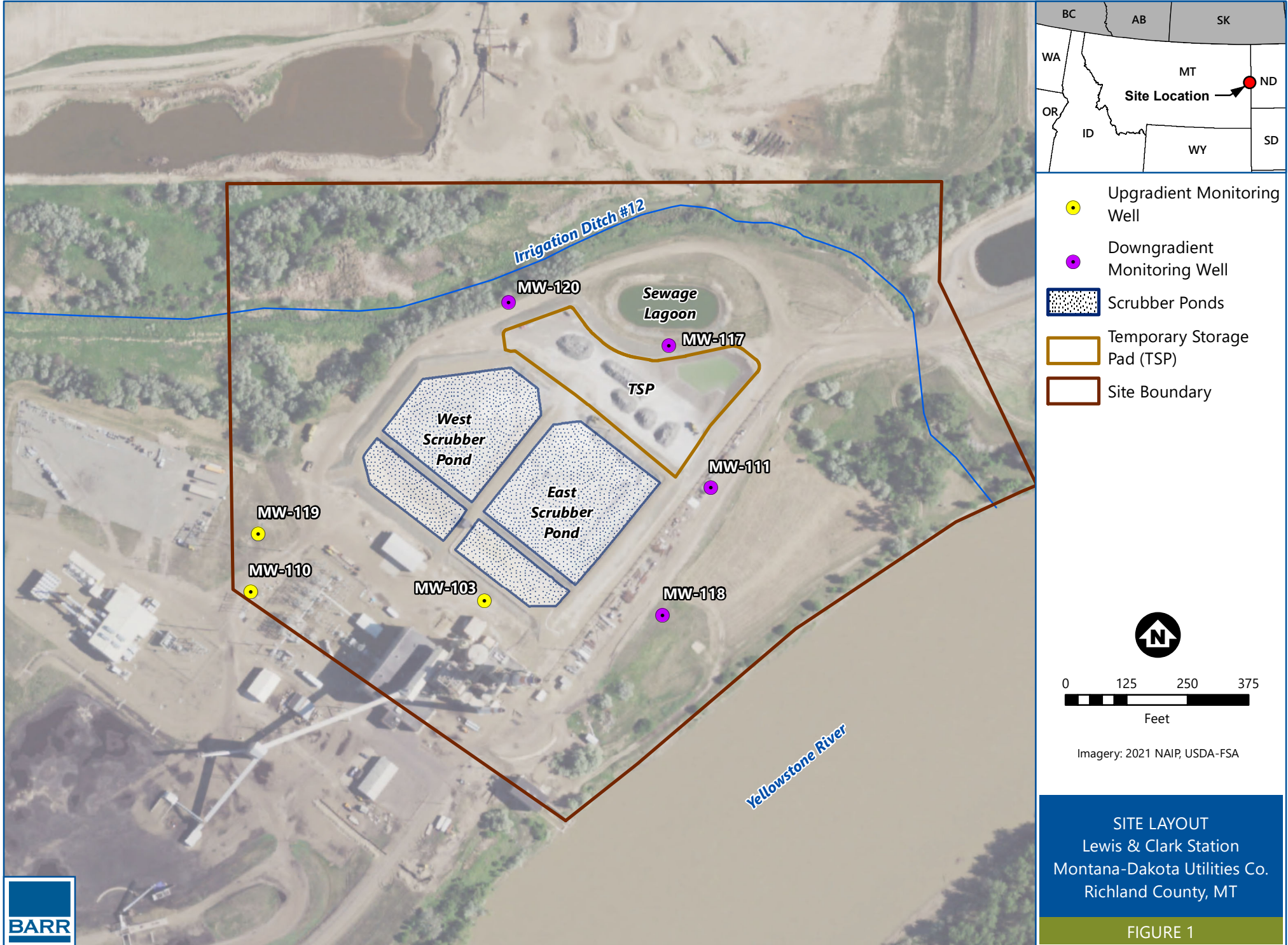
- **Hypothesis No. 1:** Due to the natural variability between sediments in which upgradient and downgradient wells are screened, the observed downgradient concentrations are due in part to the natural variation in lithium content of the sediments.
- **Hypothesis No. 2:** The GWPS based on upgradient 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.

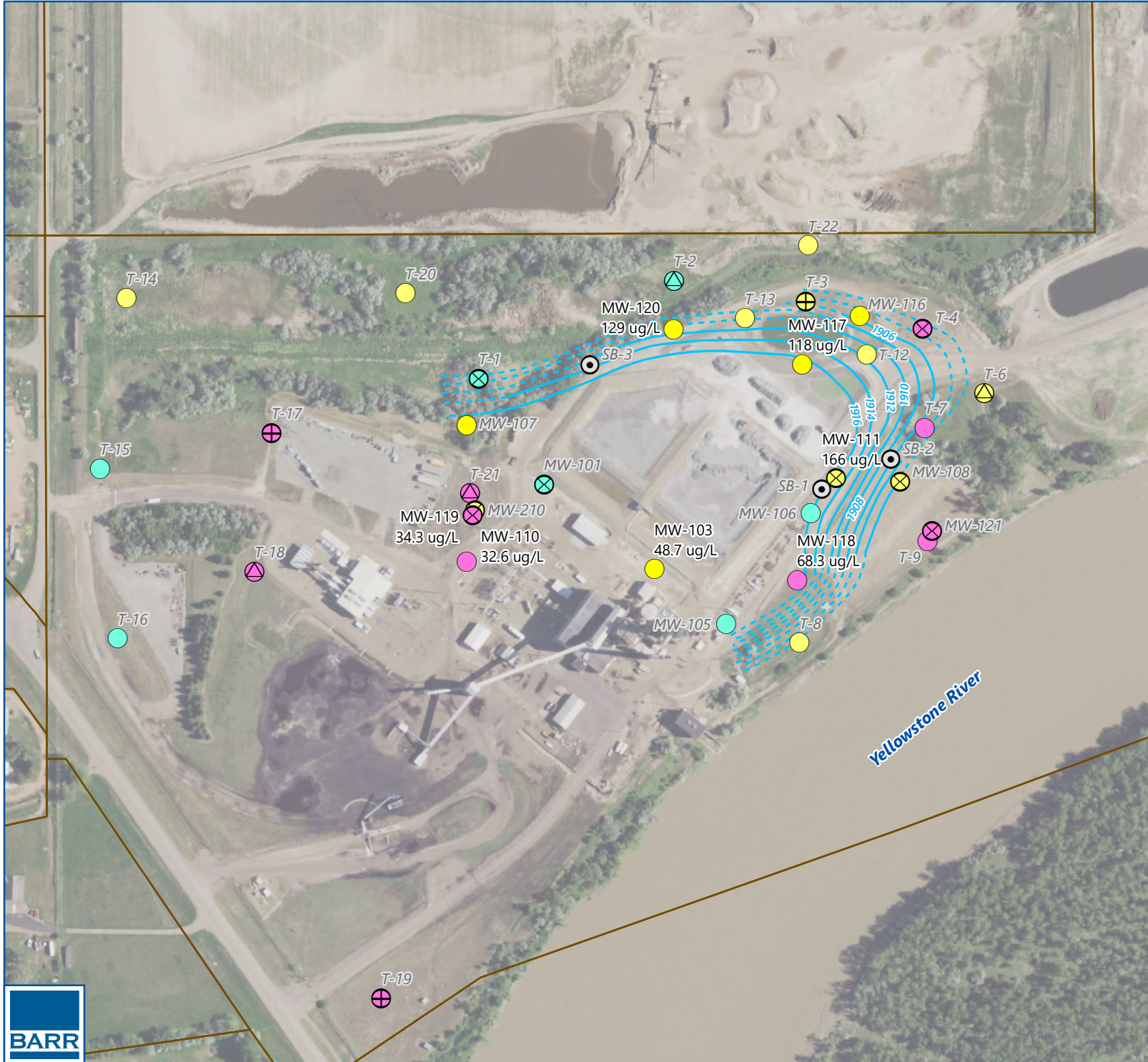
Taken together, the lines of evidence presented above provide adequate documentation and support that an alternative source is responsible for the presence of lithium at statistically significant concentrations above the GWPS. The only well with a lithium concentration that exceeds the statistical upper limit of natural variability of 0.160 mg/L is MW-111 (0.166 mg/L). A carbonaceous material zone is also documented within the boring for MW-111, indicating that concentrations of lithium that are higher than the upper limit of natural variability calculated from data developed from fine-grained sediments might be anticipated for this well. It is concluded that the combined effects of natural variability and presence of carbonaceous material results in the elevated lithium concentration in MW-111. Therefore, it is further concluded that the combined effects of natural variability and presence of carbonaceous material establish an alternative source, 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





- 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:
Material type and carbonaceous material presence were determined from boring logs (Appendix A). Lithium concentrations previously measured in samples collected from temporary wells (T-1 through T-13 in January 2019 and T-14 through T-23 in April 2020) are documented in Appendix B.

0 175 350 525

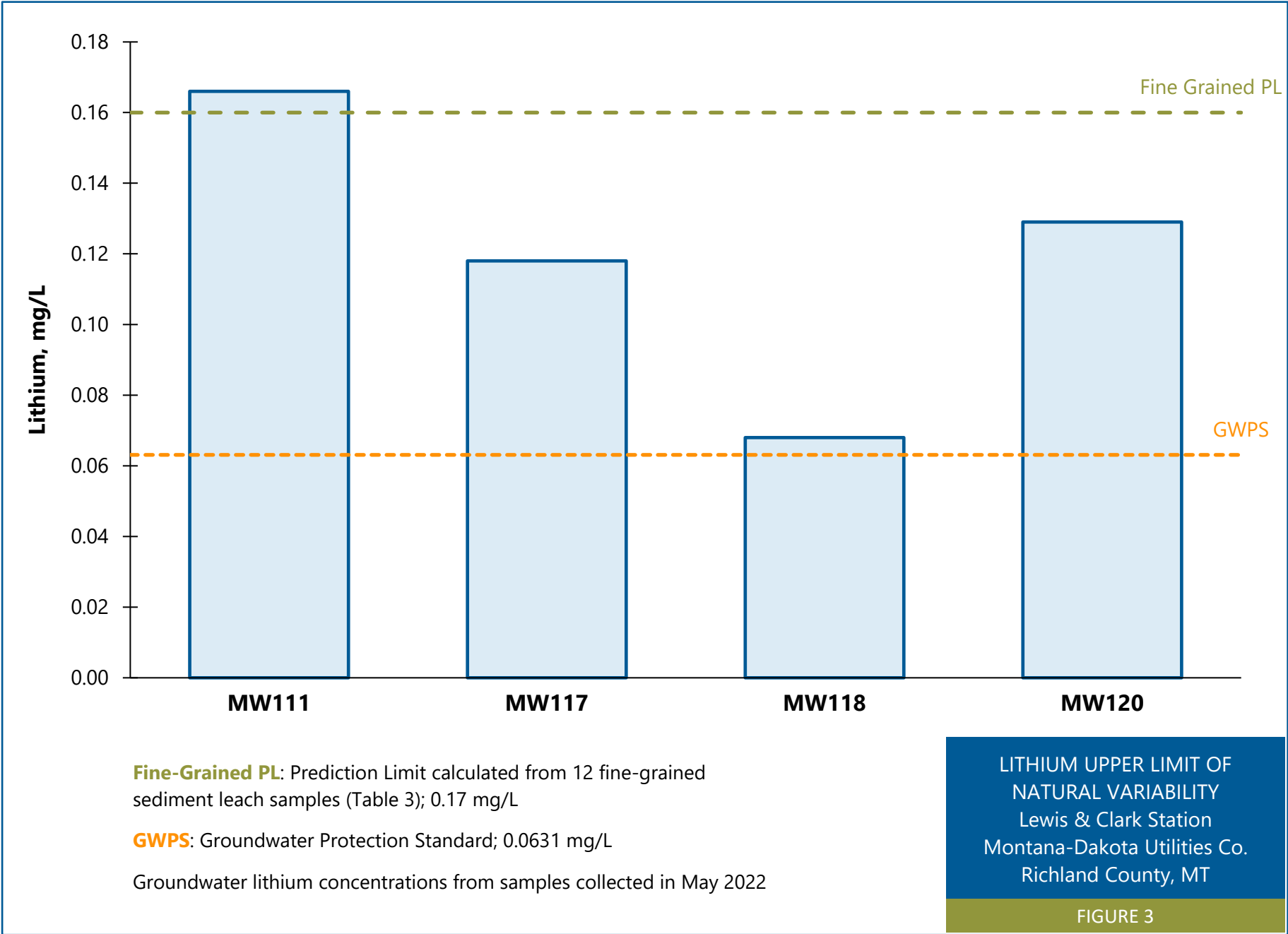
Feet

Imagery: 2021 NAIP, USDA-FSA

**WELL MATERIAL TYPES AND
LITHIUM CONCENTRATIONS
SPRING 2022**
Lewis & Clark Station
Montana-Dakota Utilities Co.
Richland County, MT

FIGURE 2





Appendices

Appendix A
Site Boring Logs

LOG OF BORING



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						
22.7	.5		GRAVEL surfacing			gp
19.7	3½	CL	SILTY CLAY, low to medium plasticity, dark brown to grayish brown, moist, very stiff (fine alluvium)	21		4+
16.7	6½	CL	SANDY CLAY, low plasticity, brown, moist, rather stiff (fine alluvium)	10		2
		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					
06.2	17	ML	SANDY SILT, nonplastic, light gray, moist, very dense (siltstone)	52		1 3/4
		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			

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 1/4 NW 1/4 SW 1/4 Section 9
Township 22 Range 59 County Richland
Gov'n'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.
PERFORATIONS: 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.

ROUTED: 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 1/2 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, 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.

Date 1 Dec 91
Firm Name Water Supply Inc
Address 2501 Twin City Dr
Mandan, ND 58504
Signature [Signature] License No. 296/004

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.	SCSU	Graphic Log	LITHOLOGIC DESCRIPTION	MAJOR UNIT	WELL OR PIEZOMETER CONSTRUCTION DETAIL	Elevation, feet
0.0			CL		TOPSOIL - SANDY CLAY (CL): fine grained; brown; frozen.	Fill	PRO. CASING Diameter: 6" Type: Steel Interval: Surface + 3'	1917.5
2.5			CL/ML		FILL - SILTY CLAY (CL/ML): yellow; moist; medium to high plasticity; strong HCl reaction; 0% gravel, 5% sand, 95% fines, orange staining.			1915.0
5.0			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:	1912.5
7.5			CL/ML					GROUT Type: Concrete Interval: 0-1' bgs
10.0			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, occurrence of silty clay, low to high plasticity.	Fort Union	SEAL Type: Bentonite chips Interval: 1-4.5' bgs	1907.5
12.5			CL		13': Dry, no oxidation, non-plastic.		SANDPACK Type: 20/40 Interval: 4.5-10' bgs	1905.0
15.0			CL			SCREEN Diameter: 2" Type: No. 10 Sch 40 Interval: PVC 5-10' bgs	1902.5	
17.5								1900.0
19.0					End of well 19.0 feet			

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 MIDU LEWIS AND CLARK STATION\26411007.GPJ BARR\LIBRARY.GLB ENVIRO LOG BARR TEMPLATE.GDT

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.	SCSU	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		
2.5			SW		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.	Alluvium	PRO. CASING Diameter: 6" Type: Steel Interval: Surface + 3' RISER CASING Diameter: 2" Type: Sch 40 PVC Interval:	1920.0
5.0							Type: Concrete Interval: 0-1' bgs SEAL Type: Bentonite chips Interval: 1-5' bgs	1917.5
7.5					8: Medium/coarse grained, subangular sand with small to large subangular cobbles and gravels.			
10.0			ML		Rusty brown water at contact. SILT (ML): very pale brown; moist; low plasticity; some brown layers within.	Fort Union	SANDPACK Type: 20/40 Interval: 5-12' bgs SCREEN Diameter: 2" Type: No. 10 Sch 40 Interval: PVC 6-11' bgs	1912.5
12.5			CL		CLAY (CL): gray; moist; very hard, homogenous, Fort Union Formation, non-plastic. End of well 12.0 feet			
15.0								
17.5								
20.0								

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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

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.:

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Depth, feet	Sample Type & Recovery	Sample No.	S C S C	Graphic Log	LITHOLOGIC DESCRIPTION	MAJOR UNIT	WELL OR PIEZOMETER CONSTRUCTION DETAIL	Elevation, feet
0.0					TOPSOIL - SANDY CLAY MIX: black; dry; less than 1".			
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' RISER CASING Diameter: 2" Type: Sch 40 PCV Interval:	1922.5 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	Interval: GROUT Type: Neat Cement Interval: 3-5' bgs SEAL Type: Bentonite chips Interval: 5-7' bgs SANDPACK Type: 20/40 Interval: 7-16' bgs SCREEN Diameter: 2" Type: No. 10 Sch 40 Interval: PVC 9-14' bgs	1917.5 1915.0 1912.5
7.5					7': Some orange/black oxidation in sand.			
10.0					10': Some heaving sand.			
15.0			ML		SILT (ML): gray; moist; 0% gravel, 0% sand, 100% fines, very hard, non-plastic, low HCL reaction.	Fort Union		
15.75					15.75: Lignite lense.			
16.0					End of well 16.0 feet			1907.5

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

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	C S C S C	Graphic Log	LITHOLOGIC DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL	Elevation, feet
0.0							CLAY FILL (CL-CH): yellowish brown (10YR 5/4); frozen; hard; roots.		
2.5			7-9-14-18.	G/S/F:0%/ 0%/ 100% G/S/F:15%/ 60%/ 25%			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
5.0			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
7.5			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. 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
10.0			2-4-3-0.	G/S/F:5%/ 20%/ 75%			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
12.5			1-2-3-0.	G/S/F:10%/ 20%/ 70%	CL-CH		At 11': Color change to dark grayish brown (10YR 4/2), softer. At 12': Sample, wet.	SANDPACK Type: 10/20 Interval: 9-16' bgs	1907.5
15.0			1-3-3-0.	G/S/F:10%/ 20%/ 70%				SCREEN Diameter: 2" Type: No. 12 Sch 40 PVC Interval: 11-16' bgs	1905.0
17.5			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.		
20.0							End of well 16.0 feet		

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.

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Project: Lewis and Clark Station	Surface Elevation: 1902.4 ft	Top of Casing Elev.: 1904.6 ft
Project No.: 26411007.14 Boundary Well	Drilling Method: Hollow Stem Auger	
Location: Sidney, Montana	Sampling Method:	
Coordinates: UTM 13N N:17326179m, E:1848702m	Completion Depth: 14.0 ft	
Datum:		

Depth, feet	Sample Type & Recovery	Sample No.	Blows/6in.	ENVIRONMENTAL DATA	S C S C	Graphic Log	LITHOLOGIC DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL	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.	<p>-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</p>	1900.0
2.5		2	1-1-4-6.	G/S/F:0%/ 60%/ 40%	SM		SILTY SAND (SM): olive brown (2.5Y 4/3); moist to wet; roots; fine grained sand within; few sandy lenses.		1897.5
5.0		3	2-2-3-3.	G/S/F:0%/ 90%/ 10%	SP		SAND (SP): fine grained sand; trace fines, loose; light olive brown (2.5Y 5/3); moist.		1895.0
7.5		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.		1892.5
		5	1-5-4-.	G/S/F:0%/ 95%/ 5%			At 8 ft, trace fine grained orange terracotta fragments.		
		6	W-3-5-3.	G/S/F:0%/ 90%/ 10%			At 9 ft, saturated.		
10.0		7	2-2-3-.	G/S/F:0%/ 90%/ 10% G/S/F:90%/ 10%/ 0%	GP		GRAVEL (GP): fine to coarse grained; subrounded; trace fine to coarse grained sand.		1890.0
12.5		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		

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.

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LOG OF BORING SB-2

DRAFT
 SHEET 1 OF 1

Project: GeoProbe Investigation
 Project No.: 26411007.10
 Location: Lewis & Clark Station, Sidney, MT
 Coordinates: N 2,248,187.2 ft E 3,585,135.6 ft
 Datum: NAVD88

Surface Elevation: 1914.4 ft
 Drilling Method: GeoProbe Direct-Push
 Sampling Method: GeoProbe
 Completion Depth: 25.0 ft

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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.	
5			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
10			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
15						1900
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.	1895
					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.	
25					End of boring 25.0 feet	1890

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.



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LOG OF BORING SB-3

DRAFT
 SHEET 1 OF 1

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		

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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
10			SP		9.5' SAND (SP): 3-inch lens of fine grained; tan; moist to wet.	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.	
20			CL-CH		LEAN TO FAT CLAY (CL-CH): olive yellow; moist; with golden brown mottles, trace manganese oxidation stains; medium plasticity.	
					End of boring 20.0 feet	

Date Boring Started:	1/31/19 2:05 pm	Remarks:	WL: 10.20' bgs, not allowed to equilibrate
Date Boring Completed:	1/31/19 2:25 pm	Weather:	25°F, clear/sunny, windy
Logged By:	DJZ		
Drilling Contractor:	AET		
Drill Rig:	6620 DT		Additional data may have been collected in the field which is not included on this log.



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LOG OF BORING T-1

DRAFT
 SHEET 1 OF 1

Project:	GeoProbe Investigation	Surface Elevation:	1914.6 ft
Project No.:	26411007.10	Drilling Method:	GeoProbe Direct-Push
Location:	Lewis & Clark Station, Sidney, MT	Sampling Method:	GeoProbe
Coordinates:	N 2,248,474.2 ft E 3,584,051.4 ft	Completion Depth:	25.0 ft
Datum:	NAVD88		

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Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0						1914.6
0 - 2.5			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.	
2.5 - 4.5			CL		SILTY CLAY (CL): dark grayish brown; moist; 0% gravel, 0% sand, 100% fines.	1910
4.5 - 8.5			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 - 9.0					8.5': color change to gray and dark gray.	
9.0 - 13.0					9.0': wet, fragments of black organics and lignite coal within.	1905
13.0 - 15.0					13': color change to grayish brown with mottles.	
15.0 - 20.0			CL		CLAY WITH SAND (CL): fine to medium grained; grayish brown; subrounded to subangular; wet to moist; 0% gravel, 25% sand, 75% fines.	1900
20.0 - 23.0			SW		SAND (SW): fine to coarse grained; wet; subrounded to subangular; well graded with gravels at contact.	1895
23.0 - 25.0			CL-CH		CLAY (CL-CH): Fort Union Formation; gray; moist; silt laminations as fractures within.	1890
25.0					End of boring 25.0 feet	

Date Boring Started:	1/31/19 3:10 pm	Remarks:	WL: 0.99' bgs
Date Boring Completed:	1/31/19 4:20 pm	Weather:	25°F, partly cloudy, windy
Logged By:	DJZ		
Drilling Contractor:	AET		
Drill Rig:	6620 DT		
		Additional data may have been collected in the field which is not included on this log.	



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LOG OF BORING T-2

DRAFT
 SHEET 1 OF 1

Project:	GeoProbe Investigation	Surface Elevation:	1911.9 ft
Project No.:	26411007.10	Drilling Method:	GeoProbe Direct-Push
Location:	Lewis & Clark Station, Sidney, MT	Sampling Method:	GeoProbe
Coordinates:	N 2,248,725.2 ft E 3,584,548.7 ft	Completion Depth:	30.0 ft
Datum:	NAVD88		

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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
18			CL-CH		CLAY (CL-CH): grayish brown; moist to wet; trace medium grained sand, mottled with gray spots; high plasticity.	
20			SM		SILTY SAND (SM): very fine to fine grained; grayish brown; trace medium to coarse grained sand; 0% gravel, 60% sand, 40% fines.	
22			SW		WELL GRADED SAND (SW): fine to coarse grained; subrounded to subangular; small to large gravels, subrounded to subangular.	1890
24			CL-CH		CLAY (CL-CH): olive brown; wet; soft; fragments of wood/roots within.	
25			CH		LIGNITE: black; wet; horizontal layering. CLAY (CH): Fort Union Formation; gray to dark gray; moist; hard.	
28			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 occurred.
 Weather: 25°F, partly cloudy
 Additional data may have been collected in the field which is not included on this log.



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LOG OF BORING T-3

DRAFT
 SHEET 1 OF 1

Project:	GeoProbe Investigation	Surface Elevation:	1915.0 ft
Project No.:	26411007.10	Drilling Method:	GeoProbe Direct-Push
Location:	Lewis & Clark Station, Sidney, MT	Sampling Method:	GeoProbe
Coordinates:	N 2,248,671.5 ft E 3,584,884.7 ft	Completion Depth:	32.5 ft
Datum:	NAVD88		

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Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0					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			CL			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
25			SP		SAND (SP): fine grained with trace medium to coarse grained; brown; wet; subrounded; trace small subrounded gravels.	1890
			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.	
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.



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LOG OF BORING T-5

DRAFT
 SHEET 1 OF 1

Project:	GeoProbe Investigation	Surface Elevation:	1912.8 ft
Project No.:	26411007.10	Drilling Method:	GeoProbe Direct-Push
Location:	Lewis & Clark Station, Sidney, MT	Sampling Method:	GeoProbe
Coordinates:	N 2,248,649.6 ft E 3,585,434.0 ft	Completion Depth:	20.0 ft
Datum:	NAVD88		

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Depth, feet	Sample Type & Recovery	Sample No.	SSU	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0					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					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					SAND (SP): fine grained; brown; wet.	
15					SILTY CLAY & CLAYEY SILT (ML-CL): brown; wet; areas of gray and rusty mottles; weak HCl reaction.	1900
18.95					SILT (ML): dark grayish brown; wet; soft; 0% gravel, 0% sand, 100% fines.	1895
20					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.



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

LOG OF BORING T-6

DRAFT
 SHEET 1 OF 1

Project:	GeoProbe Investigation	Surface Elevation:	1916.8 ft
Project No.:	26411007.10	Drilling Method:	GeoProbe Direct-Push
Location:	Lewis & Clark Station, Sidney, MT	Sampling Method:	GeoProbe
Coordinates:	N 2,248,437.8 ft E 3,585,340.5 ft	Completion Depth:	20.0 ft
Datum:	NAVD88		

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Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0					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.	
			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'.	1900
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.



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LOG OF BORING T-13

DRAFT
 SHEET 1 OF 1

Project:	GeoProbe Investigation	Surface Elevation:	1916.9 ft
Project No.:	26411007.10	Drilling Method:	GeoProbe Direct-Push
Location:	Lewis & Clark Station, Sidney, MT	Sampling Method:	GeoProbe
Coordinates:	N 2,248,629.2 ft E 3,584,730.4 ft	Completion Depth:	22.5 ft
Datum:	NAVD88		

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Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0					CLAY (CL-CH): brown; frozen; few fine to coarse sand and gravel, subrounded; 10% gravel, 10% sand, 80% fines.	1915
			CL-CH			
			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			CL-CH		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.



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LOG OF BORING T-14

DRAFT
 SHEET 1 OF 1

Project:	Supplemental ASD	Surface Elevation:	1917.1 ft
Project No.:	26411007.15	Drilling Method:	Geoprobe Direct-Push
Location:	Lewis and Clark Station, Sidney, MT	Sampling Method:	Geoprobe
Coordinates:	N 2,248,679.6 ft E 3,583,153.0 ft	Completion Depth:	13.5 ft
Datum:	NAVD88		

Depth, feet	Sample Type & Recovery	Sample No.	U S C S	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0					TOPSOIL (OL): black; frozen; roots, clayey mix; 0% gravel, 0% sand, 100% fines.	1917.1
2.5		1	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
5.0			CH		FAT CLAY (CH): dark grayish brown to gray; moist to wet; dense to hard; 0% gravel, 2% sand, 98% fines.	1912.5
7.5		2	CL-CH		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.	1910.0
10.0			CL-CH			1907.5
12.5		3	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.	1905.0
13.5					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.

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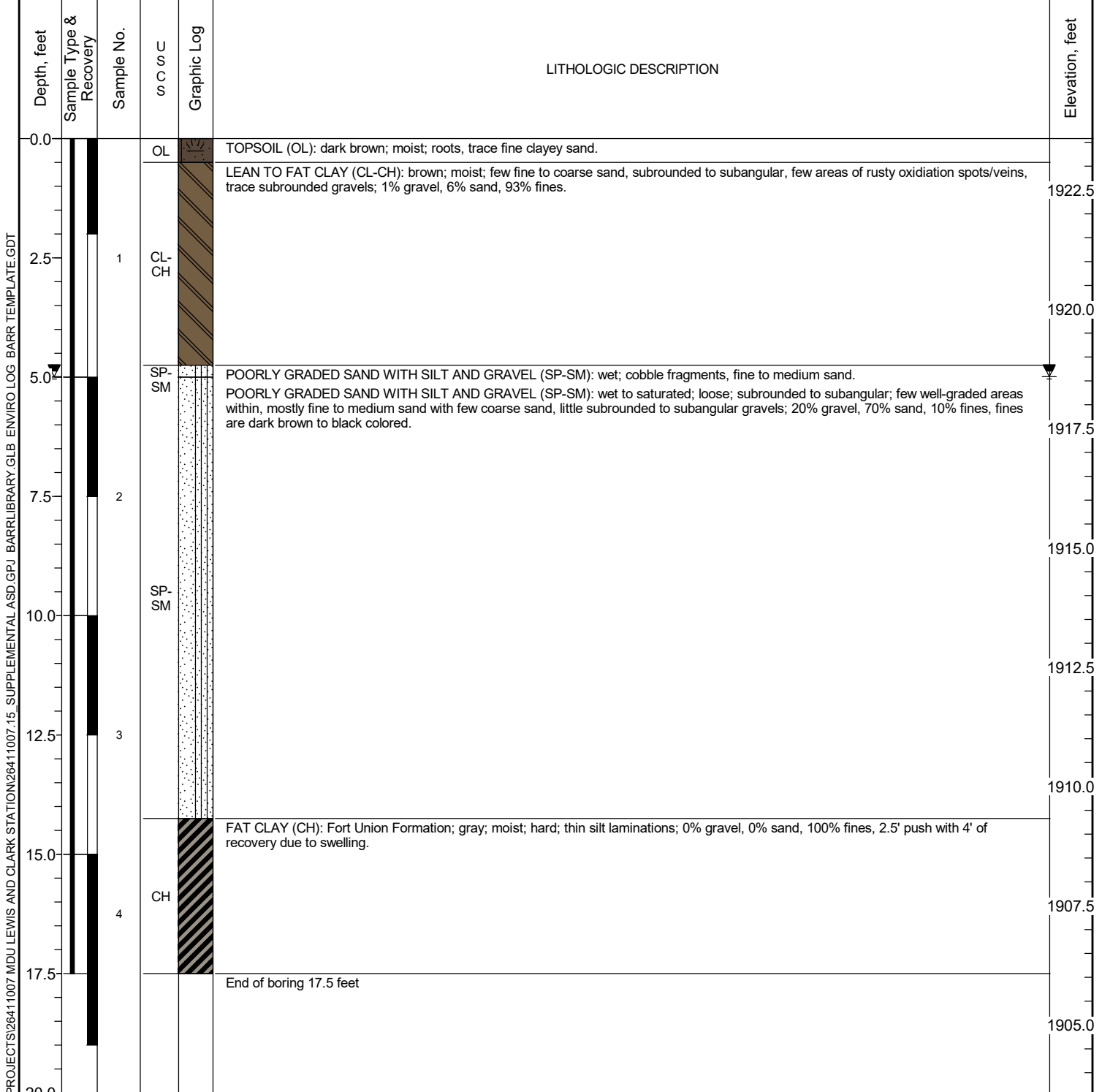


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LOG OF BORING T-15

DRAFT
 SHEET 1 OF 1

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		



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.

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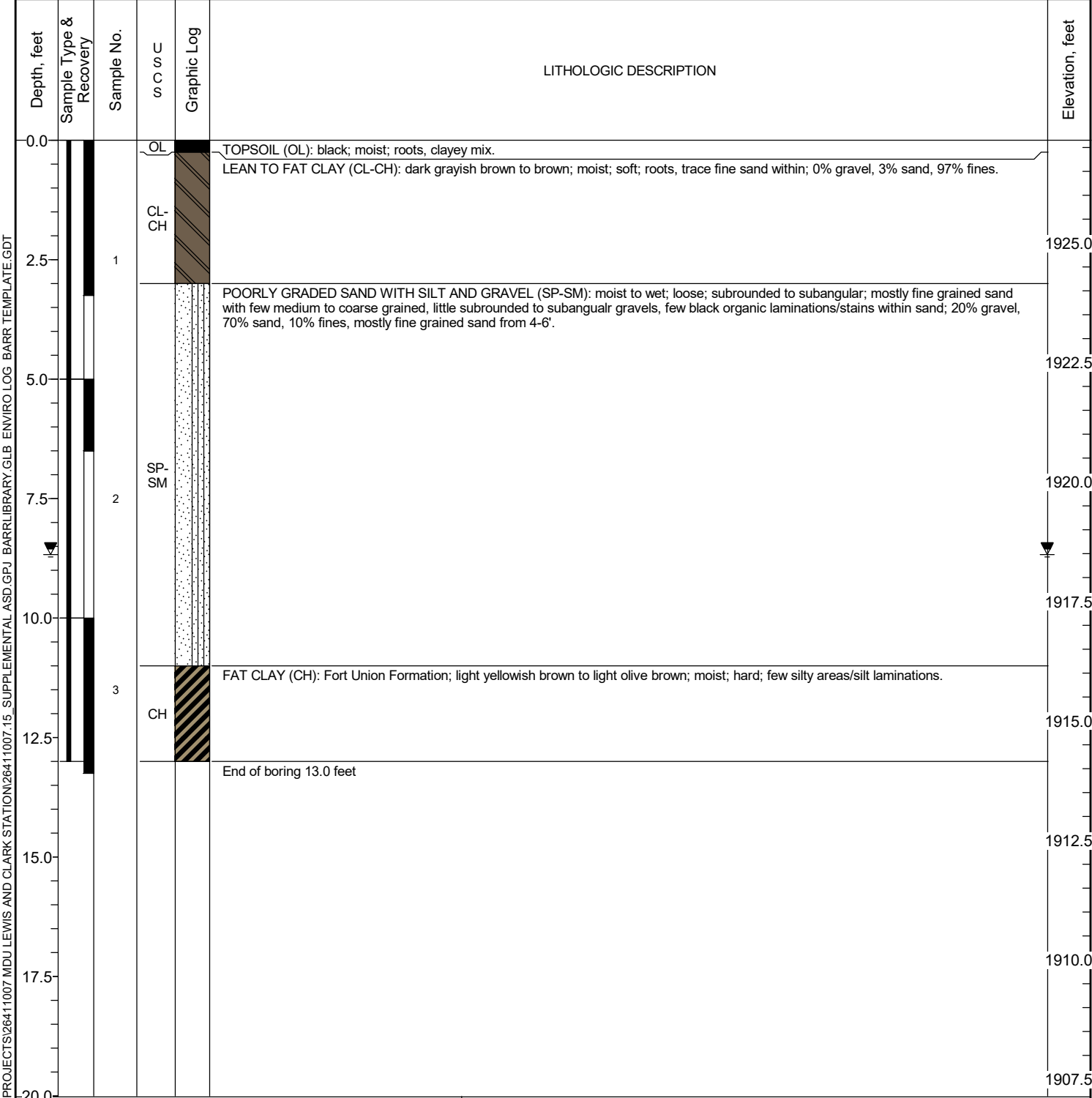


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LOG OF BORING T-16

DRAFT
 SHEET 1 OF 1

Project:	Supplemental ASD	Surface Elevation:	1927.2 ft
Project No.:	26411007.15	Drilling Method:	Geoprobe Direct-Push
Location:	Lewis and Clark Station, Sidney, MT	Sampling Method:	Geoprobe
Coordinates:	N 2,247,812.4 ft E 3,583,130.0 ft	Completion Depth:	13.0 ft
Datum:	NAVD88		



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.

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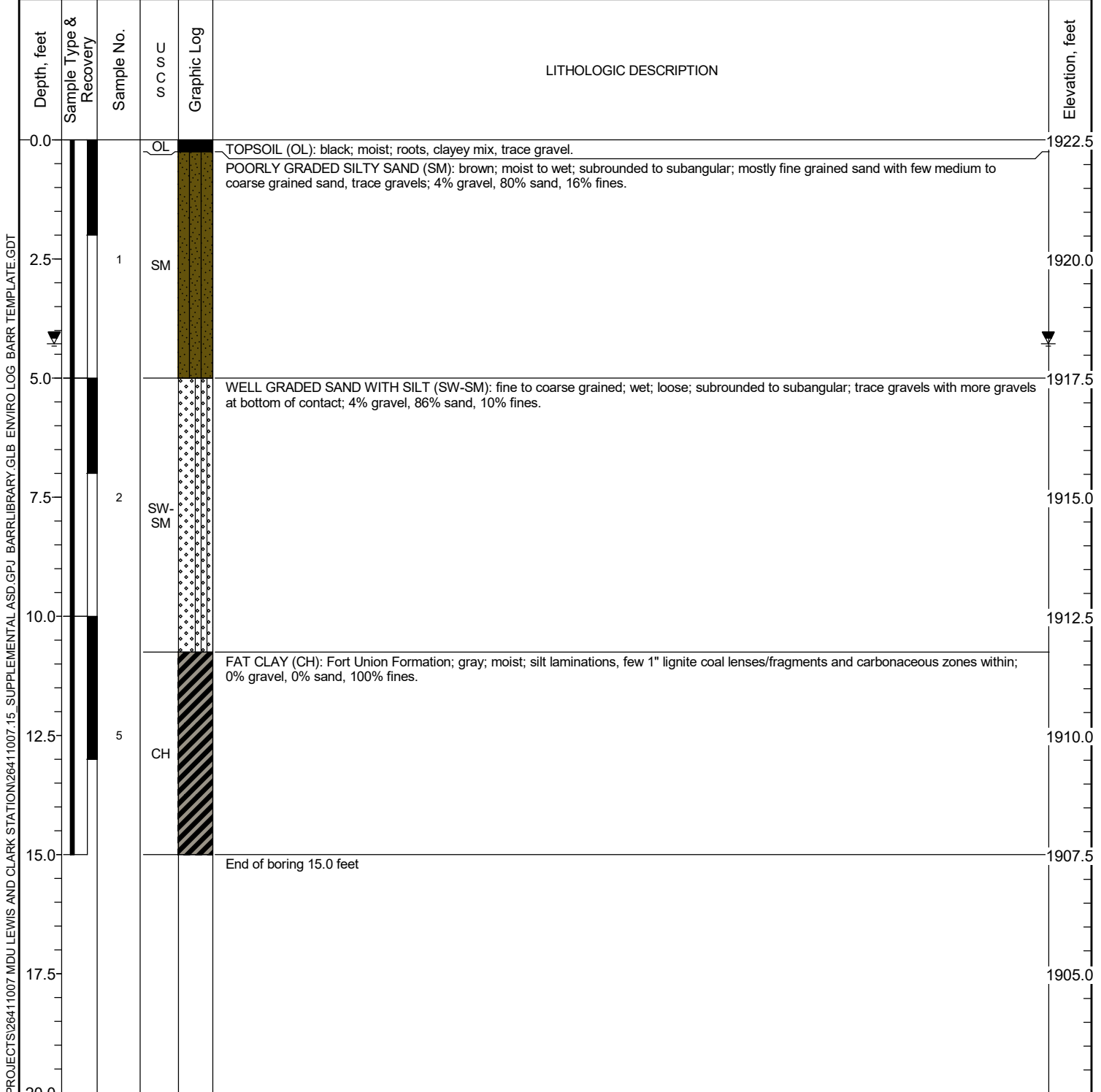


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LOG OF BORING T-17

DRAFT
 SHEET 1 OF 1

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		



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.

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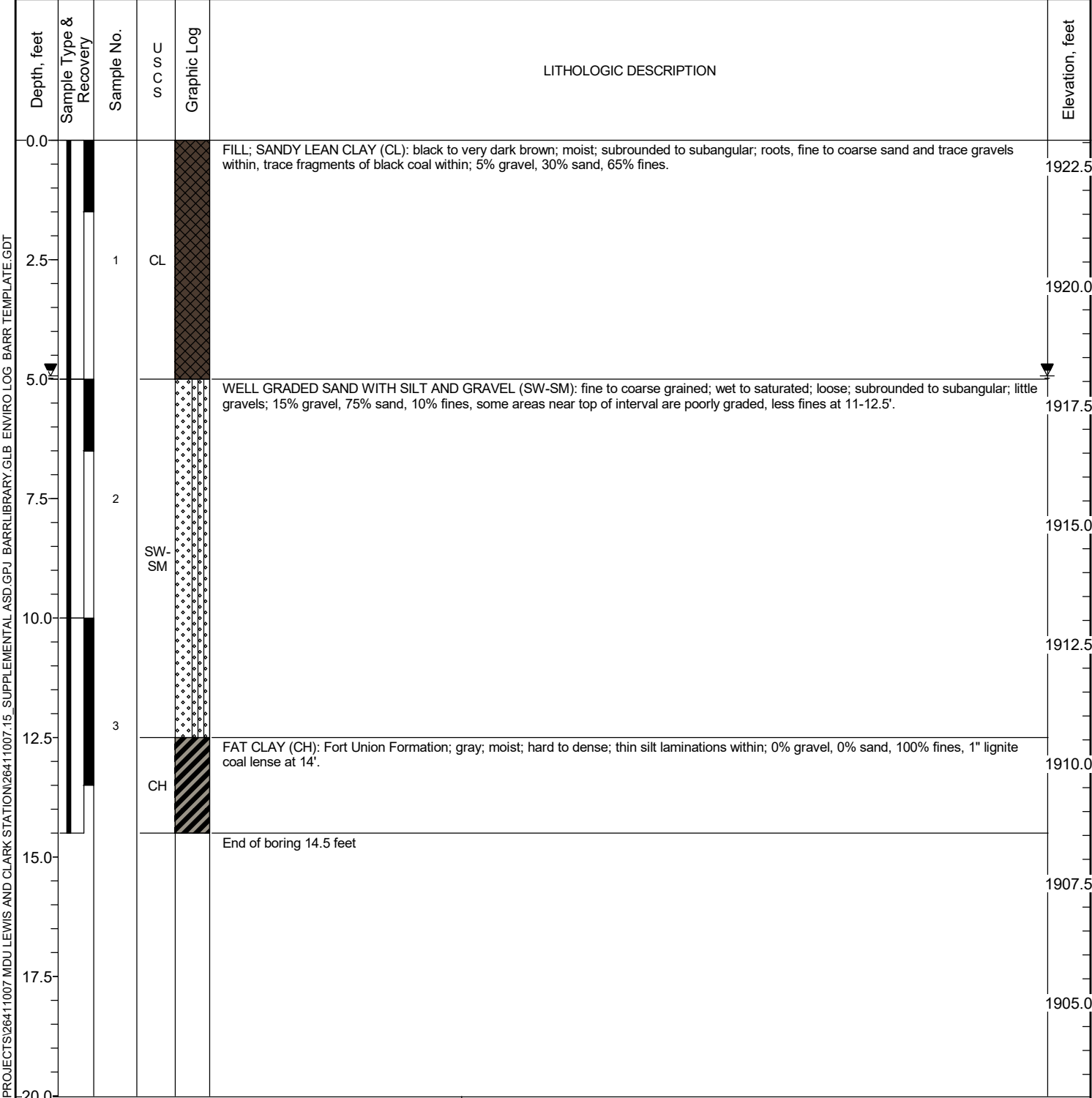
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LOG OF BORING T-18

DRAFT
 SHEET 1 OF 1

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



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.

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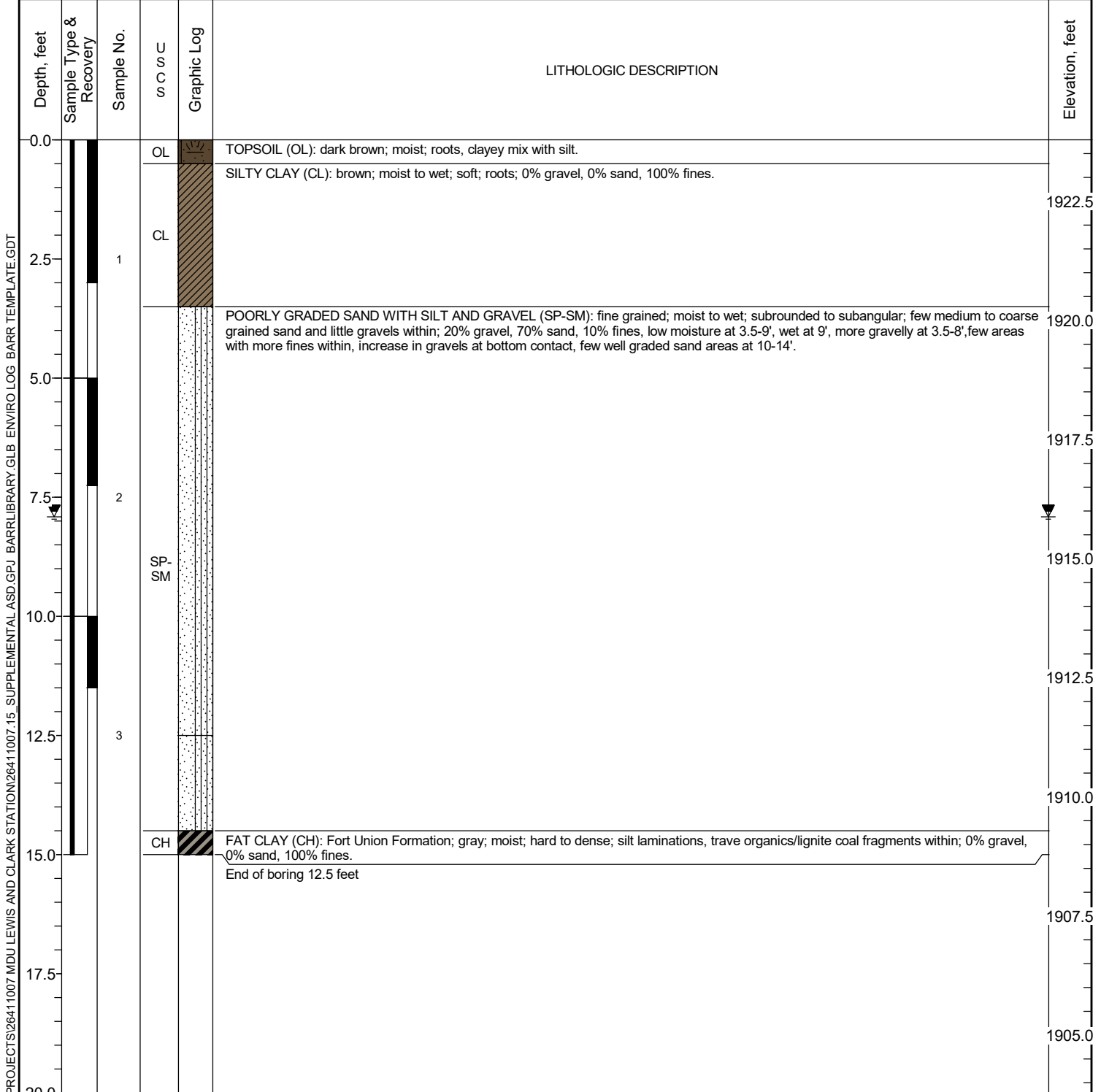


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LOG OF BORING T-19

DRAFT
 SHEET 1 OF 1

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 2,246,894.0 ft E 3,583,802.3 ft	Completion Depth:	12.5 ft
Datum:	NAVD88		



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.

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LOG OF BORING T-20

DRAFT
 SHEET 1 OF 1

Project:	Supplemental ASD	Surface Elevation:	1920.7 ft
Project No.:	26411007.15	Drilling Method:	Geoprobe Direct-Push
Location:	Lewis and Clark Station, Sidney, MT	Sampling Method:	Geoprobe
Coordinates:	N 2,248,692.1 ft E 3,583,864.1 ft	Completion Depth:	15.0 ft
Datum:	NAVD88		

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Depth, feet	Sample Type & Recovery	Sample No.	U S C S	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0.0					TOPSOIL (OL): dark grayish brown; moist; roots, clayey mix.	
					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	CL			1917.5
5.0			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.	
7.5		2	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
10.0			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.	1912.5
12.5		3				1910.0
15.0		4			End of boring 15.0 feet	1907.5
17.5						1905.0
20.0						1902.5

Date Boring Started:	4/7/20 10:00 am	Remarks: Refusal at 15' bgs. Temp well screen 5-15' bgs.
Date Boring Completed:	4/7/20 10:30 am	
Logged By:	DJZ	
Drilling Contractor:	AET	
Drill Rig:		
		Additional data may have been collected in the field which is not included on this log.

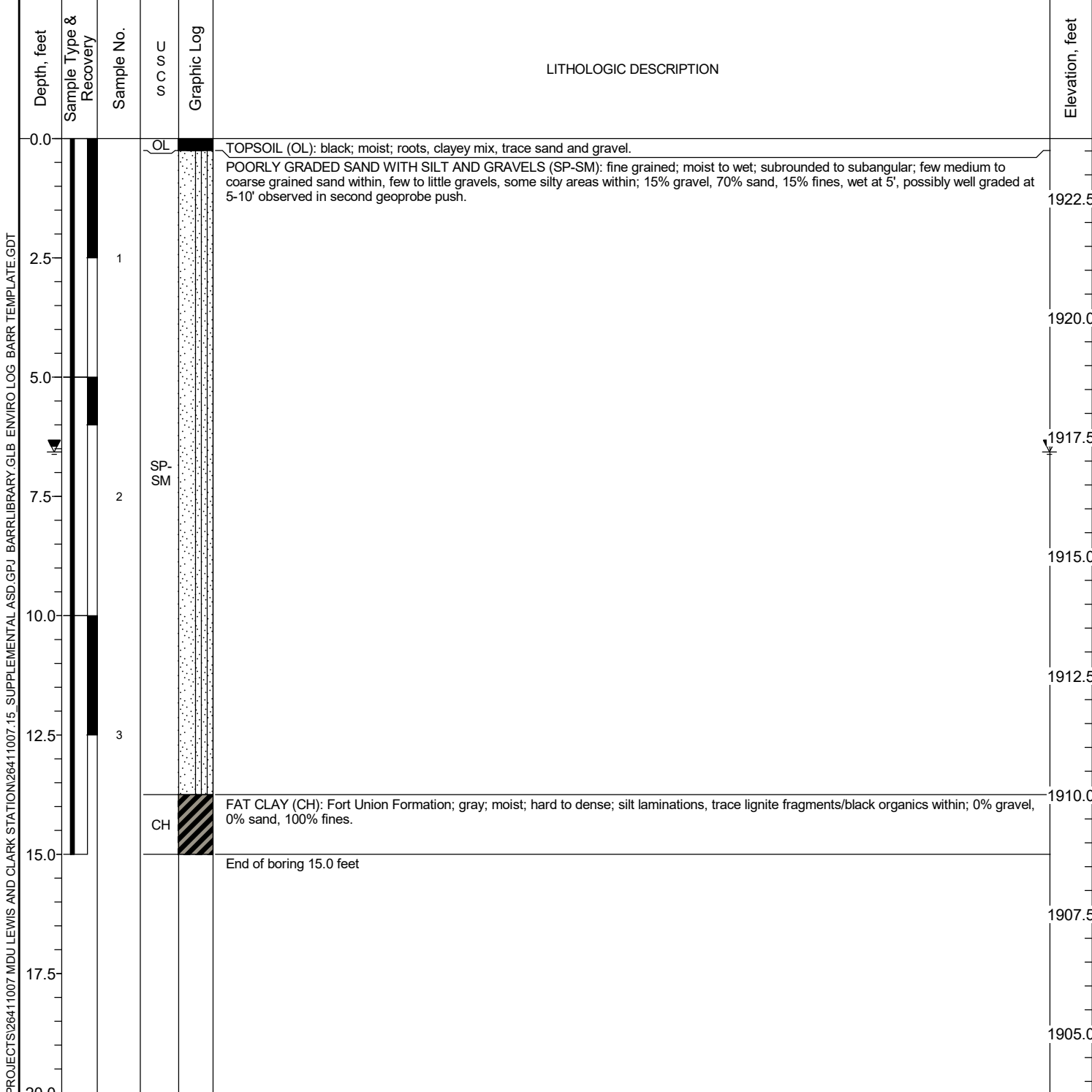


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LOG OF BORING T-21

DRAFT
 SHEET 1 OF 1

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		



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.

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LOG OF BORING T-22

DRAFT
 SHEET 1 OF 1

Project: Supplemental ASD
 Project No.: 26411007.15
 Location: Lewis and Clark Station, Sidney, MT
 Coordinates: N 2,248,814.6 ft E 3,584,890.5 ft
 Datum: NAVD88

Surface Elevation: 1912.6 ft
 Drilling Method: Geoprobe Direct-Push
 Sampling Method: Geoprobe
 Completion Depth: 20.0 ft

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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		1	CL			1910
5					FAT CLAY (CH): moist to wet; dense; hard and softer areas within, black organics and roots within; 0% gravel, 0% sand, 100% fines.	
2		2			8-9'; olive brown; more silty and saturated.	1905
10					9-12.5'; same as 3.5-8' but harder, soft at 12.5'; high plasticity.	
3		3	CH		12.5-14.5'; gray/dark gray to black; black organic/peat area with roots and shell fragments.	1900
15					14.5-15.5'; fine sand within the fat clay.	
4		4			15.5-20'; dark gray; wet, soft; high plasticity.	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.



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LOG OF BORING T-23

DRAFT
 SHEET 1 OF 1

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					SANDY SILT (ML): pale olive to light yellowish brown; moist to wet; 0% gravel, 40% sand, 60% fines. 4.5-5.5'; dry/low moisture with areas of rusty oxidation stains throughout.	1912.5
7.5		2			6.5-8'; wet to saturated; gray mottles.	1910.0
10.0			ML		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.	1902.5
15.0					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.

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Appendix B

Analytical Results



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



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

Project: 2641 1007
Lab ID: S1912224-001
Client Sample ID: SB-2
Depths: 2 - 5 Feet

Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

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



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

Project: 2641 1007
Lab ID: S1912224-002
Client Sample ID: SB-2
Depths: 10 - 20 Feet

Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

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



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

Project: 2641 1007
Lab ID: S1912224-003
Client Sample ID: T-1
Depths: 19 - 23 Feet

Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

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



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

Project: 2641 1007
Lab ID: S1912224-004
Client Sample ID: T-2
Depths: 23.5 - 30 Feet

Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

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



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

Project: 2641 1007
Lab ID: S1912224-005
Client Sample ID: T-13
Depths: 3.5 - 10 Feet

Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

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



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

Project: 2641 1007
Lab ID: S1912224-006
Client Sample ID: T-13
Depths: 15 - 20 Feet

Date Received: 12/12/2019
Sampler:
Matrix: Soil
COC: 58192

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

**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

Ann Arbor Duluth Hibbing Minneapolis
 Bismarck Grand Rapids Jefferson City Salt Lake City

Sample Origination State:

KS MO UT
 MI ND WI
 MN SD Other: **MT**

Analysis Requested	Water	Soil		
Perform MS/MSD Y / N Total Number Of Containers			Gallon Bag	% Solids

COC Number: **58192**
COC 1 of 1

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 = HNO₃
 D = H₂SO₄
 E = NaOH
 F = MeOH
 G = NaHSO₄
 H = Na₂S₂O₃
 I = Ascorbic Acid
 J = NH₄Cl
 K = Zn Acetate
 O = Other

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 Li/Se	Barr Project No: 26411007

Location	Sample Depth			Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number Of Containers	Analysis Requested	% Solids
	Start	Stop	Unit (m./ft. or in.)							
1. SB-2 (2-5')	2	5	ft	01/31/2019	1000	S	N	1		
2. SB-2 (10-20')	10	20	ft	01/31/2019	1005	S	N	1		
3. T-1 (15-23')	15	23	ft	01/31/2019	1520	S	N	1		
4. T-2 (23.5-30')	23.5	30	ft	02/01/2019	1215	S	N	1		
5. T-13 (3.5-10')	3.5	10	ft	01/30/2019	0920	S	N	1		
6. T-13 (15-20')	15	20	ft	01/30/2019	1010	S	N	1		
7.										
8.										
9.										
10.										

Preservative Code

Field Filtered Y/N

Analyze Lithium/Selenium per attached letter

Send Level 2 QC Report

Contact Scott Korom w/questions 701-221-5420

BARR USE ONLY		Relinquished by: [Signature]	On Ice? <input checked="" type="checkbox"/> Y <input type="checkbox"/> N	Date: 12-0-19	Time: 1700	Received by: [Signature]	Date: 12/1/19	Time:
Sampled by: DJZ	Barr Proj. Manager: SFK	Relinquished by: [Signature]	On Ice? <input type="checkbox"/> Y <input type="checkbox"/> N	Date:	Time:	Received by:	Date:	Time:
Barr DQ Manager: TAD	Lab Name: Pace	Samples Shipped VIA: <input type="checkbox"/> Courier <input checked="" type="checkbox"/> Federal Express <input type="checkbox"/> Sampler	Air Bill Number: 7772-0595-1120		Requested Due Date: <input checked="" type="checkbox"/> Standard Turn Around Time			
Lab Location: Sheridan WY	Lab WO:	Temperature on Receipt (°C):	Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None		<input type="checkbox"/> Rush (mm/dd/yyyy)			

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.



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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Project: Sediment Saturated Paste Extracts
Lab ID: S2007298-001
Client Sample ID: T-14 (5-7)
Depths: 5 - 7 Feet

Work Order: S2007298
Collection Date:
Date Received: 7/21/2020
Sampler:
Matrix: Sediment
COC: 50061

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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Project: Sediment Saturated Paste Extracts
Lab ID: S2007298-002
Client Sample ID: T-14 (7-10)
Depths: 7 - 10 Feet

Work Order: S2007298
Collection Date:
Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Project: Sediment Saturated Paste Extracts
Lab ID: S2007298-003
Client Sample ID: T-14 (10-13)
Depths: 10 - 13 Feet

Work Order: S2007298
Collection Date:
Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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.

- 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

RL - Reporting 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



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: S2007298-004
Client Sample ID: T-15 (5-10)
Depths: 5 - 10 Feet

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



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: S2007298-005
Client Sample ID: T-15 (10-14.25)
Depths: 10 - 14.25 Feet

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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/7/2020
Report ID: S2007298001

Project: Sediment Saturated Paste Extracts
Lab ID: S2007298-006
Client Sample ID: T-16 (11-13)
Depths: 11 - 13 Feet

Work Order: S2007298
Collection Date:
Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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.

- 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

RL - Reporting 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



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
Lab ID: S2007298-007
Client Sample ID: T-17 (5-10.75)
Depths: 5 - 10.75 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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
 - 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



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: S2007298-008
Client Sample ID: T-17 (10.75-15)
Depths: 10.75 - 15 Feet

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



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
Lab ID: S2007298-009
Client Sample ID: T-18 (5-10)
Depths: 5 - 10 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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



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: S2007298-010
Client Sample ID: T-18 (10-12.5)
Depths: 10 - 12.5 Feet

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



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
Lab ID: S2007298-011
Client Sample ID: T-18 (12.5-14.5)
Depths: 12.5 - 14.5 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
COC: 50062

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



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: S2007298-012
Client Sample ID: T-19 (3.5-5)
Depths: 3.5 - 5 Feet

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



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: S2007298-013
Client Sample ID: T-19 (5-10)
Depths: 5 - 10 Feet

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



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: S2007298-014
Client Sample ID: T-19 (10-14.5)
Depths: 10 - 14.5 Feet

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



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: S2007298-015
Client Sample ID: T-20 (3.5-5.5)
Depths: 3.5 - 5.5 Feet

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



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
Lab ID: S2007298-016
Client Sample ID: T-20 (8.25-12.5)
Depths: 8.25 - 12.5 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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



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
Lab ID: S2007298-017
Client Sample ID: T-20 (12.5-15)
Depths: 12.5 - 15 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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



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: S2007298-018
Client Sample ID: T-21 (5-13.75)
Depths: 5 - 13.75 Feet

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



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



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: S2007298-020
Client Sample ID: T-22 (3.5-10)
Depths: 3.5 - 10 Feet

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
 - 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



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: S2007298-021
Client Sample ID: T-22 (10-15)
Depths: 10 - 15 Feet

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
 - 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



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: S2007298-022
Client Sample ID: T-22 (15-20)
Depths: 15 - 20 Feet

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
 - 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



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
Lab ID: S2007298-023
Client Sample ID: T-23 (4.5-10)
Depths: 4.5 - 10 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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
 - 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



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
Lab ID: S2007298-024
Client Sample ID: T-23 (10-13.5)
Depths: 10 - 13.5 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
COC: 50063

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



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: S2007298-025
Client Sample ID: T-23 (13.5-15)
Depths: 13.5 - 15 Feet

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



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
Lab ID: S2007298-026
Client Sample ID: T-15 (14.25-17.5)
Depths: 14.25 - 17.5 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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



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
Lab ID: S2007298-027
Client Sample ID: T-16 (3-11)
Depths: 3 - 11 Feet

Date Received: 7/21/2020
Sampler:
Matrix: Sediment
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
 - 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



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: S2007298-028
Client Sample ID: T-20 (5.5-8.25)
Depths: 5.5 - 8.25 Feet

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



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
 - E Value above quantitation range
 - H Holding times for preparation or analysis exceeded
 - L Analyzed by another laboratory
 - O Outside the Range of Dilutions
 - S Spike Recovery outside accepted recovery limits

- D Report limit raised due to dilution
- G Analyzed at IML Gillette laboratory
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- X Matrix Effect

Chain of Custody for Air Canisters



- 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: **No 50061**
 COC 1 of 3

- 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: _____

SEDIMENT 3 = SD

REPORT TO	INVOICE TO
Company: <u>BARR ENGINEERING</u>	Company:
Address: <u>234 W. CENTURY</u>	Address:
Name: <u>SCOTT KOROM</u>	Name: <u>SAME</u>
email: <u>SKOROM@barr.com</u>	email:
Copy to: <u>datamgt@barr.com</u>	P.O.:
Project Name:	Barr Project No.:

Location	Canister		Flow Controller Serial #	Vacuum		Collection Date (mm/dd/yyyy)	Collection Time		Total Time	Matrix Code	PID Reading (ppm/ppb)	Sample Comments
	Serial #	Size		Initial	Final		Start (hh:mm)	Stop (hh:mm)				
1. <u>T-14 (5-7')</u>	<u>52007298</u>	<u>001</u>				<u>4/2020</u>				<u>SD</u>		<u>SEE ATTACHED LETTER FOR DETAILS</u>
2. <u>T-14 (7-10')</u>										<u>SD</u>		
3. <u>T-14 (10-13')</u>										<u>SD</u>		
4. <u>T-15 (5-10')</u>										<u>SD</u>		
5. <u>T-15 (10-14.25')</u>										<u>SD</u>		
6. <u>T-16 (11-13')</u>										<u>SD</u>		
7. <u>T-17 (5-10.75')</u>										<u>SD</u>		
8. <u>T-17 (10.75-15')</u>										<u>SD</u>		
9. <u>T-18 (5-10')</u>										<u>SD</u>		
10. <u>T-18 (10-12.5')</u>										<u>SD</u>		

BARR USE ONLY		Relinquished by:		Date	Time	Received by:		Date	Time
Sampled by:		<u>SCOTT KOROM</u>		<u>7/17/20</u>		<u>KAREN SECN</u>		<u>7/20/20</u>	<u>1030</u>
Barr Proj. Manager:	<u>JEREMY GACNIK</u>	Relinquished by:		Date	Time	Received by:		Date	Time
Barr DQ Manager:		Samples Shipped VIA:				Air Bill Number:		Requested Due Date:	
Lab Name:		<input type="checkbox"/> Courier <input checked="" type="checkbox"/> Federal Express <input type="checkbox"/> Sampler <input type="checkbox"/> Other: _____						<input type="checkbox"/> Standard Turn Around Time <input type="checkbox"/> Rush _____ (mm/dd/yyyy)	
Lab Location:		Lab WO:		Custody Seal Intact ?					
				<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None					

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

Sample Origination State:



- Ann Arbor
 Bismarck
 Duluth
 Hibbing
 Jefferson City
 Minneapolis

- KS MO WI
 MI ND Other: MT
 MN SD

- Analysis Requested:
 TO-14 TO-15 TO-15SIM
 3C Other

COC Number: **No 50062**
 COC 2 of 3

- 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

REPORT TO	INVOICE TO
Company: <u>BARR</u>	Company:
Address: <u>234 W. CENTURY</u>	Address:
Name: <u>SA SCOTT KOROM</u>	Name: <u>SCOTT KOROM</u>
email: <u>SKOROM@BARR.COM</u>	email:
Copy to: <u>datamgt@barr.com</u>	P.O.:
Project Name:	Barr Project No.:

Location	Canister		Flow Controller Serial #	Vacuum		Collection Date (mm/dd/yyyy)	Collection Time		Total Time	Matrix Code	PID Reading (ppm/ppb)	Sample Comments
	Serial #	Size		Initial	Final		Start (hh:mm)	Stop (hh:mm)				
<u>2.11 T-18 (12.5-14.5')</u>	<u>520</u>	<u>07298</u>	<u>011</u>			<u>04/2020</u>				<u>SD</u>		<u>SEE ATTACHED LETTER</u>
<u>2.12 T-19 (3.5-5')</u>			<u>012</u>							<u>SD</u>		
<u>3.13 T-19 (5-10')</u>			<u>013</u>							<u>SD</u>		
<u>4.14 T-19 (10-14.5')</u>			<u>014</u>							<u>SD</u>		
<u>5.15 T-20 (3.5-5.5')</u>			<u>015</u>							<u>SD</u>		
<u>6.16 T-20 (8.25-12.5')</u>			<u>016</u>							<u>SD</u>		
<u>7.17 T-20 (12.5-15')</u>			<u>017</u>							<u>SD</u>		
<u>8.18 T-21 (5-13.75')</u>			<u>018</u>							<u>SD</u>		
<u>8.19 T-21 (13.75-15')</u>			<u>019</u>							<u>SD</u>		
<u>10.20 T-22 (3.5-10')</u>			<u>020</u>							<u>SD</u>		

BARR USE ONLY		Relinquished by:		Date	Time	Received by:		Date	Time
Sampled by:		<u>SCOTT KOROM</u>		<u>7/7/20</u>		<u>Karen</u>		<u>7600</u>	<u>1030</u>
Barr Proj. Manager:	<u>J. GACHIR</u>	Relinquished by:		Date	Time	Received by:		Date	Time
Barr DQ Manager:		Samples Shipped VIA:				Air Bill Number:		Requested Due Date:	
Lab Name:		<input type="checkbox"/> Courier <input type="checkbox"/> Federal Express <input type="checkbox"/> Sampler <input type="checkbox"/> Other: _____						<input type="checkbox"/> Standard Turn Around Time <input type="checkbox"/> Rush _____ (mm/dd/yyyy)	
Lab Location:		Lab WO:		Custody Seal Intact ? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None					

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

Sample Origination State:



- Ann Arbor
 Bismarck
 Duluth
 Hibbing
 Jefferson City
 Minneapolis

- KS MO WI
 MI ND Other: MT
 MN SD

- Analysis Requested:
 TO-14 TO-15 TO-15SIM
 3C Other

COC Number: **No 50063**
 COC 3 of 3

- 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

REPORT TO	INVOICE TO
Company: <u>BARR</u>	Company:
Address: <u>234 W. CENTURY</u>	Address: <u>SAME</u>
Name: <u>SCOTT KORDON</u>	Name:
email: <u>SKORDON@BARR.COM</u>	email:
Copy to: <u>datamgt@barr.com</u>	P.O.:
Project Name:	Barr Project No.:

Location	Canister		Flow Controller Serial #	Vacuum		Collection Date (mm/dd/yyyy)	Collection Time		Total Time	Matrix Code	PID Reading (ppm/ppb)	Sample Comments
	Serial #	Size		Initial	Final		Start (hh:mm)	Stop (hh:mm)				
<u>2.21 T-22(10-15')</u>	<u>520072</u>	<u>98-021</u>			<u>04/20/20</u>					<u>SD</u>		<u>SEE ATTACHED LETTER</u>
<u>2.22 T-22(15-20')</u>				<u>022</u>						<u>SD</u>		
<u>2.23 T-23(4.5-10')</u>				<u>023</u>						<u>SD</u>		
<u>2.24 T-23(10-13.5')</u>				<u>024</u>						<u>SD</u>		
<u>2.25 T-23(13.5-15')</u>				<u>025</u>						<u>SD</u>		
6.												<u>SCOTT KORDON 701-335-3125</u>
7.												
8.												
9.												
10.												

BARR USE ONLY		Relinquished by:		Date	Time	Received by:		Date	Time
Sampled by:		<u>SCOTT KORDON</u>		<u>3/17/20</u>		<u>Karen Sea</u>		<u>7/20/20</u>	<u>1030</u>
Barr Proj. Manager:	<u>J. CASNIK</u>	Relinquished by:		Date	Time	Received by:		Date	Time
Barr DQ Manager:		Samples Shipped VIA:				Air Bill Number:		Requested Due Date:	
Lab Name:		<input type="checkbox"/> Courier <input type="checkbox"/> Federal Express <input type="checkbox"/> Sampler <input type="checkbox"/> Other:						<input type="checkbox"/> Standard Turn Around Time <input type="checkbox"/> Rush (mm/dd/yyyy)	
Lab Location:		Lab WO:		Custody Seal Intact ?					
				<input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None					

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.



MINNESOTA VALLEY TESTING LABORATORIES, INC.

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



Page: 1 of 1

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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

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



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Page: 1 of 1

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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

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.

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1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
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Page: 1 of 1

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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.

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 www.mvttl.com



Page: 1 of 1

Terri Olson
 Barr Engineering Company
 4300 MarketPointe Drive, Suite 200
 Minneapolis MN 55435

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

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:

Cc
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.

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



Page: 1 of 1

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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:

C
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



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Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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

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

CERTIFICATION: ND # ND-00016



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Page: 1 of 1

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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 12 Feb 19 ^{CC}

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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

CERTIFICATION: ND # ND-00016



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Terri Olson
 Barr Engineering Company
 4300 MarketPointe Drive, Suite 200
 Minneapolis MN 55435

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

Project Name: MDU Lewis & Clark

Sample Description: T-2

PO #: 26411007.10

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	6.87	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

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

CERTIFICATION: ND # ND-00016



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Page: 1 of 1

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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



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Page: 1 of 1

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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. 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



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Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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



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Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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



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Page: 1 of 1

Terri Olson
Barr Engineering Company
4300 MarketPointe Drive, Suite 200
Minneapolis MN 55435

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

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:

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

CERTIFICATION: ND # ND-00016

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	19-W187	0.148	0.567	105	75-125	0.567	0.552	101	2.7	20	-	-	< 0.02
				0.400	19-W197	0.048	0.453	101	75-125	0.453	0.466	104	2.8	20	-	-	< 0.02
Selenium - Total mg/l	0.1000	106	80-120	0.400	19-W187	0.0959	0.5280	108	75-125	0.5280	0.5252	107	0.5	20	-	-	< 0.005
				0.100	19-W195	< 0.005	0.0968	97	75-125	0.0968	0.0939	94	3.0	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. Gustaf

12 Feb 19

* Rush Li and Se Samples!

Barr Engineering Co. Chain of Custody

Sample Origination State:



- Ann Arbor Duluth Jefferson City
 Bismarck Hibbing Minneapolis

- KS MO WI
 MI ND Other: MT
 MN SD

COC Number: **52677**

COC 1 of 1

Matrix Code: Preservative Code:

- | | |
|---------------------|---|
| GW = Groundwater | A = None |
| SW = Surface Water | B = HCl |
| WW = Waste Water | C = HNO ₃ |
| DW = Drinking Water | D = H ₂ SO ₄ |
| S = Soil/Solid | E = NaOH |
| SD = Sediment | F = MeOH |
| O = Other | G = NaHSO ₄ |
| | H = Na ₂ S ₂ O ₃ |
| | I = Ascorbic Acid |
| | J = NH ₄ Cl |
| | K = Zn Acetate |
| | O = Other |

REPORT TO	INVOICE TO
Company: <u>Barr Engineering</u>	Company: <u>Same</u>
Address: <u>234 W. Century Ave</u>	Address:
Name: <u>Terri Olson</u>	Name:
email: <u>Tolson@Barr.com</u>	email:
Copy to: <u>datamgt@barr.com</u>	P.O.:
Project Name: <u>MDU Lewis and Clark</u>	Barr Project No: <u>26411007.10</u>

Location	Sample Depth			Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y/N	Total Number of Containers	% Solids
	Start	Stop	Unit (m./ft. or in.)						
1. T-1	<u>W192</u>	<u>N/A</u>	<u>1</u>	<u>02/01/2019</u>	<u>09:25</u>	<u>GW</u>	<u>N</u>	<u>1</u>	
2. T-2	<u>W193</u>	<u>N/A</u>	<u>1</u>		<u>11:40</u>		<u>N</u>	<u>1</u>	
3. T-5	<u>W194</u>	<u>N/A</u>	<u>1</u>		<u>10:15/14:50</u>		<u>N</u>	<u>1</u>	
4. T-6	<u>W195</u>	<u>N/A</u>	<u>1</u>		<u>14:15/17:20</u>		<u>N</u>	<u>1</u>	
5. T-12	<u>W196</u>	<u>N/A</u>	<u>1</u>		<u>15:10/17:00</u>		<u>N</u>	<u>1</u>	
6. Duplicate	<u>W197</u>	<u>N/A</u>	<u>1</u>		<u>-</u>		<u>N</u>	<u>1</u>	
7. Field Blank	<u>W198</u>	<u>N/A</u>	<u>1</u>		<u>14:20</u>		<u>N</u>	<u>1</u>	
8. Equipment Blank	<u>W199</u>	<u>N/A</u>	<u>1</u>		<u>14:30</u>		<u>N</u>	<u>1</u>	
9.									
10.									

Preservative Code

Field Filtered Y/N

• see attached Table 1 for requested analysis

Contact Terri Olson with questions.

• Low sample volume

BARR USE ONLY		Relinquished by: <u>MVTL</u>	On Ice? <input checked="" type="radio"/> Y <input type="radio"/> N	Date: <u>2-4-19</u>	Time:	Received by: <u>[Signature]</u>	Date: <u>4r</u>	Time:
Sampled by: <u>MLJ2</u>		Relinquished by:	On Ice? <input type="radio"/> Y <input type="radio"/> N	Date:	Time:	Received by:	Date:	Time:
Barr Proj. Manager: <u>JLS4</u>		Samples Shipped VIA: <input type="checkbox"/> Courier <input type="checkbox"/> Federal Express <input checked="" type="checkbox"/> Sampler			Air Bill Number:		Requested Due Date:	
Barr DQ Manager: <u>TAD</u>		<input type="checkbox"/> Other: _____					<input checked="" type="checkbox"/> Standard Turn Around Time	
Lab Name: <u>MVTL</u>		Lab WO:			Temperature on Receipt (°C):		<input checked="" type="checkbox"/> Rush _____	
Lab Location: <u>Bismarck, ND</u>		Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None					(mm/dd/yyyy)	

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.



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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

Approved by:

CC
Claudette K. Carroll | 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



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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 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



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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:

CC
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:

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

CERTIFICATION: ND # ND-00016



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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:

CC
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



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www.mvtl.com



Page: 1 of 1

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. 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:
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: = Due to sample quantity + = Due to internal standard response

CERTIFICATION: ND # ND-00016



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Page: 1 of 1

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. Carrö ^{CL} 1 JUL 2020

Claudette K. Carrö, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016



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Page: 1 of 1

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:

CC
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



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Page: 1 of 1

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. 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



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Page: 1 of 1

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. Carroll ^{rc} 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



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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

Approved by:

Cc
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



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www.mvttl.com



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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:

CC
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



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Page: 1 of 1

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

Approved by:

CC
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

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
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
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	-	-	< 0.005

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. Cantello

1 Jul 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.



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If you no longer wish to receive marketing e-mails from Barr, respond to communications@barr.com and we will be happy to honor your request.

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

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

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



**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.



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If you no longer wish to receive marketing e-mails from Barr, respond to communications@barr.com and we will be happy to honor your request.

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

Analysis Requested	
Water	Soil
% Solids	

COC Number: **54259**
 COC 1 of 2

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 ₂ SO ₄ E = NaOH F = MeOH G = NaHSO ₄ H = Na ₂ S ₂ O ₃ I = Ascorbic Acid J = NH ₄ Cl K = Zn Acetate O = Other
--	---

REPORT TO	INVOICE TO
Company: <u>Barr Engineering</u>	Company: <u>Same</u>
Address: <u>234 W Century Ave</u>	Address: <u>Same</u>
Name: <u>Terri Olson</u>	Name: <u>Same</u>
email: <u>T.Olson@barr.com</u>	email: <u>Same</u>
Copy to: <u>datamgt@barr.com</u>	P.O. <u>Same</u>
Project Name: <u>MDU L4C</u>	Barr Project No: <u>26411007.15</u>

Location	Sample Depth			Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y/N	Total Number of Containers	Total Volume (L) (Plastic)	% Solids	Preservative Code	Field Filtered Y/N
	Start	Stop	Unit (m./ft. or in.)									
1. T-15 W635				04/06/2020	12:02	GW	N	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							

BARR USE ONLY		Relinquished by: <u>Martin Row</u>	On Ice? <input checked="" type="checkbox"/> N	Date: <u>4-9-2020</u>	Time: <u>15:05</u>	Received by: <u>Terri Olson</u>	Date: <u>4/9/2020</u>	Time: <u>15:05</u>
Sampled by: <u>MWJ</u>	Barr Proj. Manager: <u>Jeremy Gachnick</u>	Relinquished by:	On Ice? <input type="checkbox"/> Y <input type="checkbox"/> N	Date:	Time:	Received by:	Date:	Time:
Barr DQ Manager: <u>Terri Olson</u>	Lab Name: <u>MVTL</u>	Samples Shipped VIA: <input type="checkbox"/> Courier <input type="checkbox"/> Federal Express <input checked="" type="checkbox"/> Sampler	Air Bill Number:		Requested Due Date: <input checked="" type="checkbox"/> Standard Turn Around Time			
Lab Location: <u>Bismarck</u>	Lab WO:	Temperature on Receipt (°C): <u>0.4</u>		Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None		<input type="checkbox"/> Rush (mm/dd/yyyy)		

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.

TM 562



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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-001
Client Sample ID: SB-2 20.5-21
Depths: 20.5 - 21 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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.

- 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

RL - Reporting 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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-002
Client Sample ID: T-2 22.5-23.5
Depths: 22.5 - 23.5 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-003
Client Sample ID: T-3 30-32.5
Depths: 30 - 32.5 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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
 - 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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-004
Client Sample ID: T-5 10-15
Depths: 10 - 15 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-005
Client Sample ID: T-6 19.5-20
Depths: 19.5 - 20 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-006
Client Sample ID: T-17 10.75-15
Depths: 10.75 - 15 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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

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- 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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-007
Client Sample ID: T-18 12.5-14.5
Depths: 12.5 - 14.5 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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.

- 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

RL - Reporting 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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-008
Client Sample ID: T-22 10-15
Depths: 10 - 15 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
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



Sample Analysis Report

CLIENT: Barr Engineering
Bismark, ND

Date Reported: 8/26/2020
Report ID: S2008131001

Project: 26411007.15
Lab ID: S2008131-009
Client Sample ID: COAL PILE COAL 2
Depths: 0 - 0 Feet

Work Order: S2008131
Collection Date:
Date Received: 8/6/2020
Sampler:
Matrix: Solid
COC: 58270

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.

- 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

RL - Reporting 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



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
 - E Value above quantitation range
 - H Holding times for preparation or analysis exceeded
 - L Analyzed by another laboratory
 - O Outside the Range of Dilutions
 - S Spike Recovery outside accepted recovery limits

- D Report limit raised due to dilution
- G Analyzed at IML Gillette laboratory
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- X Matrix Effect



ANALYTICAL QC SUMMARY REPORT

CLIENT: Barr Engineering
Work Order: S2008131
Project:

Date: 8/26/2020
Report ID: S2008131001

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:

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- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- O Outside the Range of Dilutions
- S Spike Recovery outside accepted recovery limits

- D Report limit raised due to dilution
- G Analyzed at IML Gillette laboratory
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- X Matrix Effect

Barr Engineering Co. Chain of Custody

Sample Origination State:

- Ann Arbor Duluth Hibbing Minneapolis Salt Lake City
 Bismarck Grand Rapids Jefferson City Salt Lake City

- KS MO UT
 MI ND WI
 MN SD Other: MT

Analysis Requested

Water Soil

SATURATED PASTE
TOTAL METALS (P, K, Ni, Se)

COC Number: **58270**

COC / of /

Matrix Code: Preservative Code:

- GW = Groundwater A = None
 SW = Surface Water B = HCl
 WW = Waste Water C = HNO₃
 DW = Drinking Water D = H₂SO₄
 S = Soil/Solid E = NaOH
 SD = Sediment F = MeOH
 O = Other G = NaHSO₄
 H = Na₂S₂O₃
 I = Ascorbic Acid
 J = NH₄Cl
 K = Zn Acetate
 O = Other

REPORT TO	INVOICE TO
Company: <u>BARR ENGINEERING</u>	Company:
Address: <u>234 W. CENTURY</u>	Address:
Name: <u>SCOTT KOROM</u>	Name: <u>SAME</u>
email: <u>skorom@barr.com</u>	email:
Copy to: <u>datamgt@barr.com</u>	P.O.:
Project Name: <u>[REDACTED]</u>	Barr Project No: <u>26411007.15</u>

Location	Sample Depth			Collection Date (mm/dd/yyyy)	Collection Time (hh:mm)	Matrix Code	Perform MS/MSD Y / N	Total Number Of Containers	% Solids
	Start	Stop	Unit (m./ft. or in.)						
1. <u>SB-2 20.5-21'</u>				<u>IN BARR RECORDS</u>	<u>IN BARR RECORDS</u>	<u>SD</u>			
2. <u>T-2 22.5-23.5'</u>				↓	↓				
3. <u>T-3 30-32.5'</u>				↓	↓				
4. <u>T-5 10-15'</u>				↓	↓				
5. <u>T-6 19.5-20'</u>				↓	↓				
6. <u>T-17 10.75-15'</u>				↓	↓				
7. <u>T-18 12.5'-14.5'</u>				↓	↓				
8. <u>T-22 10-15'</u>				↓	↓				
9. <u>COAL PILE COAL 2</u>				↓	↓				
10.									

Preservative Code
Field Filtered Y/N

52008131-001
002
003
004
005
006
007
008
009

SEE ATTACHED LETTER FOR DETAILS
CONTACT SCOTT KOROM W/ QUESTIONS 701-335-3125

BARR USE ONLY		Relinquished by: <u>Donk Zandy</u>	On Ice? <input type="radio"/> Y <input checked="" type="radio"/> N	Date: <u>8-4-20</u>	Time: <u>1300</u>	Received by: <u>Fedex</u>	Date:	Time:
Sampled by: <u>DJZ</u>	Barr Proj. Manager: <u>JJG3</u>	Relinquished by: <u>Fedex</u>	On Ice? <input type="radio"/> Y <input checked="" type="radio"/> N	Date:	Time:	Received by: <u>Karen A Sec</u>	Date: <u>8/6/20</u>	Time: <u>1030</u>
Barr DQ Manager: <u>TAO</u>	Lab Name: <u>PACE</u>	Samples Shipped VIA: <input type="checkbox"/> Courier <input checked="" type="checkbox"/> Federal Express <input type="checkbox"/> Sampler	Air Bill Number: <u>771172168518</u>		Requested Due Date: <input checked="" type="checkbox"/> Standard Turn Around Time <input type="checkbox"/> Rush _____ (mm/dd/yyyy)			
Lab Location: <u>Sheridan WY</u>	Lab WO:	Temperature on Receipt (°C):	Custody Seal Intact? <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> None					

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.

Appendix C

Groundwater Flow Rate Calculations

Lewis & Clark Station CCR Unit Groundwater Velocity Calculation

Sampling Date 5/11/2022

Upgradient (MW103)

Top of Casing Elevation	1927.33	ft amsl
Depth to Water	10.18	ft below TOC
Water Level Elevation	1917.15	ft amsl

Groundwater Monitoring System Documentation (Barr, 2018)

Downgradient (MW117)

Top of Casing Elevation	1920.34	ft amsl
Depth to Water	4.08	ft below TOC
Water Level Elevation	1916.26	ft amsl

Groundwater Monitoring System Documentation (Barr, 2018)

horizontal hydraulic conductivity (Kh)	0.001	cm/s
	2.8	ft/day
porosity (n)	0.3	
horizontal distance	645	ft
WL elevation difference	0.89	ft
gradient (i)	0.001	ft/ft
horizontal linear velocity (V)	0.0130	ft/day
horizontal V	5	ft/yr

Placement Above the Uppermost Aquifer Determination (Barr, 2018)

Lewis & Clark Station CCR Unit Groundwater Velocity Calculation

Sampling Date 8/16/2022

Upgradient (MW103)

Top of Casing Elevation	1927.33	ft amsl
Depth to Water	10.02	ft below TOC
Water Level Elevation	1917.31	ft amsl

Groundwater Monitoring System Documentation (Barr, 2018)

Downgradient (MW117)

Top of Casing Elevation	1920.34	ft amsl
Depth to Water	5.25	ft below TOC
Water Level Elevation	1915.09	ft amsl

Groundwater Monitoring System Documentation (Barr, 2018)

horizontal hydraulic conductivity (Kh)	0.001	cm/s
	2.8	ft/day
porosity (n)	0.3	
horizontal distance	645	ft
WL elevation difference	2.22	ft
gradient (i)	0.003	ft/ft
horizontal linear velocity (V)	0.0325	ft/day
horizontal V	12	ft/yr

Placement Above the Uppermost Aquifer Determination (Barr, 2018)