

# 2020 Annual Groundwater Monitoring and Corrective Action Report

Scrubber Pond and Temporary Storage Area

Lewis & Clark Station Sidney, Montana

Prepared for Montana Dakota Utilities

January 2021

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### January 2021

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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
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 2020 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. Selenium was detected at statistically significant levels for the spring monitoring event at monitoring well MW-111. An assessment of corrective measures was initiated on April 2, 2019, and completed on August 29, 2019. A selection of remedy was underway in 2020, but an alternative source demonstration (ASD) showing that lithium and selenium levels above GWPS were not the result of releases from the regulated CCR units was completed, ending the selection of remedy phase. No remedial activities have been initiated. An ASD was prepared in 2020 that showed that a source other than the Temporary Storage Pad (TSP) CCR unit caused lithium to be present at statistically significant levels above the GWPS; therefore, the TSP has been closed in accordance with the requirements of § 257.102(c).

# 1.0 Introduction

Montana-Dakota Utilities Co. (MDU) owns and operates Lewis & Clark Station, a coal-fired electricity generation unit near Sidney, Montana (Figure 1). Lewis & Clark Station is a coal-fired electrical generating plant, operation of which results in coal combustion residuals (CCR) as a by-product. Two storage ponds and a CCR pile are situated at the property to manage CCR. The storage ponds—which comprise a single, multi-unit CCR surface impoundment under the CCR Rule—are named the East and West Scrubber Ponds, or collectively the Scrubber Ponds.

The Scrubber Ponds store sluiced flue-gas desulfurization (FGD) solids. The CCR pile is located on a Temporary Storage Pad (TSP) where FGD solids (excavated from the Scrubber Ponds) are stored and allowed to drain prior to loading and hauling for disposal. The Scrubber Ponds are required to comply with the provisions of the US Environmental Protection Agency (EPA) CCR Rule (40 CFR Parts 257 and 261, Disposal of Coal Combustion Residuals from Electric Utilities). Monitoring and reporting requirements in the CCR Rule do not apply to the current TSP because it qualifies for the CCR pile exemptions in the CCR Rule. The former TSP, which was located in the same location as the current TSP, is closed.

Closure by removal of CCR began at the TSP in 2018 with the removal of CCR and CCR-contaminated sediments. A demonstration that a source other than the TSP (Alternative Source Demonstration, ASD) caused lithium to be present at statistically significant levels above the groundwater protection standards (GWPS) was completed on November 13, 2020. The ASD is provided in Appendix B. Closure by removal under § 257.102(c) has been completed.

The locations of the Scrubber Ponds and TSP are shown on Figure 1. The groundwater monitoring system is a multi-unit groundwater monitoring system, as allowed in § 257.91(d), meaning that both the Scrubber Ponds and the TSP are monitored by the groundwater monitoring system. This 2020 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) describes the monitoring program and results for the Scrubber Ponds and TSP at MDU's Lewis & Clark Station.

#### 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 and TSP are currently in assessment monitoring. Baseline groundwater monitoring was completed in 2017, as documented in the 2017 Annual Groundwater Monitoring and Corrective

Action Report, Scrubber Pond and Temporary Storage Area (Barr, 2018a). A detection monitoring program began on October 17, 2017, and continued until April 14, 2018 (Barr, 2019a). A statistically significant increase (SSI) over background levels was determined for constituents listed in appendix III to the CCR Rule in 2018, so the site transitioned to an assessment monitoring program (§ 257.95(a)) on April 15, 2018. Assessment monitoring continued through 2020.

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 GWPS. An assessment of corrective measures (ACM) was initiated on April 2, 2019, and completed on August 29, 2019 (Barr, 2019b). The site was undergoing a selection of remedy, as described in § 257.97, subject to the ongoing evaluation of a potential alternative source. An ASD (Appendix C) showing that lithium and selenium levels above GWPS are not the result of releases from the regulated CCR units was completed on January 28, 2021, and the selection of remedy was suspended.

#### 1.3 CCR Rule Requirements

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

# 2.0 Groundwater Monitoring and Corrective Action Program

This section documents the status of the groundwater monitoring and corrective action program for the CCR units for 2020. 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 2021 are described in Section 2.5.

#### 2.1 Groundwater Monitoring System

#### 2.1.1 Documentation

Figure 1 shows an aerial image of the CCR units and all upgradient (or background) and downgradient monitoring wells in the groundwater monitoring system, including well identification numbers, that are part of the groundwater monitoring program, as required by § 257.90(e)(1). Further details on the groundwater monitoring system are included in Groundwater Monitoring System Certification, Lewis & Clark Station (Barr, 2018b).

#### 2.1.2 Changes to Monitoring System

There were no changes to the groundwater monitoring system in 2020.

#### 2.2 Monitoring and Analytical Results

The following actions and results occurred during assessment monitoring in 2020:

- 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 (March 4-5 and August 26-28, 2019) were consistent with the requirements of § 257.95(b) and § 257.95(d)(1).
- Following the March sampling event, two wells (MW-111 and MW-118) were resampled (April 20) to confirm selenium results.
- A total of fourteen additional samples (seven monitoring wells during two sampling events, May 19 and September 21) were collected from the CCR groundwater monitoring system and were analyzed for lithium to complete baseline sampling requirements.
- Lithium was detected at statistically significant levels above the GWPS for both spring and fall monitoring events at all downgradient monitoring wells.
- Selenium was detected at statistically significant levels above the GWPS for the spring monitoring event at one well (MW-111). Selenium was below the GWPS in all wells for the fall monitoring event.

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

Background concentration levels were established under § 257.94(b) and are provided in Table 2 in compliance with § 257.95(d)(3). Recorded concentrations for these parameters are provided in Table 4.

#### 2.2.1 Establishment of Lithium Groundwater Protection Standards

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 MCL; 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 have been adopted for lithium and selenium in accordance with § 257.95(h)(3).

Background concentration levels 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 monitoring wells. Samples collected during the baseline sample collection period (Barr, 2018a) were used to establish the site-specific GWPS for selenium (Barr, 2018a).

The 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 were reported as non-detect with a reporting limit (RL) of 100  $\mu$ g/L; therefore, the initial background lithium concentration level was set as the RL of 100  $\mu$ g/L for lithium. On July 30, 2018, EPA promulgated for the first time a default lithium GWPS (40  $\mu$ g/L) in the agency's Phase I revision to CCR Rule § 257.95(h)(2).

After the Phase I CCR Rule revision was issued and before completion of the ACM in 2019, all wells in the groundwater monitoring system had been sampled and analyzed three times for lithium concentrations with the lower RL. A lithium GWPS was determined for the ACM using the upgradient lithium monitoring results from the three events that used the lower RL (a total of nine samples; Barr, 2020). A fourth monitoring event was conducted in August 2019. An additional four samples were collected in 2020 to complete the required eight baseline sampling events for each well for lithium at the lower RL. The additional four sampling events include the standard spring and fall sampling events, plus two sampling events where samples were only analyzed for lithium. With eight baseline events (the minimum specified in § 257.94(b)) at the lower RL, a GWPS was recalculated.

Table 3 provides a summary of the GWPS and background concentration levels determined in August 2019 and the revised lithium GWPS calculated in 2020.

#### 2.3 Corrective Action Program Status

An ACM (§ 257.95(g)(4)) was completed on August 29, 2019 (Barr, 2019b). Since then, MDU has commenced work to further understand the source of the GWPS exceedances and site conditions to better evaluate potential remedies.

During the selection of remedy evaluation, an alternative source demonstration (ASD) was completed for both lithium and selenium. The results of the ASD demonstrate that lithium and selenium levels above

GWPS are not the result of releases from the regulated CCR units (Appendix C). Therefore, the selection of remedy phase has been terminated for lithium and selenium exceedances.

### 2.4 Key Actions Completed/Problems Encountered

The following key actions were completed for the groundwater monitoring program through 2020:

- 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.
- Determined that selenium was detected at statistically significant levels above background during the spring sampling at MW-111.
- Updated the GWPS for lithium (Table 3).
- Continued selection of remedy.
- Completed an ASD for both lithium and selenium (Appendix C), ending the selection of remedy phase.

No problems were encountered.

#### 2.5 Key Activities for Upcoming Year

The following key groundwater monitoring program activities are planned for 2021:

- Continue the assessment monitoring program in accordance with the CCR Rule.
- Evaluate analytical results from monitoring events according to the Statistical Method Selection Certification (Barr, 2017).

## 3.0 References

- 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 2020
§ 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	Error! Reference source not found., Section 2.2.1 Establishment of Lithium Groundwater Protection Standards, Error! Reference source not found., Error! Not a valid bookmark self-reference., and Error! Reference source not found.
§ 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.	Error! Reference source not found.

#### Table 2 Background Concentration Levels Lewis & Clark Station Sidney, Montana

Parameter	Units	Background Concentration Level
Boron	mg/L	2.4
Calcium	mg/L	97.6
Chloride	mg/L	25.7
Fluoride	mg/L	0.87
рН	pH units	7.3 – 7.9
Sulfate	mg/L	516
Total Dissolved Solids	mg/L	1,060

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

#### Table 3 Groundwater Protection Standards 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	10
Barium	µg/L	2000	2000	40.2
Beryllium	µg/L	4	4	1
Cadmium	µg/L	5	5	2
Chromium	µg/L	100	100	2.3
Cobalt	µg/L	6	6	2
Fluoride	mg/L	4	4	0.87
Lead	µg/L	15	15	1
Lithium	µg/L	62.7	40	62.7
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	1
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 Date	MW 3/18/	2020	MW103 5/19/2020	MW103 7/21/2020	MW103 9/22/2020	MW110 3/16/2020	MW110 5/18/2020	MW110 7/20/2020	MW110 9/21/2020
	Sa	mple Type	N	FD	N	N	N	N	N	N	N
Parameter	Analysis Location	Units									
Appendix III											
Boron	Lab	mg/l	1.10	1.08			1.21	0.28			0.33
Calcium	Lab	mg/l	95.8	96.1			106	108			97.0
Chloride	Lab	mg/l	17.7	17.5			23.2	22.4			32.1
Fluoride	Lab	mg/l	0.73	0.72			0.73	0.46			0.54
рН	Field	pH units	7.45		7.45	7.44	7.30	7.39	7.44	7.40	7.36
Solids, total dissolved	Lab	mg/l	1080	1090			997	915			759
Sulfate, as SO4	Lab	mg/l	448	481			348	219			204
Appendix IV											
Antimony	Lab	mg/l	0.0038	0.0036			0.0042	< 0.001 U			< 0.001 U
Arsenic	Lab	mg/l	0.0025	0.0027			0.0022	< 0.002 U			< 0.002 U
Barium	Lab	mg/l	0.0267	0.0248			0.0286	0.0393			0.0352
Beryllium	Lab	mg/l	< 0.0005 U	< 0.0005 U			< 0.0005 U	< 0.0005 U			< 0.0005 U
Cadmium	Lab	mg/l	< 0.0005 U	< 0.0005 U			< 0.0005 U	< 0.0005 U			< 0.0005 U
Chromium	Lab	mg/l	< 0.002 U	< 0.002 U			< 0.002 U	< 0.002 U			< 0.002 U
Cobalt	Lab	mg/l	< 0.002 U	< 0.002 U			0.0023	< 0.002 U			< 0.002 U
Lead	Lab	mg/l	< 0.0005 U	< 0.0005 U			< 0.0005 U	< 0.0005 U			< 0.0005 U
Lithium	Lab	mg/l	0.053	0.053	0.043	0.054	0.060	0.042	0.033	0.044	0.045
Mercury	Lab	mg/l	< 0.0002 U	< 0.0002 U			< 0.0002 U	< 0.0002 U			< 0.0002 U
Molybdenum	Lab	mg/l	0.0196	0.0201			0.0202	0.0035			0.0037
Selenium	Lab	mg/l	0.0558	0.0554			0.0444	0.0056			< 0.005 U
Thallium	Lab	mg/l	< 0.0005 U	< 0.0005 U			< 0.0005 U	< 0.0005 U			< 0.0005 U
Radium 226	Lab	pCi/l	0.5 +/- 0.2	0.6 +/- 0.2			0.3 +/- 0.2 UB	0.08 +/- 0.1 ND			0.3 +/- 0.2 UB
Radium 228	Lab	pCi/l	0.5 +/- 1.1 ND	0.4 +/- 1.0 ND			-0.01 +/- 0.7 ND	-0.4 +/- 1.0 ND			-0.1 +/- 0.6 ND
Radium, combined (226+228)	Calc	pCi/l	1 +/- 1.12 q	1 +/- 1.02 q			0.3 +/- 0.2 ND	0.08 +/- 0.1 ND			0.3 +/- 0.2 ND

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

		Location Date	MW111 3/17/2020	MW111 4/20/2020	5/19/		MW111 7/21/2020	MW 9/22/	2020	MW117 3/17/2020	MW117 5/19/2020	MW117 7/21/2020	MW117 9/22/2020
	Sa	mple Type	N	N	N	FD	N	N	FD	N	N	N	N
Parameter	Analysis Location	Units											
Appendix III													
Boron	Lab	mg/l	6.40					8.04	8.32	9.46			10.8
Calcium	Lab	mg/l	186					193	194	353			352
Chloride	Lab	mg/l	36.1					35.8	37.7	51.5			49.9
Fluoride	Lab	mg/l	1.95					2.06	2.04	0.22			0.29
рН	Field	pH units	7.36		7.34		7.24	7.12		7.36	7.26	7.23	6.99
Solids, total dissolved	Lab	mg/l	3880					3840	3930	8790			8090
Sulfate, as SO4	Lab	mg/l	2230					1970	2130	5780			4960
Appendix IV													
Antimony	Lab	mg/l	< 0.001 U					< 0.001 U	< 0.001 U	< 0.001 U			< 0.001 U
Arsenic	Lab	mg/l	< 0.002 U					< 0.002 U	< 0.002 U	< 0.002 U			< 0.002 U
Barium	Lab	mg/l	0.0198					0.0240	0.0296	0.0307			0.0172
Beryllium	Lab	mg/l	< 0.0005 U					< 0.0005 U	< 0.0005 U	< 0.0005 U			< 0.0005 U
Cadmium	Lab	mg/l	< 0.0005 U					< 0.0005 U	< 0.0005 U	< 0.0005 U			< 0.0005 U
Chromium	Lab	mg/l	< 0.002 U					0.0061	0.0080	0.0051			0.0031
Cobalt	Lab	mg/l	< 0.002 U					< 0.002 U	< 0.002 U	< 0.002 U			< 0.002 U
Lead	Lab	mg/l	< 0.0005 U					< 0.0005 U	< 0.0005 U	0.0010			< 0.0005 U
Lithium	Lab	mg/l	0.190		0.154	0.159	0.204	0.227	0.224	0.130	0.115	0.140	0.135
Mercury	Lab	mg/l	< 0.0002 U					< 0.0002 U	< 0.0002 U	< 0.0002 U			< 0.0002 U
Molybdenum	Lab	mg/l	0.0509					0.0534	0.0666	0.0031			0.0048
Selenium	Lab	mg/l	0.0801	0.0783				0.0634	0.0761	0.0383			0.0322
Thallium	Lab	mg/l	< 0.0005 U	-				< 0.0005 U	< 0.0005 U	< 0.0005 U			< 0.0005 U
Radium 226	Lab	pCi/l	0.2 +/- 0.1					0.3 +/- 0.2 UB	0.3 +/- 0.2 UB	0.6 +/- 0.2			0.8 +/- 0.2 UB
Radium 228	Lab	pCi/l	-0.3 +/- 1.0 ND					0.9 +/- 0.8 ND	1.1 +/- 0.7	-0.2 +/- 1.1 ND			1.9 +/- 0.9
Radium, combined (226+228)	Calc	pCi/l	0.2 +/- 0.1 q					1.2 +/- 0.82 ND	1.4 +/- 0.73 q	0.6 +/- 0.2 q			2.7 +/- 0.92 q

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

		Location Date	MW118 3/17/2020		MW118 5/19/2020		MW118 9/22/2020	MW119 3/16/2020		MW119 7/20/2020	MW119 9/21/2020	MW120 3/17/2020	MW120 5/19/2020	7/20	/120 /2020	MW120 9/22/2020
	Sa	mple Type	N	N	N	N	N	N	N	N	N	N	N	N	FD	N
Parameter	Analysis Location	Units														
Appendix III																
Boron	Lab	mg/l	1.43				1.74	0.26			0.30	8.60				10.1
Calcium	Lab	mg/l	108				96.9	114			104	410				456
Chloride	Lab	mg/l	25.9				22.2	24.9			36.8	56.4				60.4
Fluoride	Lab	mg/l	0.92				1.14	0.44			0.49	0.41				0.41
рН	Field	pH units	7.51		7.40	7.31	7.11	7.40	7.41	7.39	7.29	6.92	6.80	6.80		6.70
Solids, total dissolved	Lab	mg/l	1680				1310	883			805	6880				6880
Sulfate, as SO4	Lab	mg/l	779				571	202			210	4220				4180
Appendix IV																
Antimony	Lab	mg/l	< 0.002 U				< 0.001 U	< 0.001 U			< 0.001 U	< 0.001 U				< 0.001 U
Arsenic	Lab	mg/l	< 0.005 U				< 0.002 U	< 0.002 U			< 0.002 U	< 0.002 U				< 0.002 U
Barium	Lab	mg/l	0.0254				0.0232	0.0344			0.0356	0.0224				0.0226
Beryllium	Lab	mg/l	< 0.0005 U				< 0.0005 U	< 0.0005 U			< 0.0005 U	< 0.0005 U				< 0.0005 U
Cadmium	Lab	mg/l	< 0.0005 U				< 0.0005 U	< 0.0005 U			< 0.0005 U	< 0.0005 U				< 0.0005 U
Chromium	Lab	mg/l	< 0.002 U				< 0.002 U	< 0.002 U			< 0.002 U	0.0020				0.0032
Cobalt	Lab	mg/l	< 0.002 U				< 0.002 U	< 0.002 U			< 0.002 U	< 0.002 U				< 0.002 U
Lead	Lab	mg/l	< 0.0005 U				0.0024	< 0.0005 U			< 0.0005 U	< 0.0005 U				0.0013
Lithium	Lab	mg/l	0.085		0.076	0.106	0.095	0.041	0.035	0.047	0.048	0.145	0.110	0.130	0.146	0.135
Mercury	Lab	mg/l	< 0.0002 U				< 0.0002 U	< 0.0002 U			< 0.0002 U	< 0.0002 U				< 0.0002 U
Molybdenum	Lab	mg/l	0.0236				0.0393	0.0034			0.0037	0.0030				0.0039
Selenium	Lab	mg/l	0.0716	0.0698			0.0689	0.0056			< 0.005 U	< 0.005 U				< 0.005 U
Thallium	Lab	mg/l	< 0.0005 U				< 0.0005 U	< 0.0005 U			< 0.0005 U	< 0.0005 U				< 0.0005 U
Radium 226	Lab	pCi/l	0.05 +/- 0.1 ND				0.1 +/- 0.2 ND	0.2 +/- 0.1			0.2 +/- 0.2	0.2 +/- 0.1				0.2 +/- 0.1 UB
Radium 228	Lab	pCi/l	0.08 +/- 1.1 ND				0.1 +/- 0.8 ND	-0.4 +/- 1.1 ND			0.5 +/- 0.7 ND	2.0 +/- 0.7				1 +/- 0.7 ND
Radium, combined (226+228)	Calc	pCi/l	0.13 +/- 1.1 ND				0.2 +/- 0.82 ND	0.2 +/- 0.1 q			0.7 +/- 0.73 q	2.2 +/- 0.71				1.2 +/- 0.71 ND

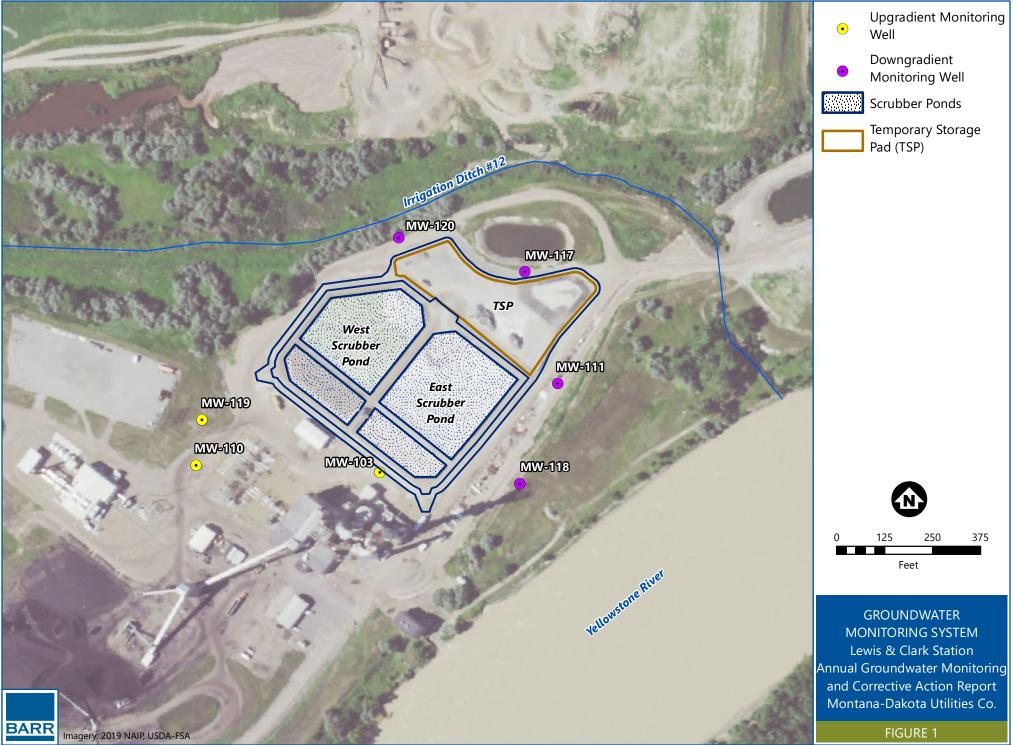
#### **Data Footnotes and Qualifiers**

#### **Barr Standard Footnotes and Qualifiers**

	Not analyzed/Not available.
N	Sample Type: Normal
FD	Sample Type: Field Duplicate
ND	Not detected.
q	The combined radium result includes both detected and not detected values.
U	The analyte was analyzed for, but was not detected.
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.

# Figures

Barr Footer: ArcGIS 10.7.1, 2020-01-29 10:04 File: I:\Projects\26\41\1007\Maps\Reports\CCR\_Monitoring\_Report\_2019\Figure 01 Groundwater Monitoring System.mxd User: MRQ



Appendices

# Appendix A

Laboratory Reports and Field Sheets



MINNESOTA VALLEY TESTING LABORATORIES, INC. 1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890 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



#### **REVISION #1**

CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: Dup 1

Event and Year: March 2020

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Report Date: 1 Apr 20 Lab Number: 20-W478 Work Order #: 82-0623 Account #: 002800 Date Sampled: 18 Mar 20 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 0.6C

	As Receive Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Matal Digostion		1.7		EPA 200.2	19 Mar 20	HT
Metal Digestion Total Suspended Solids	3	mg/l	2	13765-85	19 Mar 20 14:25	HT
Total Alkalinity	288	mg/1 CaCO3	20	SM2320-B	19 Mar 20 17:00	HT
Nitrate-Nitrite as N	3.91	mg/l	0.10	EPA 353.2	19 Mar 20 12:05	EV
	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 20 11:27	MDE
Mercury - Dissolved	114	mg/l	1.0	6010D	24 Mar 20 12:22	MDE
Magnesium - Total	81.5	mg/l	1.0	6010D	24 Mar 20 12:22	MDE
Sodium - Total	7.0	mg/1	1.0	6010D	24 Mar 20 12:22	MDE
Potassium - Total	96.9	mg/1	1.0	6010D	24 Mar 20 14:22	MDE
Calcium - Dissolved	112	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Magnesium - Dissolved	79.2	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Sodium - Dissolved	7.2	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Potassium - Dissolved		mg/l	0.020	6010D	30 Mar 20 11:07	SZ
Lithium - Dissolved	0.050	mg/1	0.10	6010D	27 Mar 20 10:48	SZ
Boron - Dissolved	0.99	mg/l	0.0010	6020B	20 Mar 20 14:08	MDE
Antimony - Dissolved		mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Arsenic - Dissolved	< 0.002		0.0020	6020B	20 Mar 20 14:08	MDE
Barium - Dissolved	0.0206	mg/l	0.0005	6020B	23 Mar 20 12:40	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Mar 20 14:08	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Cobalt - Dissolved	< 0.002	mg/1	0.0005	6020B	20 Mar 20 14:08	MDE
Lead - Dissolved	< 0.0005	mg/1		6020B	20 Mar 20 14:08	
Molybdenum - Dissolved	0.0172	mg/l	0.0020	6020B	20 Mar 20 14:08	
Selenium - Dissolved	0.0531	mg/l	0.0050	6020B	20 Mar 20 14:08	
Thallium - Dissolved	< 0.0005	mg/l	0.0005	60200	at har at 11.00	

\* Holding time exceeded

10 14Ar XX Claudite K. Canrep Approved by:

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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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CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: Field Blank (FB)

Event and Year: March 2020

Report Date: 1 Apr 20 Lab Number: 20-W479 Work Order #: 82-0623 Account #: 002800 Date Sampled: 18 Mar 20 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

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PO #: 180534 OP

Temp at Receipt: 0.6C

	As Receive Result	d	Method RL	Method Reference	Analyzed	Analyst
Metal Digestion				EPA 200.2	19 Mar 20	HT
Total Suspended Solids	< 2	mg/1	2	13765-85	19 Mar 20 14:25	нт
Total Alkalinity	< 20	mg/l CaCO3	20	SM2320-B	19 Mar 20 17:00	HT
Nitrate-Nitrite as N	< 0.1	mg/l	0.10	EPA 353.2	19 Mar 20 12:05	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 20 11:27	MDE
Agnesium - Total	< 1	mg/1	1.0	6010D	24 Mar 20 12:22	MDE
Sodium - Total	< 1	mg/1	1.0	6010D	24 Mar 20 12:22	MDE
Potassium - Total	< 1	mg/l	1.0	6010D	24 Mar 20 12:22	MDE
Calcium - Dissolved	< 1	mg/1	1.0	6010D	24 Mar 20 14:22	MDE
Magnesium - Dissolved	< 1	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Sodium - Dissolved	< 1	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Potassium - Dissolved	< 1	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Lithium - Dissolved	< 0.02	mg/1	0.020	6010D	30 Mar 20 11:07	SZ
Boron - Dissolved	< 0.1	mg/l	0.10	6010D	27 Mar 20 10:48	SZ
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	20 Mar 20 14:08	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Barium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
	< 0.0005	mg/l	0.0005	6020B	23 Mar 20 12:40	MDE
Beryllium - Dissolved Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Mar 20 14:08	MDE
	< 0.002	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Chromium - Dissolved	< 0.002	mg/1	0.0020	6020B	20 Mar 20 14:08	MDE
Cobalt - Dissolved	< 0.0002	mg/1	0.0005	6020B	20 Mar 20 14:08	MDE
Lead - Dissolved	< 0.0003	mg/1	0.0020	6020B	20 Mar 20 14:08	MDE
Molybdenum - Dissolved	< 0.002	mg/1	0.0050	6020B	20 Mar 20 14:08	MDE
Selenium - Dissolved Thallium - Dissolved	< 0.0005	mg/1	0.0005	6020B	20 Mar 20 14:08	

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\* Holding time exceeded

Claudite K. Canto Approved by:

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: MW103

Event and Year: March 2020

Report Date: 1 Apr 20 Lab Number: 20-W480 Work Order #: 82-0623 Account #: 002800 Date Sampled: 18 Mar 20 9:31 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 0.6C

	As Receive Result	bd	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	19 Mar 20	HT
Total Suspended Solids	5	mg/1	2	13765-85	19 Mar 20 14:25	HT
DH - Field	7.45	units	NA	SM 4500 H+ B	18 Mar 20 9:31	DJN
Temperature - Field	6.08	Degrees C	NA	SM 2550B	18 Mar 20 9:31	DJN
otal Alkalinity	289	mg/l CaCO3	20	SM2320-B	19 Mar 20 17:00	HT
Conductivity - Field	1416	umhos/cm	1	EPA 120.1	18 Mar 20 9:31	DJN
litrate-Nitrite as N	3.91	mg/l	0.10	EPA 353.2	19 Mar 20 12:05	EV
ercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 20 11:27	MDE
agnesium - Total	115	mg/1	1.0	6010D	24 Mar 20 12:22	MDE
Sodium - Total	80.0	mg/l	1.0	6010D	24 Mar 20 12:22	MDE
Potassium - Total	7.2	mg/1	1.0	6010D	24 Mar 20 12:22	MDE
alcium - Dissolved	97.0	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
agnesium - Dissolved	112	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Sodium - Dissolved	79.7	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Potassium - Dissolved	7.0	mg/1	1.0	6010D	24 Mar 20 14:22	MDE
ithium - Dissolved	0.050	mg/l	0.020	6010D	30 Mar 20 11:07	SZ
Boron - Dissolved	0.98	mg/l	0.10	6010D	27 Mar 20 10:48	SZ
Antimony - Dissolved	0.0031	mg/l	0.0010	6020B	20 Mar 20 14:08	MDE
rsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Barium - Dissolved	0.0206	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	23 Mar 20 12:40	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Mar 20 14:08	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Mar 20 14:08	MDE
Molybdenum - Dissolved	0.0170	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Selenium - Dissolved	0.0556	mg/l	0.0050	6020B	20 Mar 20 14:08	
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Mar 20 14:08	MDE

\* Holding time exceeded

2020 Claudette Approved by: K. Canteo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: MW110

Event and Year: March 2020

Report Date: 1 Apr 20 Lab Number: 20-W481 Work Order #: 82-0623 Account #: 002800 Date Sampled: 16 Mar 20 16:29 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 0.6C

	As Receive Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion		2.63		EPA 200.2	19 Mar 20	HT
Total Suspended Solids	6	mg/1	2	13765-85	19 Mar 20 14:25	
oH - Field	7.39	units	NA	SM 4500 H+ B	16 Mar 20 16:29	
Cemperature - Field	3.60	Degrees C	NA	SM 2550B	16 Mar 20 16:29	
Total Alkalinity	413	mg/l CaCO3	20	SM2320-B	19 Mar 20 17:00	
Conductivity - Field	1360	umhos/cm	1	EPA 120.1	16 Mar 20 16:29	
Nitrate-Nitrite as N	20.0	mg/l	0.10	EPA 353.2	19 Mar 20 12:05	
lercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 20 11:27	
Magnesium - Total	69.4	mg/l	1.0	6010D	24 Mar 20 12:22	
Sodium - Total	102	mg/l	1.0	6010D	24 Mar 20 12:22	
Potassium - Total	6.8	mg/l	1.0	6010D	24 Mar 20 12:22	
alcium - Dissolved	118	mg/l	1.0	6010D	24 Mar 20 14:22	
agnesium - Dissolved	69.3	mg/l	1.0	6010D	24 Mar 20 14:22	
Sodium - Dissolved	99.8	mg/l	1.0	6010D	24 Mar 20 14:22	
Potassium - Dissolved	6.7	mg/l	1.0	6010D	24 Mar 20 14:22	
Aithium - Dissolved	0.039	mg/l	0.020	6010D	30 Mar 20 11:0	
Boron - Dissolved	0.27	mg/1	0.10	6010D	27 Mar 20 10:48	
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	20 Mar 20 14:00	
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Mar 20 14:01	
Barium - Dissolved	0.0352	mg/l	0.0020	6020B	20 Mar 20 14:00	
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	23 Mar 20 12:40	
Cadmium - Dissolved	< 0,0005	mg/l	0.0005	6020B	20 Mar 20 14:00	
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Mar 20 14:01	
	< 0.002	mg/l	0.0020	6020B	20 Mar 20 14:0	
Cobalt - Dissolved	< 0.0005	mg/1	0.0005	6020B	20 Mar 20 14:0	
Lead - Dissolved	0.0027	mg/1	0.0020	6020B	20 Mar 20 14:0	
Molybdenum - Dissolved	< 0.005	mg/1	0.0050	6020B	20 Mar 20 14:0	
Selenium - Dissolved Thallium - Dissolved	< 0.0005	mg/1	0.0005	6020B	20 Mar 20 14:0	8 MDE

\* Holding time exceeded

14 Apr 20 20 Claudithe K. Cantlo Approved by:

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL - Method Reporting Limit

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CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: MW119

Event and Year: March 2020

Report Date: 1 Apr 20 Lab Number: 20-W482 Work Order #: 82-0623 Account #: 002800 Date Sampled: 16 Mar 20 18:57 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

Data

PO #: 180534 OP

Temp at Receipt: 0.6C

	As Receive Result	ed	Method RL	Method Reference	Analyzed	Analyst
Metal Digestion				EPA 200.2	19 Mar 20	HT
Total Suspended Solids	2	mg/l	2	13765-85	19 Mar 20 14:25	HT
pH - Field	7.40	units	NA	SM 4500 H+ B	16 Mar 20 18:57	DJN
Temperature - Field	3.96	Degrees C	NA	SM 2550B	16 Mar 20 18:57	DJN
Total Alkalinity	417	mg/l CaCO3	20	SM2320-B	19 Mar 20 17:00	HT
Conductivity - Field	1311	umhos/cm	1	EPA 120.1	16 Mar 20 18:57	DJN
Nitrate-Nitrite as N	15.2	mg/1	0.10	EPA 353.2	19 Mar 20 12:05	EV
Mercury - Dissolved	< 0,0002	mg/1	0.0002	EPA 245.1	25 Mar 20 11:27	MDE
Magnesium - Total	69.0	mg/l	1.0	6010D	24 Mar 20 12:22	MDE
Sodium - Total	100	mg/l	1.0	6010D	24 Mar 20 12:22	MDE
Potassium - Total	7.2	mg/1	1.0	6010D	24 Mar 20 12:22	MDE
Calcium - Dissolved	114	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Magnesium - Dissolved	68.3	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Sodium - Dissolved	94.6	mg/1	1.0	6010D	24 Mar 20 14:22	MDE
Potassium - Dissolved	6.9	mg/1	1.0	6010D	24 Mar 20 14:22	
Lithium - Dissolved	0.040	mg/l	0.020	6010D	30 Mar 20 11:07	SZ
Boron - Dissolved	0.26	mg/1	0,10	6010D	27 Mar 20 10:48	
Antimony - Dissolved	< 0.001	mg/1	0.0010	6020B	20 Mar 20 14:08	
Arsenic - Dissolved	< 0.002	mg/1	0.0020	6020B	20 Mar 20 14:08	
Barium - Dissolved	0.0330	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	23 Mar 20 12:40	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Mar 20 14:08	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
	< 0.002	mg/1	0.0020	6020B	20 Mar 20 14:08	MDE
Cobalt - Dissolved	< 0.0005	mg/1	0,0005	6020B	20 Mar 20 14:08	MDE
Lead - Dissolved	0.0032	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Molybdenum - Dissolved	0.0053	mg/1	0.0050	6020B	20 Mar 20 14:08	MDE
Selenium - Dissolved Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Mar 20 14:08	

at a b b a d

\* Holding time exceeded

Apr 2000 Approved by: Claudette K. Cantep

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

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CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: MW111

Event and Year: March 2020

Report Date: 1 Apr 20 Lab Number: 20-W483 Work Order #: 82-0623 Account #: 002800 Date Sampled: 17 Mar 20 13:09 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 0.6C

	As Receive Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
ustal Dispation				EPA 200.2	19 Mar 20	HT
Metal Digestion Total Suspended Solids	3	mg/l	2	13765-85	19 Mar 20 14:25	HT
pH - Field	7.36	units	NA	SM 4500 H+ B	17 Mar 20 13:09	DJN
Femperature - Field	4.72	Degrees C	NA	SM 2550B	17 Mar 20 13:09	DJN
Temperature - Fierd	435	mg/l CaCO3	20	SM2320-B	19 Mar 20 17:00	HT
otal Alkalinity Conductivity - Field	4077	umhos/cm	1	EPA 120.1	17 Mar 20 13:09	DJN
Nitrate-Nitrite as N	23.3	mg/l	0.10	EPA 353.2	19 Mar 20 12:05	EV
	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 20 11:27	MDE
lercury - Dissolved	540	mg/l	1.0	6010D	24 Mar 20 12:22	MDE
lagnesium – Total Sodium – Total	142	mg/l	1.0	6010D	24 Mar 20 12:22	MDE
	10.5	mg/l	1.0	6010D	24 Mar 20 12:22	MDE
otassium - Total alcium - Dissolved	186	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
	540	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
lagnesium - Dissolved Godium - Dissolved	136	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Potassium - Dissolved	10.0	mg/1	1.0	6010D	24 Mar 20 14:22	MDE
	0.180	mg/l	0.020	6010D	30 Mar 20 11:07	SZ
Jithium - Dissolved Boron - Dissolved	6.05	mg/l	0.10	6010D	27 Mar 20 10:48	SZ
	< 0.001	mg/1	0,0010	6020B	20 Mar 20 14:08	MDE
ntimony - Dissolved	< 0.002	mg/l	0,0020	6020B	20 Mar 20 14:08	MDE
Arsenic - Dissolved	0.0175	mg/1	0.0020	6020B	20 Mar 20 14:08	MDE
Barium - Dissolved	< 0.0005	mg/l	0.0005	6020B	23 Mar 20 12:40	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Mar 20 14:08	MDE
Ladmium - Dissolved	< 0.002	mg/1	0.0020	6020B	20 Mar 20 14:08	MDE
Chromium - Dissolved	< 0.002	mg/1	0.0020	6020B	20 Mar 20 14:08	MDE
Cobalt - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Mar 20 14:08	MDE
Lead - Dissolved	0.0437	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Molybdenum - Dissolved	0.0758	mg/l	0.0050	6020B	20 Mar 20 14:08	MDE
Selenium - Dissolved Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Mar 20 14:08	MDE

\* Holding time exceeded

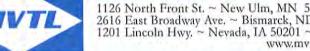
or 20.20 Claudette Approved by: K. Cantlo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

# = Due to concentration of other analytes
+ = Due to internal standard response CERTIFICATION: ND # ND-00016

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CERTIFICATE OF ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: MW117

Event and Year: March 2020

Report Date: 1 Apr 20 Lab Number: 20-W484 Work Order #: 82-0623 Account #: 002800 Date Sampled: 17 Mar 20 10:30 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 0.6C

	As Receive Result	ed.	Method RL	Method Reference	Date Analyzed	Analyst
total minusking				EPA 200.2	19 Mar 20	HT
Metal Digestion	84	mg/1	2	13765-85	19 Mar 20 14:25	HT
Total Suspended Solids	7.36	units	NA	SM 4500 H+ B	17 Mar 20 10:30	DJN
oH - Field	0.80	Degrees C	NA	SM 2550B	17 Mar 20 10:30	DJN
emperature - Field	379	mg/1 CaCO3	20	SM2320-B	19 Mar 20 17:00	HT
otal Alkalinity	8177	umhos/cm	1	EPA 120.1	17 Mar 20 10:30	DJN
onductivity - Field	33.8	mg/l	0.10	EPA 353.2	19 Mar 20 12:05	EV
itrate-Nitrite as N	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 20 11:27	MDE
ercury - Dissolved	1070	mg/1	1.0	6010D	24 Mar 20 12:22	MDE
agnesium - Total	565	mg/1	1.0	6010D	24 Mar 20 12:22	MDE
odium - Total	23.1	mg/1	1.0	6010D	24 Mar 20 12:22	MDE
otassium - Total	368	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
alcium - Dissolved	1100	mg/1	1.0	6010D	24 Mar 20 14:22	MDE
lagnesium - Dissolved	560	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
odium - Dissolved	22.8	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Potassium - Dissolved	0,125	mg/1	0.020	6010D	30 Mar 20 11:07	SZ
ithium - Dissolved	9.21	mg/1	0.10	6010D	27 Mar 20 10:48	
Boron - Dissolved		mg/l	0.0010	6020B	20 Mar 20 14:08	MDE
ntimony - Dissolved	< 0.001		0,0020	6020B	20 Mar 20 14:08	MDE
rsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Mar 20 14:08	
Barium - Dissolved	0.0113	mg/l	0.0005	6020B	23 Mar 20 12:40	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Mar 20 14:08	
admium - Dissolved	< 0.0005	mg/1	0.0020	6020B	20 Mar 20 14:08	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Cobalt - Dissolved	< 0.002	mg/1	0.0005	6020B	20 Mar 20 14:08	
Lead - Dissolved	< 0.0005	mg/1	0.0020	6020B	20 Mar 20 14:08	
Allybdenum - Dissolved	0.0028	mg/l	0.0020	6020B	20 Mar 20 14:08	
Selenium - Dissolved Thallium - Dissolved	0.0367 < 0.0005	mg/l mg/l	0.0005	6020B	20 Mar 20 14:08	

\* Holding time exceeded

Approved by: laudette K. Canil

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

# = Due to concentration of other analytes
+ = 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 fest 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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CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: MW118

Event and Year: March 2020

Report Date: 1 Apr 20 Lab Number: 20-W485 Work Order #: 82-0623 Account #: 002800 Date Sampled: 17 Mar 20 19:01 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 0.6C

	As Receive Result	đ	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	19 Mar 20	HT
Total Suspended Solids	2	mg/l	2	13765-85	19 Mar 20 14:25	HT
pH - Field	7.51	units	NA	SM 4500 H+ B	17 Mar 20 19:01	DJN
Temperature - Field	4.22	Degrees C	NA	SM 2550B	17 Mar 20 19:01	DJN
Total Alkalinity	353	mg/l CaCO3	20	SM2320-B	19 Mar 20 17:00	HT
Conductivity - Field	2138	umhos/cm	1	EPA 120.1	17 Mar 20 19:01	DJN
Nitrate-Nitrite as N	10.9	mg/l	0.10	EPA 353.2	19 Mar 20 12:05	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 20 11:27	MDE
Agnesium - Total	202	mg/l	1.0	6010D	24 Mar 20 12:22	MDE
Sodium - Total	108	mg/l	1.0	6010D	24 Mar 20 12:22	MDE
Potassium - Total	7.7	mg/l	1.0	6010D	24 Mar 20 12:22	MDE
Calcium - Dissolved	116	mg/1	1.0	6010D	24 Mar 20 14:22	MDE
Magnesium - Dissolved	200	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Sodium - Dissolved	105	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Potassium - Dissolved	7.5	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
	0.082	mg/l	0.020	6010D	30 Mar 20 11:07	SZ
Lithium - Dissolved	1.45	mg/1	0.10	6010D	27 Mar 20 10:48	SZ
Boron - Dissolved	< 0.002 *	mg/l	0.0010	6020B	27 Mar 20 11:19	MDE
Intimony - Dissolved	< 0.005 ^	mg/l	0.0020	6020B	27 Mar 20 11:19	MDE
Arsenic - Dissolved	0.0229	mg/l	0.0020	6020B	27 Mar 20 11:19	MDE
Barium - Dissolved	< 0.0005	mg/l	0.0005	6020B	27 Mar 20 13:53	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	27 Mar 20 11:19	
Cadmium - Dissolved	< 0.002	mg/l	0.0020	6020B	27 Mar 20 11:19	MDE
Chromium - Dissolved	< 0.002	mg/l	0,0020	6020B	27 Mar 20 11:19	MDE
Cobalt - Dissolved	< 0.002	mg/1	0.0005	6020B	27 Mar 20 11:19	MDE
Lead - Dissolved		mg/l	0.0020	6020B	27 Mar 20 11:19	MDE
Molybdenum - Dissolved	0.0237	mg/l	0.0050	6020B	27 Mar 20 11:19	MDE
Selenium - Dissolved Thallium - Dissolved	< 0.0005	mg/1	0.0005	6020B	27 Mar 20 11:19	MDE

\* Holding time exceeded

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

14 Apr 2020 Clauditte Approved by: K. Cantlo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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.



MEMBER

9 of 9 Page:

CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: MW120

Event and Year: March 2020

Report Date: 1 Apr 20 Lab Number: 20-W486 Work Order #: 82-0623 Account #: 002800 Date Sampled: 17 Mar 20 8:59 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 0.6C

	As Receive Result	d	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	19 Mar 20	HT
Total Suspended Solids	2	mg/l	2	13765-85	19 Mar 20 14:25	HT
pH - Field	6.92	units	NA	SM 4500 H+ B	17 Mar 20 8:59	DJN
Temperature - Field	1.23	Degrees C	NA	SM 2550B	17 Mar 20 8:59	DJN
otal Alkalinity	704	mg/l CaCO3	20	SM2320-B	19 Mar 20 17:00	HT
Conductivity - Field	6556	umhos/cm	1	EPA 120.1	17 Mar 20 8:59	DJN
litrate-Nitrite as N	5.30	mg/1	0.10	EPA 353.2	19 Mar 20 12:05	EV
lercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	25 Mar 20 11:27	MDE
Magnesium - Total	860	mg/l	1.0	6010D	24 Mar 20 12:22	MDE
Sodium - Total	406	mg/1	1.0	6010D	24 Mar 20 12:22	MDE
Potassium - Total	28.3	mg/l	1.0	6010D	24 Mar 20 12:22	MDE
alcium - Dissolved	448	mg/1	1.0	6010D	24 Mar 20 14:22	MDE
lagnesium - Dissolved	930	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Sodium - Dissolved	414	mg/l	1.0	6010D	24 Mar 20 14:22	MDE
Potassium - Dissolved	29.0	mg/l	1.0	6010D	24 Mar 20 14;22	MDE
ithium - Dissolved	0.145	mg/l	0.020	6010D	30 Mar 20 11:07	SZ
Boron - Dissolved	9.75	mg/l	0.10	6010D	27 Mar 20 10:48	SZ
Antimony - Dissolved	< 0.001	mg/1	0.0010	6020B	20 Mar 20 14:08	MDE
Arsenic - Dissolved	< 0,002	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Barium - Dissolved	0.0204	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Beryllium - Dissolved	< 0,0005	mg/l	0.0005	6020B	23 Mar 20 12:40	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Mar 20 14:08	MDE
Thromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Mar 20 14:08	MDE
Cobalt - Dissolved	< 0.002	mg/1	0.0020	6020B	20 Mar 20 14:08	MDE
Lead - Dissolved	< 0.0002	mg/1	0.0005	6020B	20 Mar 20 14:08	MDE
	0.0024	mg/1	0.0020	6020B	20 Mar 20 14:08	MDE
Aolybdenum - Dissolved	< 0.005	mg/1	0.0050	6020B	20 Mar 20 14:08	MDE
Selenium - Dissolved Thallium - Dissolved	< 0.0005	mg/1	0.0005	6020B	20 Mar 20 14:08	MDE

\* Holding time exceeded

Approved by:

Apr 2000 Claudette K. Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

The reporting limit was elevated for any analyte requiring a dilution as coded below:  $\varpi$  = Due to sample matrix  $\parallel$  = Due to co i = Due to sample quantity + = Due to in # = Due to concentration of other analytes
+ = Due to internal standard response

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.

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

# **Chain of Custody Record**

Project Name	:			Event:						Work Ord	er Number:	:
	MDU Lev	wis & Clark		March 2020						82-0023		
Report To: Attn: Address: Phone: Email:	MDU Lewis & Clark Todd Peterson 400 N. 4th St Bismarck, ND 58501 701-425-2427 Todd.Peterson@mdu.co	501								Collected By: DAMA Mieswaag		
Lab Number W473 W479 W470 W481 W482 W482 W482 W482 W485 W486	Sample ID Dup 1 Field Blank (FB) MW103 MW110 MW119 MW111 MW117 MW117 MW118 MW120	\$ 18.100-11.10200 18.100-11.10200 18.100-11.10200 18.100-11.2020 18.100-11.2020 18.100-11.2020 19.100-11.2020 17.100-11.2020 19.100-11.2020	NA D 9 3 1 629 1857 1309 1030	GW GW GW GW GW GW GW GW GW GW	X       X       X       X       X       X       X       X       X       X       X       X       X       X       X	X X X X X X 20 UV V	NUNCON X X X X X X X X X X X X X X	ли	NA NA NA 14/6 1360 1311 4077 8177 2138 6556	NA NA 7.45 7.39 7.30 7.36 7.36 7.36 7.51 6,92	NA NA	Analysis Required MDU Lewis & Clark List

Comments:

Relinquished By	1 1			Received By				
Name	Date/Time	Location	Temp (°C)	Name	Date/Time			
1 Ann	18 Mar 2020 1638	Log In Walk In #2	ROT 0.6 TM562 / TM805	- THAT YOL -	18100020			
2			\$218m22020 @					



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April 10, 2020

Montana Dakota Utilities Todd Peterson 5181 Southgate Dr. Billings, MT 59102

RE: Amended Field Data Report

Dear Mr. Peterson,

Per email dated April 6, 2020 from Terri Olson, Barr Engineering, it was brought to MVTL's attention that some of the summary data in the Field Data Report did not match the Raw Data collected in the field. Attached to this letter is the corrected Field Data Report.

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



# **MVTL Laboratories Inc.**

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

# **MDU Lewis and Clark**

CCR Sampling

Attn: MDU

WO# 82-0636 82-0623 400 N. 4th St.

Bismarck, ND 58501

#### FIELD DATA REPORT

		START		TIME	WATER	WATER		:	F	IELD R	EADING	S	
SAMPLE ID	PURGE DATE	PURGE TIME	SAMPLE DATE	OF SAMPLE	LEVEL START (FT)	LEVEL END (FT)	VOLUME REMOVED (mL)	SAMPLE METHOD	TEMP (°C)	EC	pН	TURB. NTU	SAMPLE APPEARANCE OR COMMENT
MW103	18-Mar-20	8:06	18-Mar-20	9:31	10.78	10.77	8500.0	Bladder	6.08	1416	7.45	3.81	clear
MW110	16-Mar-20	12:54	16-Mar-20	16:29	9.26	9.35	14700.0	Bladder	3.60	1360	7.39	6.98	clear
MW119	16-Mar-20	18:12	16-Mar-20	18:57	9.12	9.20	4500.0	Bladder	3.96	1311	7.40	3.14	clear
MW111	17-Mar-20	11:54	17-Mar-20	13:09	7.00	7.78	7500.0	Bladder	4.72	4077	7.36	4.07	clear
MW117	16-Mar-20	11:33	17-Mar-20	10:30	6.67	9.64	9000.0	Bladder	0.80	8177	7.36	108.00	slightly turbid
MW118	17-Mar-20	17:56	17-Mar-20	19:01	8.47	8.50	5500.0	Bladder	4.22	2138	7.51	1.80	clear
MW120	17-Mar-20	8:24	17-Mar-20	8:59	15.13	15.60	3500.0	Bladder	1.23	6556	6.92	1.06	clear
					na = Not	Applicable	NR = Not Re	corded				······	



# **Field Datasheet**

Groundwater Assessment

Company:	MDU Lewis & Clark	
Event:	March 2020	
Sample ID:	1.03	
Sampling Person	al: Dallen Niesmaas	

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-		Telesia		°F	Mind: M		<u> </u>		Precip:	Suppy / D	artly Cloudy / Cloudy
Neather Conditions		Temp:	2/10	°F	Wind: N	orth	@ 14				
		ORMATIO	N		-				IPLING IN	FORMATI	
Well Locked?	YES	NO			1	Purging Me		Bladder			Control Settings:
Vell Labeled?	XES	NO				Sampling N		Bladder			Purge: <u>7</u> Se
Casing Strait?	TES	NO			_	Dedicated E	quipment?	(YES) -	NO NO		Recover: 57 Se
Grout Seal Intact?	YES	NO	Not \	Visible	1					7	PSI:
Repairs Necessary?						Duplicate S		YES	NO		
	g Diameter		11			Duplicate S	ample ID:	Dup-	•	]	
Water Level Be			.78	ft	-					7	
	pth of Well	: 'Q	ers	ft			Bottl	e List:	· · · · · · · · · · · · · · · · · · ·	-	
	/ell Volume		K B	liters		1 Liter Raw		4-1L Nitric			
	op of Pump		813	ft	4	500mL Nitric					
Water Level A			77	ft	4	500mL Nitric	•				
Measureme	ent Method	: Electric \	Nater Level	Indicator	1	250mL Sulfu	ric			]	
					FIE	LD READIN	IGS				
Stabilization Parar	neters	Temp.	Spec.		DO	ORP	Turbidity	Water Level	Pumping	Liters	Appearance or Comment
(3 Consecutiv	e)	(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)		Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
18 March 2020	12806	Start of Well	Purge								······································
10/.000 000	IST VI	5180	2667	7,40	Hall	248.6	76.7	10,77	1.DD	500	Clan
	1841	5153	1508	Till	5134	7.40,2	10,0	10,77	100	3000	Clear
	0911	568	1472	7.45	284	2400/1	4.56	10,77	1:100	3000	clear
	0916	6.6	1432	7,45	2:80	239,4	4.47	90,77	100	BCOV.	(da-
	0927	6.22	1443	7.45	2,88	239. 8	4.08	10.72	100	500	2Cm
	D926	6.44	1425	7,45	2.90	239.4	3.98	190,77	6/08	500	Cla
	2931	10,08	1411	7.45	2,96	23942	3,81	10.77	100	500	Ch-
		0.0	7.0					Ľ	-	-	
					<u> </u>	1					
			<u> </u>			1				La	<u> </u>
	Well St	abilized?	YES	NO				Total Vol	ume Purged:	<u> 15011</u>	Liters
Comula Data	Timo	Temp.	Spec.	pН			Turbidity				Appearance or Comment
Sample Date	Time	ر (°C)	Cond,				(NTU)	,			Clarity, Color, Odor, Ect.
18 March 2020	0931	6+08	14/6	7.45			3681				r/zor
							·····				
Comments:											



E. Broadway Ave, Bis	smarck, ND				r Assessme			Company: Event: Sample ID: Sampling P		MDU Lewi March 202 L J C Dance	20
Phone: (701) 258-9				or	M/in als		- A 1		Precip:	Suppy / Dr	artly Cloudy / Cloudy
er Conditions:		Temp:	24	°F	Wind:	MIST	@ /S		······		
1	WELL INFO		Ņ		-				IPLING IN	FORMÁTI	
cked?	- TÊS	$\langle NO \rangle$				Purging Me		Bladder			Control Settings:
beled?	YES	NO			4	Sampling M		Bladder	A CONTRACTOR		Purge: 2 Sec.
Strait?	(YES)	NO		1. 1. I.	-	Dedicated E	quipment?	YES	NO ; U	bbing	Recover: Sec.
eal Intact?	YES	NO	Not \	/isible	4					1	PSI:
Necessary?					4	Duplicate Sa		YES	(NO)		Small bladder pump
	g Diameter:	2	n 1 1	ft	-	Duplicate Sa	ample ID:		<b></b>	1	Factory
Water Level Be			1.6.2	ft	-		Bott	le List:		I	
	pth of Well: ell Volume:	/	Contraction of the second	liters		1 Liter Raw		4- 1L Nitric			
Depth to To			7: 1	ft	-	500mL Nitric					Ŷ
Water Level Af		673	5	ft	-	500mL Nitric					- Alexandre and Alexandre a
Measureme		Electric	Nater Level		1	250mL Sulfur					
		l								•	
tabilization Paran	neters	Temp.	Spec.	I	DO	ORP	Turbidity		Pumping	Liters	Appearance or Comment
(3 Consecutive		(°C)	Cond.	pН	(mg/L)	(mV)	(NTU)	Water Level	Rate	Removed	Clarity, Color, Odor, Ect.
urge Date	Time	±0.5°	±5%	±0.1	±10%	±10	· · · · · ·	(ft)	mL/Min		clear, slightly turbid, turbid
		Start of Well	Purge		1			6			
na/112020	1259	3,39	1399	7.41	5-69	265.5	80,4	9,34	70	350	cu
	1329	3,45.	1370	7.40	5,51	272.9	48.9	9.35	70	2100	ch
	13.59	3148	1365	700	7,56	280,0	2614	9.35	70	2100	Ch
	1429	3.67	1364	7.39	7.52	177.6	19.R	9.35	10	2100	d
	1484	3.67	1362	7.39	71.58	282,2	11.Z	9,35	40	2100	cler
	1559	3.71	1363	7.38	7.82	295,5,	9.57	9.35	70	4200	de
	1619	3,62	1361	7,39	7.97	298.6	7,14	9,35	70	1050	2 cm
	1624	3,50	1361	7.30	7,95	298,7	7.00	9.15	70	300	
	1629	3.60	1360	7,39	7.98	298,9	6,98	9.35	70	250	Clem
	Well Sta	bilized?	YES	NO		]	, e	Total Vol	ume Pu <b>rge</b> d:	14,700 ml	Liters
· · · ·		Temp.	Spec.	1			Turbidity	1			Appearance or Comment
nple Date	Time	(°C)	Cond.	pН			(NTU)				Clarity, Color, Odor, Ect.
arch2020	1629	3,60	1360	7.39			6,98				Clear
ents:	Tools 6		volumes	the CA	TU) NEVE	er went	below	· 5 unde	The 3	volume	s so started Samplin

2616 E. Broadway Ave, Bismarck, NI

Stabilization Parameters (3 Consecutive)

Purge Date

16, narin2020

Sample Date

6March2020

Comments:

Phone: (701) 258-9720 Weather Conditions:

Well Locked?

Well Labeled? Casing Strait?

Grout Seal Intact? Repairs Necessary?



Groundwater Assessment

Company:	MDU Lewis & Clark
Event:	March 2020
Sample ID:	119
Sampling Persor	al: parlen Nie Graas

//Sunny / Partly Cloudy / Cloudy

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720 Weather Conditions:

Wind: West @ 1.2

SAMPLING	INFORMATION	

Precip:

WELL INFORMATION					
Well Locked?	YES	-1102			
Well Labeled?	/XES>	NO			
Casing Strait?	YES	NO			
Grout Seal Intact?	XES	NO	No	ot Visible	
Repairs Necessary?	Repairs Necessary?				
Casin	g Diamete <b>r</b> :		2"		
Water Level Be	efore Purge:	C	1,12	ft	
Total De	Total Depth of Well:			ft	
W	Ĺ	1.62	liters		
Depth to To	ĺ	1,28	ft		
Water Level At	Y	9,20	ft		
Measureme	ent Method:	Electric	Water Le	vel Indicator	

Temp:

UT

°F

	JAIA		
Purging Method:	Bladder		
Sampling Method:	Bladder		
Dedicated Equipment?	XES	NO T	-itedy
		/	
Duplicate Sample?	YES	(NO	
Duplicate Sample ID:			

Bottle List:

ON	
Control Settings	:
Purge: \$3	Sec.
Recover: 257	Sec.
PSI: 30	

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

#### FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec.	-11	DO	ORP	Turbidity	Water Level	Pumping	Liters	Appearance or Comment
			Cond.	рН	(mg/L)	(mV)	(NTU)	VValei Levei	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
6 March 2020	1512	Start of Wel	l Purge				_	<b>A</b> 43			£
Sparmer	1017	5.21	1314	7.36	7.04	2.33.8	17,8	9.18	180	500	Cler
	1837	4.03	1303	7,40	2156	24613	7.47	9,20	100	2000	Cler
	1847	3,80	1308	7.40	2044	252,4	3.78	9,20	1.02	1000	éler.
	1852	3.90	1308	7,40	2,42.	25413	3041	9,20	100	500	ch
	1857	3,96	1311	7,40	2,38	256,8	3.14	9,20	100	500	un
		1100		Ţ						-	
					1						
						-					
	Well St	abilized?	YES	NO				Total Vol	ume Purged:	4500	Liters
	T	Temp.	Spec.				Turbidity	1			Appearance or Comment
Sample Date	Time	(°C)	Cond.	рН			(NTU)				Clarity, Color, Odor, Ect.
6March 2020	1857	3,96	13/1	7,40		· · · · · · · · · · · · · · · · · · ·	3.14				Clean
0/110/01/01	1	1.6.1									
omments:	1										



Groundwater Assessment

°F

30

	Company:		MDU Lew	is & Cla	rk			
neet	Event:		March 202	20				
ent	Sample ID:							
	Sampling Pe	ersonal: 🌔	allen	Nies	NAA	5		-
				Ģ	~			-
Vorth @ 7	- F	recip: ۵	Sunny / Pa	artly Clo	oudy / C	loudy		_
	SAM	PLING IN	FORMATI	ϿN				
Purging Method:	Bladder		ſ		Control	Settings:		]
Sampling Method:	Bladder			Purge:	Ŧ3		Sec.	]
Dedicated Equipment?	YES	NO		Recove	r: 57-	-	Sec.	·
				PSI:	_			

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Weather Conditions:

Wind: North @ 14

WELL INFORMATION					
Well Locked?	YES	NO			
Well Labeled?	YES	NO			
Casing Strait?	YES	NO			
Grout Seal Intact?	YES	NO	No	ot Visible	
Repairs Necessary?	) )		-		
Casin	g Diameter:	2	11		
Water Level Be	efore Purge:	Ŧ.	00	ft	
Total De	pth of Well:	17.1	20 ·	ft	
W	ell Volume:	6	T	liters	
Depth to To	~	-	ft		
Water Level At	Ŧ.	78	ft		
Measureme	ent Method:	Electric V	Vater Lev	vel Indicator	

Temp:

Duplicate Sample?	YES	NO>		
Duplicate Sample ID:				
Bottle List:				
1 Liter Raw	4-1L Nitric			
500mL Nitric				
500mL Nitric (filtered)				

25	250mL Sulfuric			
	READINGS			

Stabilization Para	meters	Temp.	Spec.	, "U	DO	ORP	Turbidity	Water Level	Pumping	Liters	Appearance or Comment
(3 Consecutiv	/e)	(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)		Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
170 10	1154	Start of Well	Purge								
1 FMarch 2020	1159	5.05	4317	7.20	4,24	246,0	27.5	7,74	100	500	Cler
	1229	358	4336	7,33	BE Stell	259.0	28.0	\$7,74	100	3000	r Jean
	1259	1,60	4092	7.34	3,23 3.50	251.9	4.44	7.78	100	3000	clean
	1304.	4,62	4096	735	3,19	254,5	4,24	7,78	100	500.	ch
	1309	4.72	4177	7.36	3.00	257iZ	4.07	7.78	100	500	a
								· / / ·	/ -		'
										<u> </u>	
<b>.</b>	Well St	abilized?	(YES	NO		,		Total Vol	ume Purged:	7500	Liters
	I	Temp.	Spec.				Turbidity	1			Appearance or Comment
Sample Date	Time	(°C)	Cond.	рН			(NTU)				Clarity, Color, Odor, Ect.
17 March 2020	1309	4,72	4077	7.36			4.07				clear
Comments:											



Groundwater Assessment

°F

~

Company:	MDU Lewis & Clark	
Event:	March 2020	
Sample ID:	117	
Sampling Personal:	Darnon Alia	e (maag
-8		

Sunny / Partly Cloudy / Cloudy

Purge:

PSI:

Recover:

Control Settings:

5

5

10

Sec.

Sec.

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Weather Conditions:

Wind: 1-ight@

	$\smile$	
SAMPLING	INFORMATION	

Precip:

WELL INFORMATION									
Well Locked?	YES	VO)							
Well Labeled?	YES	NO							
Casing Strait?	YES_	NO							
Grout Seal Intact?	(YES)	NO	Not Visible						
Repairs Necessary?	Sar	The second s	and the second						
Casin	g Diameter:	2	11 						
Water Level Be	efore Purge:	6	br ft						
. Total De	pth of Well:	110	ζ <i>j</i> ft						
W	/ell Volume:	3.0	liters						
Depth to To	op of Pump:	t,	f ft						
Water Level At	fter Sample:	9.60	⊈ ft						
Measureme	ent Method:	Electric V	Vater Level Indicator						

Temp:

	01110		
Purging Method:	Bladder		
Sampling Method:	Bladder		] .
Dedicated Equipment?	YES	NO T	Alerad
	North Contraction	Į -	
Duplicate Sample?	YES	(NO)	]
Duplicate Sample ID:	مين ما بي الكرينيين. من ما بي الكرينيين ما بي		]

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

#### FIELD READINGS

					L I L L		<u>u</u>				
Stabilization Para	meters	Temp.	Spec.	рH	DO	ORP	Turbidity	Water Level	Pumping	Liters	Appearance or Comment
(3 Consecutiv	(3 Consecutive)		Cond.	рп	(mg/L)	(mV)	(NTU)	vvaler Lever	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
16 March 2020	1133.	Start of Well					50	د .	3		<i>y</i>
	1128	3,40	7746	714	7,424	246.7	45.W	-7.48	1-50	750	Clean
	12455	2.41	-7741	7,19	8.48	257.2	31.3	9.19.	150	4500	dear
	1223	2	41.23	7.20	3:22	264.8	47.8	6, 54	150	2250	
	1233	2.18	7752	7,20	13,22	269,1	15.6	100	150	1500	E la company
				*	1.			Below			
17 March 2020	F97/025	Purged	well	5 mini	before	Samplin	Ģ	Ist.			
1 7/11/00 LOUD		0				/		5152			
								7			
											······································
											·····
	Well Sta	abilized?	YES	NO				Total Vol	ume Purged:	9,000	Liters
Coursela Data	<b>T</b>	Temp.	Spec.		PO	OPP	Turbidity		·····		Appearance or Comment
Sample Date	Time	(°C)	Cond.	рН	0	0, 1	(NTU)				Clarity, Color, Odor, Ect.
17 March 2070	1.030	0180	8177	43L	8,93	257,8	108				Slight Turbid
Comments:			~								,



Groundwater Assessment

Wind:

Company:	MDU Lewis & Clark
Event:	March 2020
Sample ID:	118
Sampling Persona	al: Darren Alissinaag
Precip	: Sunny / Partly Cloudy / Cloudy

Purge:

PSI:

Control Settings:

Sec.

Sec.

3

Recover: 57

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Weather Conditions:

@ 4

WELL INFORMATION									
Well Locked?	YES	(NO)							
Well Labeled?	YES	NO							
Casing Strait?	(YES)	NO	····						
Grout Seal Intact?	VES	NO	Not Visible						
Repairs Necessary?	· · · ·								
	g Diameter:	2'	1						
Water Level Be	efore Purge:	8,4	7 ft						
Total De	pth of Well:	1400	7 ft						
N	/ell Volume:		177. liters						
Depth to Te	op of Pump:	9052	> ft						
Water Level A:	fter Sample:	Str.	50 ft						
Measureme	ent Method:	Electric Water Level Indicator							

Temp:

30

°F

,	SAN	/IPLING IN	FORMAT	ION
Purging Method:	Bladder			
Sampling Method:	Bladder			Pur
Dedicated Equipment?	YES	NO		Rec
	14	blizz		PSI:
Duplicate Sample?	YES	NO		-
Duplicate Sample ID:	······			

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

#### FIELD READINGS

NW

					0 8	LD KLADIN	105				
Stabilization Para	ameters	Temp.	Spec.		DO	ORP	Turbidity	Water Level	Pumping	Liters	Appearance or Comment
(3 Consecuti	ive)	(°c)	Cond.	рН	(mg/L)	(mV)	(NTU)	vvaler Lever	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
7March 2020	17156	Start of Wel	ll Purge								
-11-01-00 CO 00	1801	5.41	2168	7.47	6.36	261.6	252	8.4.6	100	500	Slightly tybid
	1824	4,29	2142	7.50	10.53	2693	657	8,49	100.	3000	Cieg
	1846	4,28	2140	751	9,14	2735	2.81	8,50	100	500	cler
	1851	4:30	2140	751	9:21	274,3	1,91	8.50	100	500	chu
	1.856	4,18	2139	7,51	9,03	2.76,3	1.84	1152	100	300	Ch-
	1901	4.22	2138	7.51	9,21	276,6	1,80	8,50	100	500	d
					,						
	Well S	tabilized?	YES	NO				Total Vol	ume Purged:	<u>5500</u>	Liters
		Temp.	Spec.				Turbidity				Appearance or Comment
Sample Date	Time	(°C)	Cond.	pН			(NTU)				Clarity, Color, Odor, Ect.
17March 2020	1901	4,22	2138	FIST			1.80				Chan
		<u> </u>				<u></u>					
iomments:											



ft

ft

15.56 ft

**Electric Water Level Indicator** 

15060

liters

Groundwater Assessment

Company:	MDU Lewis & Clark
Event:	March 2020
Sample ID:	120
Sampling Person	al: Darren Nieswaag

2616 E. Broadway Ave, Bismarck, ND

Total Depth of Well:

Depth to Top of Pump:

Measurement Method:

Water Level After Sample:

Well Volume:

Sunny / Partly Cloudy / Cloudy Wind: @ \$ Precip: Temp: °F Sauth Weather Conditions: 6 SAMPLING INFORMATION WELL INFORMATION Purging Method: Bladder Control Settings: (NQ) Well Locked? ¥ES Well Labeled? XES Sampling Method: Bladder Purge: ßЭ Sec. NO YES! YES Dedicated Equipment? NO Recover: 57 Sec. Casing Strait? NO Not Visible) PSI: YES NO Grout Seal Intact? Duplicate Sample? Repairs Necessary? YES -CND 2" Duplicate Sample ID: Casing Diameter: ft Water Level Before Purge: 5.

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

FIELD READINGS

				1	T		1	1		1	
Stabilization Para	imeters	Temp.	Spec.	рН	DO	ORP	Turbidity	Water Level	Pumping	Liters	Appearance or Comment
(3 Consecuti	ve)	] (°C)	Cond.	pr	(mg/L)	(mV)	(NTU)	vvater Lever	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
7 March 2020	0824	Start of Well	l Purge	,	Arron						
	0829	2.24	6466	6.20	3.21	219.8	3,85	15,42	100	500	clean
	17849	1.18	6468	6,93	2.25	221.8	1:19	15141	100	2000	cler
	0854	1.09	1518	6193	2-18	223.6	1.62	15141	100	500	a
	0859	112-3	65.56	6.92	2,20	223,8	LIOL	15.41	100	500	ch
	1-0-2						,				
		1									
							· ·				
	Well St	abilized?	YES	NO				Total Vol	ume Purged:	3580	Liters
- • • ·		Temp.	Spec.				Turbidity				Appearance or Comment
Sample Date	Time	(°C)	Cond.	рН			(NTU)				Clarity, Color, Odor, Ect.
	0859		6556	6.92			1,06			1	Clear

Phone: (701) 258-9720

Instrument (Circle One):       #1 650 MDS 06F100203       #2 650 MDS 04H14736       #3 556 MPS 12E102056         Date:       Mach 2020       Time:       Of 55.5       mv Range +/- 50       50       Post Site Check         DH       Temp 'C       Pre Cal       Post Cal       Post Cal Range       mv       50       Post Site Check         Buffer 7       If 8.73       7.49       7.49       7.49       7.20       6.95-7.05       720.4       0.4/-50         Buffer 10       If 8.73       7.49       7.41       7.49       7.49       7.49       7.49       7.49       7.49       7.41	Site: MDU Lew	is and Clark	Technician:	Darren Nieswaag
Date: $\int March 2020$ Time: $\mathcal{O}65.5$ pH       Temp 'C       Pre Cal       Post Cal Range       mv       mv Range +/-       mv		#1 650 MDS 08F100203	·	
pHTemp 'CPre CalPost CalPost Cal Rangemv50Buffer 7 $\boxed{1,2,7,4}$ $\boxed{7,4,9}$ $\boxed{7,4,9}$ $\boxed{7,4,9}$ $\boxed{7,2,9}$ $\boxed{7,2,9,4}$ $\boxed{9,4,5,0}$ Buffer 10 $\boxed{1,2,2,5}$ $\boxed{7,4,9,4}$ $\boxed{7,4,9,4}$ $\boxed{1,0,0,0}$ $9,95-10.05$ $\boxed{-1,7,7,9}$ $\boxed{-1,80,4/-50}$ $\boxed{1,21,7,5}$ $\boxed{7,0,2}$ Buffer 4 $\boxed{1,2,5,5}$ $\boxed{7,9,4}$ $\boxed{3,9,9,4}$ $4.95-5.05$ $\boxed{250,5}$ $\boxed{10,0,0}$ $\boxed{1,25,7,9}$ $\boxed{7,0,2}$ $\boxed{7,0,2}$ Buffer 1413 $\boxed{1,9,0,3}$ $\boxed{1,4,4,1}$ $\boxed{1,4,4,3}$ $\boxed{1,4,4,3}$ $\boxed{1,4,4,3}$ $\boxed{1,4,4,3}$ $\boxed{1,4,4,3}$ $\boxed{1,3,9,4}$ $\underbrace{5,0,1,3}$ Date: $\boxed{2,1,6,3}$ $\underbrace{2,3,1,1}$ $\pm 10 \text{ mV}$ $Check$ $\boxed{5,0,1,5}$ $\boxed{1,3,9,4}$ $\underbrace{5,0,1,3}$ Date: $\boxed{1me:}$ $\boxed{1me:}$ $\boxed{1me:}$ $\boxed{1me:}$ $\boxed{1me:}$ $\boxed{1me:}$ $\boxed{1me:}$ $\boxed{1me:}$ Date: $\boxed{1me:}$ $\boxed{1me:}$ $\boxed{9,95-10.05}$ $\boxed{-1,40,+0}$ $\boxed{1,80,+1,50}$ $\boxed{1,80,+1,50}$ $\boxed{1,80,+1,50}$ Buffer 7 $\boxed{9,95-10.05}$ $\boxed{-1,80,+1,50}$ $\boxed{1,80,+1,50}$ $\boxed{1,80,+1,50}$ $\boxed{1,80,+1,50}$ $\boxed{1,80,+1,50}$ Buffer 10 $\boxed{9,95-10.05}$ $\boxed{-1,80,+1,50}$ $\boxed{1,80,+1,50}$ $\boxed{1,80,+1,50}$ $\boxed{1,80,+1,50}$ Buffer 113 $\boxed{0,85-10,05}$ $\boxed{1,80,+1,50}$ $\boxed{1,80,+1,50}$ $\boxed{1,80,+1,50}$ $\boxed{1,80,+1,50}$ Conductivity $\boxed{0,85-10,05}$ $\boxed{1,80,+1,50}$ $\boxed{1,80,+1,50}$ $\boxed{1,80,+1,50}$ $1,80,+1,5$	Date: (J.Ma.M	and Olar		<u>Time: 0936</u>
pH         Temp °C         Pre Cal         Post Cal         Post Cal Range         mv         S0         pH         Temp °C         Reading           Buffer 7	Buffer 7 Buffer 10 Buffer 4 <b>Conductivity</b> Buffer 1413 <b>ORP</b> 231 mV @ 25C	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Post Cal Range       mv       50 $6.95-7.05$ $-20.4$ $0 +/-50$ $9.95-10.05$ $-197.9$ $-180 +/-50$ $4.95-5.05$ $158.9$ $180 +/-50$ $\pm 10\%$ Buffer 5000 $50/5$ $\pm 10 \text{ mV}$ $Check$ $5.96$ $\pm 10 \text{ mV}$ $Check$ $5.96$ Barometric Pressure (mm Hg) $Barometric Pressure (mm Hg)$	$\begin{array}{c c} \mathbf{pH} & \text{Temp °C} & \text{Reading} \\ \\ \text{Buffer 7} & 12,75 & 7.02 \\ \hline \end{array}$
DO Barometric Pressure (mm Hg)	pH Buffer 7 Buffer 10 Buffer 4 Conductivity Buffer 1413 ORP		Post Cal Range       mv       50         6.95-7.05       0 +/- 50         9.95-10.05       -180 +/- 50         4.95-5.05       180 +/- 50         L       Check         ±10%       Buffer 5000	pH Temp °C Reading Buffer 7

# **MVTL Calibration Worksheet**

	MVTL	. Calibration Worksheet	Λ
Site: MDU Le	wis and Clark	Technician:	Darren Nieswang
Instrument (Circle One):	#1 650 MDS 08F100203	#2 650 MDS 04H14736	#3.556 MPS 12E102056
Date: 16 Marda	Pre Site Calibr		Post Site Check Time: 1905
pH Buffer 7 Buffer 10 Buffer 4 Conductivity Buffer 1413 ORP 231 mV @ 25C	Temp °C       Pre Cal       Post Cal $[$\frac{9}{7}$, 0]$ $6.99$ $7.00$ $19.07$ $10.00$ $10.00$ $19.07$ $1416$ $1413$ $7.33$ $225.5$ $231.0$	$\begin{array}{c ccccc} & & & & & & & & & & & & & & & & &$	pHTemp °CReadingBuffer 7 $\boxed{10, 2, 7}$ $\boxed{7, 03}$ ConductivityBuffer 5000 $\boxed{13, 56}$ $\boxed{77, 5039}$
DO BAS;te	16,79 10,87 9,25	Barometric Pressure (mm Hg) mg/L 7/8,4	
pH Buffer 7 Buffer 10 Buffer 4 Conductivity Buffer 1413 ORP	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Post Cal Range       mv       mv       Range +/- $6.95-7.05^{-7/3.3}$ $-145-5-76-76-76-76-76-76-76-76-76-76-76-76-76-$	Time: $9997$ pH Temp °C ReadingBuffer 7 $291$ F.02ConductivityBuffer 5000 $13_{A}02$ 5072
231 mV @ 25C DO	5.66 457.5 231.3 18.82 7.90 8:72	±10 mV Barometric Pressure (mm Hg) mg/L	

### **Claudette Carroll**

From: Sent: To: Subject: Jeremy Meyer Friday, April 10, 2020 9:35 AM Bismarck Customer Service; Claudette Carroll FW: Privileged & Confidential: L&C lab data from MVTL

See Todd's email below for reporting for L&C.

Thanks,

# Jeremy Meyer

Bismarck Field Services Manager Cell (701) 391-4900



Minnesota Valley Testing Labs 2616 E. Broadway Ave. Bismarck, ND 58501

I hope you are pleased with the timeliness and accuracy of our services. If you have any comments to recognize excellence or feedback that will help improve our services, please contact Jane Knaak via email at <u>iknaak@mvtl.com</u>.

From: Peterson, Todd <Todd.Peterson@mdu.com> Sent: Thursday, April 9, 2020 2:55 PM To: Jeremy Meyer <jmeyer@mvtl.com> Subject: FW: Privileged & Confidential: L&C lab data from MVTL

Hi Jeremy,

I appreciate the quick turn around with the Lewis & Clark groundwater samples from March 23. Barr Engineering would like the report for 202082-0623 (CCR wells) to exclude the extra analyses for

- o (Major lons
- o Total Suspended Solids (TSS)
- o Nitrate-Nitrite as N
- o Dissolved Metals

This is good data to have, but not necessary for the CCR requirements. I apologize if this wasn't clear in the sampling plan overview I provided and I will make a reminder note for the next sampling event. Please go ahead and amend the 0623 report and resend to me and copy Barr Engineering.

Thank you,

Todd Peterson, CHMM Environmental Specialist III Montana-Dakota Utilities 400 North 4th St Bismarck, ND 58501 701-222-7835 office 701-425-2427 cell 701-222-7845 fax

#### Tell me and I forget, teach me and I may remember, involve me and I learn.

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From: Jeremy J. Gacnik <<u>JGacnik@barr.com</u>> Sent: Wednesday, April 8, 2020 5:43 PM To: Peterson, Todd <<u>Todd.Peterson@mdu.com</u>> Cc: Paul T. Swenson <<u>PSwenson@barr.com</u>>; Denise M. Levitan <<u>DLevitan@barr.com</u>>; Terri A. Olson <<u>TOlson@barr.com</u>>; Krebsbach, Abbie <<u>Abbie.Krebsbach@mdu.com</u>> Subject: Privileged & Confidential: L&C lab data from MVTL

# \*\* WARNING: EXTERNAL SENDER. NEVER click links or open attachments without positive sender verification of purpose. DO NOT provide your user ID or password on sites or forms linked from this email. \*\*

#### Hi Todd,

We have received three analytical reports from MVTL for Lewis & Clark, as detailed below:

- 202082-0623 (CCR wells)
- 202082-0624 (MW121)
- 202082-0626 (SP and YR samples for lithium and selenium)

The data received in the CCR Well and MW-121 reports contain analysis that was not requested, including:

- Major lons
- Total Suspended Solids (TSS)
- Nitrate-Nitrite as N
- Dissolved Metals

While having this additional data in the MW-121 should not be an issue, we would want it removed from the CCR Well Report. The CCR report will be publicly accessible and we want to limit the data presented to only what is needed. Can you direct MVTL to re-issue the CCR Well Report (202082-0623) with only the CCR parameters, removing the extra analysis?

Let us know if you have any questions.

Thanks,

Jeremy J. Gacnik, PE

Senior Civil Engineer Denver, CO office: 952.842.3676 JGacnik@barr.com www.barr.com

#### resourceful, naturally.



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MVTL

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1126 N. Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890 2616 E. Broadway Ave. ~ Bismarck, ND 58502 ~ 800-279-6885 ~ Fax 701-258-9724 1201 Lincoln Highway ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885 www.mvtl.com

MEMBER ACIL

#### Page: 1 of 2

## **Quality Control Report**

Lab IDs: 20-W478 to 20-W4	86	Pr	oject: MI	DU Lewis	& Clark		Vork Or	der: 202	1		y						1
Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Antimony - Dissolved mg/l	0.1000 0.1000	106 106	80-120 80-120	0.100 0.100	20-W478 20-W485	0.0030 < 0.002	0.1074 0.1035	104 104	75-125 75-125	0.1074 0.1035	0.1059 0.1068	103 107	1.4 3.1	20 20	-	-	< 0.001 < 0.001
Arsenic - Dissolved mg/l	0.1000 0.1000	102 104	80-120 80-120	0.100 0.100	20-W478 20-W485	< 0.002 < 0.005	0.1026 0.1015	103 102	75-125 75-125	0.1026 0.1015	0.1028 0.1072	103 107	0.2 5.5	20 20	-	-	< 0.002 < 0.005
Barium - Dissolved mg/l	0.1000 0.1000	108 104	80-120 80-120	0.100 0.100	20-W478 20-W485	0.0206 0.0229	0.1219 0.1160	101 93	75-125 75-125	0.1219 0.1160	0.1164 0.1205	96 98	4.6 3.8	20 20	-	-	< 0.002 < 0.002
Beryllium - Dissolved mg/l	0.1000 0.1000	111 99	80-120 80-120	0.100 0.100	20-W478 20-W485	< 0.0005 < 0.0005	0.1088 0.0959	109 96	75-125 75-125	0.1088 0.0959 0.0973	0.1044 0.0960 0.1002	104 96 -	4.1 0.1 2.9	20 20 20	-	- - -	< 0.0005 0.0023
Boron - Dissolved mg/l	0.40	102	80-120	0.400	20-W482	0.26	0.63	92	75-125	0.63	0.63	92	0.0	20		-	< 0.1 < 0.1
Cadmium - Dissolved mg/l	0.1000 0.1000	104 106	80-120 80-120	0.100 0.100	20-W478 20-W485	< 0.0005 < 0.0005	0.0971 0.0986	97 99	75-125 75-125	0.0971 0.0986	0.0994 0.0999	99 100	2.3 1.3	20 20	-	-	< 0.0005 < 0.0005
Calcium - Dissolved mg/l	20.0	108	80-120	500	20W483q	186	685	100	75-125	685	690	101	0.7	20	-	-	< 1
Chromium - Dissolved mg/l	0.1000 0.1000	106 105	80-120 80-120	0.100 0.100	20-W478 20-W485	< 0.002 < 0.002	0.0992 0.0981	99 98	75-125 75-125	0.0992 0.0981	0.0980 0.1020	98 102	1.2 3.9	20 20	-	-	< 0.002 < 0.002
Cobalt - Dissolved mg/l	0.1000 0.1000	107 105	80-120 80-120	0.100 0.100	20-W478 20-W485	< 0.002 < 0.002	0.0971 0.0960	97 96	75-125 75-125	0.0971 0.0960	0.0956 0.0990	96 99	1.6 3.1	20 20	-	-	< 0.002 < 0.002
Lead - Dissolved mg/l	0.1000 0.1000	109 105	80-120 80-120	0.100 0.100	20-W478 20-W485	< 0.0005 < 0.0005	0.1004 0.0961	100 96	75-125 75-125	0.1004 0.0961	0.0959 0.0987	96 99	4.6 2.7	20 20	-		< 0.0005 < 0.0005
Lithium - Dissolved mg/l	0.400	107	80-120	0.400	20-W482	0.040	0.441	100	75-125	0.441	0.432	98	2.1	20	-	-	< 0.02
Magnesium - Dissolved mg/l	20.0	108	80-120	500	20W483q	540	980	88	75-125	980	980	88	0.0	20	-	-	< 1
Magnesium - Total mg/l	20.0 20.0	109 106	80-120 80-120	500	20W483q	540	1000	92	75-125	1000	1020	96	2.0	20			<1 <1 <1
Mercury - Dissolved mg/l	0.0020	105	85-115	0.002	20-W478	< 0.0002	0.0017	85	70-130	0.0017	0.0018	90	5.7	20	-	-	< 0.0002
Molybdenum - Dissolved mg/l	0.1000 0.1000	108 109	80-120 80-120	0.100 0.100	20-W478 20-W485	0.0172 0.0237	0.1160 0.1225	99 99	75-125 75-125	0.1160 0.1225	0.1145 0.1282	97 104	1.3 4.5	20 20	-	-	< 0.002 < 0.002

MVTL

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MEMBER ACIL

#### Page: 2 of 2

## **Quality Control Report**

Lab IDs: 20-W478 to 20-W4	486	Pi	oject: MI	DU Lewis	& Clark		Work On	der: 202	082-0623	3							
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
Nitrate-Nitrite as N mg/l	0.50	104	90-110	1.00	20-W479	< 0.1	1.06	106	90-110	1.06	1.05	105	0.9	20		·	< 0.1
Potassium - Dissolved mg/l	10.0	101	80-120	100	20W483q	10.0	104	94	75-125	104	104	94	0.0	20	1	5	<1
Potassium - Total mg/l	10.0 10.0	103 98	80-120 80-120	100	20W483q	10,5	107	96	75-125	107	109	98	1.9	20	2 - 1 - 1	12.4	<1 <1 <1
Selenium - Dissolved mg/l	0.1000 0.1000	109 103	80-120 80-120	0.100 0.100	20-W478 20-W485	0.0531 0.0670	0.1705 0.1694	117 102	75-125 75-125	0.1705 0.1694	0.1619 0.1766	109 110	5.2 4.2	20 20	-	2	< 0.005 < 0.005
Sodium - Dissolved mg/l	20.0	106	80-120	500	20W483q	136	600	93	75-125	600	615	96	2.5	20	(***)	24	<1
Sodium - Total mg/l	20.0 20.0	108 106	80-120 80-120	500	20W483q	142	635	99	75-125	635	635	99	0.0	20	-	111	<1 <1 <1
Thallium - Dissolved mg/l	0.1000 0.1000	109 105	80-120 80-120	0.100 0.100	20-W478 20-W485	< 0.0005 < 0.0005	0.1005 0.0942	100 94	75-125 75-125	0.1005 0.0942	0.0948 0.0978	95 98	5.8 3.8	20 20	5	-	< 0.0005 < 0.0005
Total Alkalinity mg/l CaCO3	410	94	90-110	410 410	20-D792 20-W487	444 494	803 869	88 91	80-120 80-120	803 869	802 871	87 92	0.1 0.2	20 20	94	80-120	< 20 < 20
Total Suspended Solids mg/l	•••	• • •			-				1.1.1	14 36 7	13 36 7		7.4 0.0 0.0	20 20 0			<2 <2

Samples were received in good condition on 18 Mar 2020 at 1638.

Temperature upon receipt at the Bismarck laboratory was 0.6°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.

For some analytes, the reported results were elevated due to instrument performance at the lower limit of quantitation (LLOQ).

C. Cantlo 14 Apr 2020

Approved by:



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Page:

Report Date: 13 Apr 20 Lab Number: 20-W504 Todd Peterson Work Order #: 82-0636 Montana-Dakota Utilities Co. Account #: 002800 400 N 4th St Date Sampled: 18 Mar 20 Bismarck ND 58501 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services Project Name: MDU Lewis & Clark PO #: 180534 OP Sample Description: Dup 1 Temp at Receipt: 0.6C

Event and Year: March 2020

Date Method Method As Received Analyst Reference Analyzed Result RL 7 Apr 20 OL See Attached Report Radium 226 OL 2 Apr 20 See Attached Report Radium 228

OL = Analysis performed by an Outside Laboratory.

Approved by:

Aur 2020 Claudite K. Cantep

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

= Due to sample quantity

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

Project Name: MDU Lewis & Clark

Sample Description: Field Blank (FB)

Event and Year: March 2020

Report Date: 13 Apr 20 Lab Number: 20-W505 Work Order #: 82-0636 Account #: 002800 Date Sampled: 18 Mar 20 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 0.6C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Radium 226	See Attached Report			7 Apr 20	OL
Radium 228	See Attached Report			2 Apr 20	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

613170 Claudite K Canto

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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1 of 1 Page:

Report Date: 13 Apr 20 Lab Number: 20-W506 Work Order #: 82-0636 Account #: 002800 Date Sampled: 18 Mar 20 9:31 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 0.6C

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

Project Name: MDU Lewis & Clark

Sample Description: MW103

Event and Year: March 2020

	As Recei Result	ived	Method RL	Method Reference	Date Analyzed		Analyst
pH - Field Temperature - Field Conductivity - Field Radium 226 Radium 228		units Degrees C umhos/cm ached Report ached Report	NA NA 1	SM 4500 H+ B SM 2550B EPA 120.1	18 Mar 20 18 Mar 20 18 Mar 20 7 Apr 20 2 Apr 20	9:31 9:31 9:31	DJN DJN DJN OL OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

Claudette K Canil. for Xide

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

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Page: 1 of 1

Todd Peterson Montana-Dakota Utilities Co. 400 N 4th St Bismarck ND 58501 Report Date: 13 Apr 20 Lab Number: 20-W507 Work Order #: 82-0636 Account #: 002800 Date Sampled: 16 Mar 20 16:29 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark

Sample Description: MW110

Event and Year: March 2020

PO #: 180534 OP

Temp at Receipt: 0.6C

	As Rece: Result	ived	Method RL	Method Reference	Date Analyzed	Analyst
pH - Field Temperature - Field Conductivity - Field Radium 226 Radium 228		units Degrees C umhos/cm ached Report ached Report	NA NA 1	SM 4500 H+ B SM 2550B EPA 120.1	16 Mar 20 16:29 16 Mar 20 16:29 16 Mar 20 16:29 7 Apr 20 2 Apr 20	DJN

OL = Analysis performed by an Outside Laboratory.

Approved by:

or 20 20 Claudette K. Cantle

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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Todd Peterson

400 N 4th St

Sample Description: MW119

Event and Year: March 2020

Bismarck ND 58501

Project Name: MDU Lewis & Clark

Montana-Dakota Utilities Co.

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Page: 1 of 1

Report Date: 13 Apr 20 Lab Number: 20-W508 Work Order #: 82-0636 Account #: 002800 Date Sampled: 16 Mar 20 18:57 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 0.6C

	As Rece: Result	ived	Method RL	Method Reference	Date Analyzed	Analyst
pH - Field Temperature - Field Conductivity - Field Radium 226 Radium 228		units Degrees C umhos/cm ached Report ached Report	NA NA 1	SM 4500 H+ B SM 2550B EPA 120,1	16 Mar 20 18:57 16 Mar 20 18:57 16 Mar 20 18:57 7 Apr 20 2 Apr 20	DJN DJN DJN OL OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

200 Claudette K. Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

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

Project Name: MDU Lewis & Clark

Sample Description: MW111

Event and Year: March 2020

1 of 1 Page:

Report Date: 13 Apr 20 Lab Number: 20-W509 Work Order #: 82-0636 Account #: 002800 Date Sampled: 17 Mar 20 13:09 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 0.6C

	As Rece: Result	ived	Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.36	units	NA	SM 4500 H+ B	17 Mar 20 13:09	DJN
Temperature - Field	4.72	Degrees C	NA	SM 2550B	17 Mar 20 13:09	DJN
Conductivity - Field	4077	umhos/cm	1	EPA 120.1	17 Mar 20 13:09	DJN
Radium 226		ached Report			7 Apr 20	OL
Radium 228		ached Report			2 Apr 20	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

r 2020 Clauditte K. Cantle

60

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

# = Due to concentration of other analytes
+ = Due to internal standard response

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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Montana-Dakota Utilities Co.

58501



Page: 1 of 1

Report Date: 13 Apr 20 Lab Number: 20-W510 Work Order #: 82-0636 Account #: 002800 Date Sampled: 17 Mar 20 10:30 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

PO #: 180534 OP

Sample Description: MW117

Project Name: MDU Lewis & Clark

Todd Peterson

400 N 4th St

Bismarck ND

Event and Year: March 2020

Temp at Receipt: 0.6C

	As Rece Result	ived	Method Method RL Reference		Date Analyzed	Analyst	
pH - Field	7.36	units	NA	SM 4500 H+ B	17 Mar 20	10:30	DJN
Temperature - Field	0.80	Degrees C	NA	SM 2550B	17 Mar 20	10:30	DJN
Conductivity - Field	8177	umhos/cm	1	EPA 120.1	17 Mar 20	10:30	DJN
Radium 226	15.75.12 Co	ached Report			7 Apr 20		OL
Radium 228		ached Report			2 Apr 20		OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

14 Avr 2020 Claudette K. Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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Page: 1 of 1

Report Date: 13 Apr 20 Lab Number: 20-W511 Work Order #: 82-0636 Account #: 002800 Date Sampled: 17 Mar 20 19:01 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark

Montana-Dakota Utilities Co.

58501

Sample Description: MW118

Todd Peterson

400 N 4th St

Bismarck ND

Event and Year: March 2020

Temp at Receipt: 0.6C

PO #: 180534 OP

	As Rece: Result	lved	Method RL	Method Reference	Dat Ana	e lyzed		Analyst
pH - Field	7.51	units	NA	SM 4500 H+ B	17	Mar 2	0 19:01	DJN
Temperature - Field	4.22	Degrees C	NA	SM 2550B	17	Mar 2	0 19:01	DJN
Conductivity - Field	2138	umhos/cm	1	EPA 120.1	17	Mar 2	0 19:01	DJN
	enter e	ached Report			7	Apr 2	0	OL
Radium 226 Radium 228		ached Report				Apr 2		OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

14 Apr 2020 Clauditte K. Cantop

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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Report Date: 13 Apr 20 Lab Number: 20-W512 Work Order #: 82-0636 Account #: 002800 Date Sampled: 17 Mar 20 8:59 Date Received: 18 Mar 20 16:38 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 0.6C

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

Project Name: MDU Lewis & Clark

Sample Description: MW120

Event and Year: March 2020

	As Rece Result	ived	Method Method RL Reference		Date Analyzed		Analyst	
pH - Field	6.92	units	NA	SM 4500 H+ B	17 Mar 2	0 8:59	DJN	
Temperature - Field	1.23	Degrees C	NA	SM 2550B	17 Mar 2	0 8:59	DJN	
Conductivity - Field	6556	umhos/cm	1	EPA 120.1	17 Mar 2	0 8:59	DJN	
Radium 226	See Att	ached Report			8 Apr 2	0	OL	
Radium 228		ached Report			3 Apr 2	0	OL	

OL = Analysis performed by an Outside Laboratory.

Approved by:

CC Apr 200 Claudette K. Cantep

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

# = Due to concentration of other analytes
+ = Due to internal standard response CERTIFICATION: ND # ND-00016

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## ANALYTICAL SUMMARY REPORT

April 13, 2020

Minnesota Valle	y Testing Laboratories		
1126 N Front St			
New Ulm, MN 5	6073-1176		
Work Order:	C20030769	Quote ID:	C5783
Project Name:	202082-0636		

202002-0030

Energy Laboratories, Inc. Casper WY received the following 9 samples for Minnesota Valley Testing Laboratories on 3/25/2020 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C20030769-001	20-W504; Dup 1	03/18/20 0:00	03/25/20	Groundwater	pH Check for Nitric Radiochem FIRST Radium 226, Total Radium 228, Total
C20030769-002	20-W505; Field Blank (FB)	03/18/20 0:00	03/25/20	Groundwater	Same As Above
C20030769-003	20-W506; MW103	03/18/20 9:31	03/25/20	Groundwater	Same As Above
C20030769-004	20-W507; MW110	03/16/20 16:29	03/25/20	Groundwater	Same As Above
C20030769-005	20-W508; MW119	03/16/20 18:57	03/25/20	Groundwater	Same As Above
C20030769-006	20-W509; MW111	03/17/20 13:09	03/25/20	Groundwater	Same As Above
C20030769-007	20-W510; MW117	03/17/20 10:30	03/25/20	Groundwater	Same As Above
C20030769-008	20-W511; MW118	03/17/20 19:01	03/25/20	Groundwater	Same As Above
C20030769-009	20-W512; MW120	03/17/20 8:59	03/25/20	Groundwater	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 2393 Salt Creek Hwy., Casper, WY 82601, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager .

Report Approved By:

Kasey U.

Digitally signed by Kasey Vidick Date: 2020.04.13 12:47:45 -06:00



Prepared by Casper, WY Branch

Client:Minnesota Valley Testing LaboratoriesProject:202082-0636Lab ID:C20030769-001Client Sample ID:20-W504; Dup 1

Report Date: 04/13/20 Collection Date: 03/18/20 DateReceived: 03/25/20 Matrix: Groundwater

	MCL/					
Analyses	Result Units	Qualifiers	RL	QCL Method	Analysis Date / By	
RADIONUCLIDES, TOTAL						
Radium 226	0.6 pCi/L			E903.0	04/07/20 13:30 / trs	
Radium 226 precision (±)	0.2 pCi/L			E903.0	04/07/20 13:30 / trs	
Radium 226 MDC	0.2 pCi/L			E903.0	04/07/20 13:30 / trs	
Radium 228	0.4 pCi/L	U		RA-05	04/02/20 11:52 / plj	
Radium 228 precision (±)	1.0 pCi/L			RA-05	04/02/20 11:52 / plj	
Radium 228 MDC	1.7 pCi/L			RA-05	04/02/20 11:52 / plj	

Report	RL - Analyte Reporting Limit
Definitions:	QCL - Quality Control Limit
	U - Not detected at Minimum Detectable Concentration (MDC)





Prepared by Casper, WY Branch

Client:Minnesota Valley Testing LaboratoriesProject:202082-0636Lab ID:C20030769-002Client Sample ID:20-W505; Field Blank (FB)

Report Date: 04/13/20 Collection Date: 03/18/20 DateReceived: 03/25/20 Matrix: Groundwater

	MCL/				
Analyses	Result Units	Qualifiers	RL	QCL Method	Analysis Date / By
RADIONUCLIDES, TOTAL					
Radium 226	0.2 pCi/L	U		E903.0	04/07/20 13:30 / trs
Radium 226 precision (±)	0.2 pCi/L			E903.0	04/07/20 13:30 / trs
Radium 226 MDC	0.2 pCi/L			E903.0	04/07/20 13:30 / trs
Radium 228	1.3 pCi/L	U		RA-05	04/02/20 11:52 / plj
Radium 228 precision (±)	1 pCi/L			RA-05	04/02/20 11:52 / plj
Radium 228 MDC	1.8 pCi/L			RA-05	04/02/20 11:52 / plj

Report	RL - Analyte Reporting Limit
Definitions:	QCL - Quality Control Limit
	U - Not detected at Minimum Detectable Concentration (MDC)





Prepared by Casper, WY Branch

 Client:
 Minnesota Valley Testing Laboratories

 Project:
 202082-0636

 Lab ID:
 C20030769-003

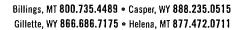
 Client Sample ID:
 20-W506; MW103

Report Date: 04/13/20 Collection Date: 03/18/20 09:31 DateReceived: 03/25/20 Matrix: Groundwater

	MCL/					
Analyses	Result Units	Qualifiers	RL	QCL Method	Analysis Date / By	
RADIONUCLIDES, TOTAL						
Radium 226	0.5 pCi/L			E903.0	04/07/20 15:50 / trs	
Radium 226 precision (±)	0.2 pCi/L			E903.0	04/07/20 15:50 / trs	
Radium 226 MDC	0.2 pCi/L			E903.0	04/07/20 15:50 / trs	
Radium 228	0.5 pCi/L	U		RA-05	04/02/20 13:25 / plj	
Radium 228 precision (±)	1.1 pCi/L			RA-05	04/02/20 13:25 / plj	
Radium 228 MDC	1.9 pCi/L			RA-05	04/02/20 13:25 / plj	

Report Definitions:	RL - Analyte Reporting Limit
Definitions.	QCL - Quality Control Limit U - Not detected at Minimum Detectable Concentration (MDC)





Prepared by Casper, WY Branch

Client:Minnesota Valley Testing LaboratoriesProject:202082-0636Lab ID:C20030769-004Client Sample ID:20-W507; MW110

 Report Date:
 04/13/20

 Collection Date:
 03/16/20 16:29

 DateReceived:
 03/25/20

 Matrix:
 Groundwater

	MCL/					
Analyses	Result Units	Qualifiers	RL	QCL Method	Analysis Date / By	
RADIONUCLIDES, TOTAL						
Radium 226	0.08 pCi/L	U		E903.0	04/07/20 15:50 / trs	
Radium 226 precision (±)	0.1 pCi/L			E903.0	04/07/20 15:50 / trs	
Radium 226 MDC	0.2 pCi/L			E903.0	04/07/20 15:50 / trs	
Radium 228	-0.4 pCi/L	U		RA-05	04/02/20 13:25 / plj	
Radium 228 precision (±)	1.0 pCi/L			RA-05	04/02/20 13:25 / plj	
Radium 228 MDC	1.7 pCi/L			RA-05	04/02/20 13:25 / plj	

Report	RL - Analyte Reporting Limit
Definitions:	QCL - Quality Control Limit
	U - Not detected at Minimum Detectable Concentration (MDC)



Prepared by Casper, WY Branch

Client:Minnesota Valley Testing LaboratoriesProject:202082-0636Lab ID:C20030769-005Client Sample ID:20-W508; MW119

 Report Date:
 04/13/20

 Collection Date:
 03/16/20 18:57

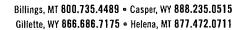
 DateReceived:
 03/25/20

 Matrix:
 Groundwater

Analyses	Result Units	Qualifiers	RL	QCL Method	Analysis Date / By
RADIONUCLIDES, TOTAL					
Radium 226	0.2 pCi/L			E903.0	04/07/20 15:50 / trs
Radium 226 precision (±)	0.1 pCi/L			E903.0	04/07/20 15:50 / trs
Radium 226 MDC	0.2 pCi/L			E903.0	04/07/20 15:50 / trs
Radium 228	-0.4 pCi/L	U		RA-05	04/02/20 13:25 / plj
Radium 228 precision (±)	1.1 pCi/L			RA-05	04/02/20 13:25 / plj
Radium 228 MDC	1.9 pCi/L			RA-05	04/02/20 13:25 / plj

Report	RL - Analyte Reporting Limit
Definitions:	QCL - Quality Control Limit
	U - Not detected at Minimum Detectable Concentration (MDC)





Prepared by Casper, WY Branch

 Client:
 Minnesota Valley Testing Laboratories

 Project:
 202082-0636

 Lab ID:
 C20030769-006

 Client Sample ID:
 20-W509; MW111

Report Date: 04/13/20 Collection Date: 03/17/20 13:09 DateReceived: 03/25/20 Matrix: Groundwater

Analyses	Result Units	Qualifiers	RL	MCL/ QCL Method	Analysis Date / By
RADIONUCLIDES, TOTAL					
Radium 226	0.2 pCi/L			E903.0	04/07/20 15:50 / trs
Radium 226 precision (±)	0.1 pCi/L			E903.0	04/07/20 15:50 / trs
Radium 226 MDC	0.2 pCi/L			E903.0	04/07/20 15:50 / trs
Radium 228	-0.3 pCi/L	U		RA-05	04/02/20 13:25 / plj
Radium 228 precision (±)	1.0 pCi/L			RA-05	04/02/20 13:25 / plj
Radium 228 MDC	1.7 pCi/L			RA-05	04/02/20 13:25 / plj

Report	RL - Analyte Reporting Limit
Definitions:	QCL - Quality Control Limit
	U - Not detected at Minimum Detectable Concentration (MDC)





Prepared by Casper, WY Branch

 Client:
 Minnesota Valley Testing Laboratories

 Project:
 202082-0636

 Lab ID:
 C20030769-007

 Client Sample ID:
 20-W510; MW117

Report Date: 04/13/20 Collection Date: 03/17/20 10:30 DateReceived: 03/25/20 Matrix: Groundwater

		o 11/1	-		
Analyses	Result Units	Qualifiers	RL	QCL Method	Analysis Date / By
RADIONUCLIDES, TOTAL					
Radium 226	0.6 pCi/L			E903.0	04/07/20 15:50 / trs
Radium 226 precision (±)	0.2 pCi/L			E903.0	04/07/20 15:50 / trs
Radium 226 MDC	0.2 pCi/L			E903.0	04/07/20 15:50 / trs
Radium 228	-0.2 pCi/L	U		RA-05	04/02/20 13:25 / plj
Radium 228 precision (±)	1.1 pCi/L			RA-05	04/02/20 13:25 / plj
Radium 228 MDC	1.8 pCi/L			RA-05	04/02/20 13:25 / plj

Report	RL - Analyte Reporting Limit
Definitions:	QCL - Quality Control Limit
	U - Not detected at Minimum Detectable Concentration (MDC)



Prepared by Casper, WY Branch

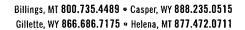
Client:Minnesota Valley Testing LaboratoriesProject:202082-0636Lab ID:C20030769-008Client Sample ID:20-W511; MW118

Report Date: 04/13/20 Collection Date: 03/17/20 19:01 DateReceived: 03/25/20 Matrix: Groundwater

	MCL/						
Analyses	Result Units	Qualifiers	RL	QCL Method	Analysis Date / By		
RADIONUCLIDES, TOTAL							
Radium 226	0.05 pCi/L	U		E903.0	04/07/20 15:50 / trs		
Radium 226 precision (±)	0.1 pCi/L			E903.0	04/07/20 15:50 / trs		
Radium 226 MDC	0.2 pCi/L			E903.0	04/07/20 15:50 / trs		
Radium 228	0.08 pCi/L	U		RA-05	04/02/20 13:25 / plj		
Radium 228 precision (±)	1.1 pCi/L			RA-05	04/02/20 13:25 / plj		
Radium 228 MDC	1.8 pCi/L			RA-05	04/02/20 13:25 / plj		

Report	RL - Analyte Reporting Limit
Definitions:	QCL - Quality Control Limit
	U - Not detected at Minimum Detectable Concentration (MDC)





Prepared by Casper, WY Branch

 Client:
 Minnesota Valley Testing Laboratories

 Project:
 202082-0636

 Lab ID:
 C20030769-009

 Client Sample ID:
 20-W512; MW120

 Report Date:
 04/13/20

 Collection Date:
 03/17/20 08:59

 DateReceived:
 03/25/20

 Matrix:
 Groundwater

Analyses	Result Units	Qualifiers	RL	MCL/ QCL Method	Analysis Date / By
		quannoro			,
RADIONUCLIDES, TOTAL					
Radium 226	0.2 pCi/L			E903.0	04/08/20 15:13 / plj
Radium 226 precision (±)	0.1 pCi/L			E903.0	04/08/20 15:13 / plj
Radium 226 MDC	0.2 pCi/L			E903.0	04/08/20 15:13 / plj
Radium 228	2.0 pCi/L			RA-05	04/03/20 13:24 / plj
Radium 228 precision (±)	0.7 pCi/L			RA-05	04/03/20 13:24 / plj
Radium 228 MDC	0.9 pCi/L			RA-05	04/03/20 13:24 / plj



Billings, MT 800.735.4489 • Casper, WY 888.235.0515 Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

## **QA/QC Summary Report**

Prepared by Casper, WY Branch

Client: Minnesota Valley Te	esting Laborato	ries W	ork Order: C2003	Report Date: 04/10/20				
Analyte	Count Re	sult Units	RL %REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E903.0							Batch: RA	226-959
Lab ID: LCS-RA226-9599	3 Laborato	ry Control Sample		Run: G542	M_200330B		04/07	/20 13:29
Radium 226		11 pCi/L	106	80	120			
Radium 226 precision (±)		2.1 pCi/L						
Radium 226 MDC	(	0.20 pCi/L						
Lab ID: MB-RA226-9599	3 Method B	Blank		Run: G542	M_200330B		04/07	/20 13:29
Radium 226		0.2 pCi/L						U
Radium 226 precision (±)		0.1 pCi/L						
Radium 226 MDC		0.2 pCi/L						
Lab ID: C20030754-001HDU	P 3 Sample	Duplicate		Run: G542	M_200330B		04/07	/20 13:30
Radium 226		19 pCi/L				11	20	
Radium 226 precision (±)		3.7 pCi/L						
Radium 226 MDC	(	0.20 pCi/L						
Method: E903.0							Batch: RA	226-9602
Lab ID: LCS-RA226-9602	3 Laborato	ry Control Sample		Run: G542	M_200331A		04/08	/20 15:13
Radium 226		11 pCi/L	105	80	120			
Radium 226 precision (±)		2.1 pCi/L						
Radium 226 MDC	l l	0.20 pCi/L						
Lab ID: MB-RA226-9602	3 Method I	Blank		Run: G542	M_200331A		04/08	/20 15:13
Radium 226		0.1 pCi/L						U
Radium 226 precision (±)		0.1 pCi/L						
Radium 226 MDC		0.2 pCi/L						
Lab ID: C20030769-009ADU	P 3 Sample	Duplicate		Run: G542	M_200331A		04/08	/20 15:13
Radium 226	0	.093 pCi/L				91	20	UR
Radium 226 precision (±)	l l	0.12 pCi/L						
Radium 226 MDC		0.18 pCi/L						

Qualifiers:

RL - Analyte Reporting Limit

R - Relative Percent Difference (RPD) exceeds advisory limit

U - Not detected at Minimum Detectable Concentration (MDC)



# **QA/QC Summary Report**

Prepared by Casper, WY Branch

Client: I	Minnesota Valley Te	esting Laboratories			Work Order:	C2003	0769	Report Date: 04/10/20				
Analyte		Coun	t Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual	
Method:	RA-05									Batch: RA	228-622	
Lab ID:	LCS-228-RA226-959	<b>9</b> 3	Laboratory Cor	ntrol Sample	Э		Run: TENN	ELEC-3_200330	A	04/02	/20 11:52	
Radium 22	8		7.9	pCi/L		85	80	120				
Radium 22	8 precision (±)		1.8	pCi/L								
Radium 22	8 MDC		1.7	pCi/L								
Lab ID:	MB-RA226-9599	3	Method Blank				Run: TENN	ELEC-3_200330	A	04/02	/20 11:52	
Radium 22	.8		0.4	pCi/L							U	
Radium 22	8 precision (±)		1	pCi/L								
Radium 22	8 MDC		2	pCi/L								
Lab ID:	C20030754-001HDU	<b>&gt;</b> 3	Sample Duplica	ate			Run: TENN	ELEC-3_200330	A	04/02	/20 11:52	
Radium 22	8		0.21	pCi/L					470	20	UR	
Radium 22	8 precision (±)		0.98	pCi/L								
Radium 22	8 MDC		1.6	pCi/L								
- Duplicate	RPD is outside of the acce	eptance	range for this ana	lysis. Howev	ver, the RER is less	than the	limit of 2.0. R	ER is 0.23.				
Method:	RA-05									Batch: RA	228-622	
Lab ID:	LCS-228-RA226-960	<b>2</b> 3	Laboratory Cor	ntrol Sample	e		Run: TENN	ELEC-3_200331	A	04/03/	/20 13:24	
Radium 22	8		7.9	pCi/L		85	80	120				
Radium 22	8 precision (±)		1.6	pCi/L								
Radium 22	8 MDC		1.0	pCi/L								
Lab ID:	MB-RA226-9602	3	Method Blank				Run: TENN	ELEC-3_200331	A	04/03	/20 13:24	
Radium 22	8		0.5	pCi/L							U	
Radium 22	8 precision (±)		0.6	pCi/L						,		
Radium 22	8 MDC		1	pCi/L								
Lab ID:	C20030769-009ADU	<b>3</b>	Sample Duplica	ate			Run: TENN	ELEC-3_200331	A	04/03	/20 13:24	
Radium 22	.8		1.8	pCi/L					10	20		
Radium 22	8 precision (±)		0.79	pCi/L								
	8 MDC		0.91	pCi/L								

#### Qualifiers:

RL - Analyte Reporting Limit

R - Relative Percent Difference (RPD) exceeds advisory limit

U - Not detected at Minimum Detectable Concentration (MDC)

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	Com /
LABORATORIES	Den .

Trust our People. Trust our Data. www.energylab.com

# Work Order Receipt Checklist

## Minnesota Valley Testing Laboratories

### C20030769

Login completed by:	Dorian Quis	Date Received: 3/25/2020								
Reviewed by:	Misty Stephens	Received by: adw								
Reviewed Date:	3/26/2020	Carrier name: Ground								
Shipping container/cooler in	good condition?	Yes 🗹	No 🗌	Not Present						
Custody seals intact on all s	hipping container(s)/cooler(s)?	Yes	No 🗌	Not Present 🗸						
Custody seals intact on all s	sample bottles?	Yes	No 🗌	Not Present						
Chain of custody present?		Yes 🗹	No 🗌							
Chain of custody signed wh	en relinquished and received?	Yes 🗸	No 🗌							
Chain of custody agrees with sample labels?		Yes 🗹	No 🗌							
Samples in proper container/bottle?		Yes 🗸	No 🗌							
Sample containers intact?		Yes 🗹	No 🗌							
Sufficient sample volume for indicated test?		Yes 🗸	No 🗌							
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res CI, Sulfite, Ferrous Iron, etc.)		Yes 🗸	No 🗌							
Temp Blank received in all shipping container(s)/cooler(s)?		Yes	No 🗹	Not Applicable						
Container/Temp Blank temperature:		14.0°C No Ice								
Water - VOA vials have zero headspace?		Yes	No 🗌	No VOA vials submitted						
Water - pH acceptable upon receipt?		Yes 🗹	No 🗌	Not Applicable						

#### **Standard Reporting Procedures:**

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

#### **Contact and Corrective Action Comments:**

None



LABORATORIES, Inc. 2616 E Broadway Ave

# Chain of Custody Record

Page<u>1\_</u>of<u>1\_</u>

	Bisma	rck, ND	58501
Pho	one: (701)	258-9720	1

Phone: (701) 258-9720 Toll Free: (800) 279-6885 Fax: (701) 258-9724						202082-0636										
Company Name and Address:				Account #:							Phone #:					
												701-258-9720				
					Contact:							Fax #:				
<u>2616 E Broadway</u> Bismarck, ND 58501				Claudette Name of Sampler:							E-mail: ccarroll@mvtl.com					
Billing Address (indicate if different from above):											For e-mail report check box					
• · · · · · · · · · · · · · · · · · · ·				Quote Number							Date Submitted:					
		OX 249 MN 56073			Project Name/Number:							20-Mar-20 Purchase Order #:				
<u>New Ulm, MN 56073</u>					Project Name/Number:							BL6219				
	Sample Information							B	ottle	Тур	)e					
IML Lab Number	MVTL Lab Number	Client	Sample ID	Sample Type	Date Sampled	Time Sampled	Untreated	1000 ml HNO3	VOC Vials Umpreserved	Glass Jar	Other	Analysis Required		red		
	20-W504		Dup 1	GW	18-Mar-20	NA		4				Ra226 & Ra228		28		
	20-W505	Field	Blank (FB)	GW	18-Mar-20	NA		4				Ra226 & Ra228		28		
	20-W506	N	IW103	GW	18-Mar-20	931		4				Ra226 & Ra228		28		
	20-W507	Ν	IW110	GW	16-Mar-20	1629		4				Ra226 & Ra228				
	20-W508	N	IW119	GW	16-Mar-20	1857		4				Ra226 & Ra228				
	20-W509	N	IW111	GW	17-Mar-20	1309		4				Ra226 & Ra228		28		
	20-W510	N	W117	GW	17-Mar-20	1030		4				Ra226 & Ra228		28		
	20-W511	N	IW118	GW	17-Mar-20	1901		4				Ra226 & Ra228				
	20-W512	N	IW120	GW	17-Mar-20	859		4				Ra226 & Ra228				
		AI	l results mu	st be re	eported a	as a nur	ne	ric	al v	alu	e	CD	003076	۹		
Trans	sferred by:	Date:	Time:	Sample	Condition:	R	ecei	ved	by:			Date:		Temp:		
T. Olson		20-Mar-20	1700													
2.						Aurto	7	$\sim$	Du	- NS	n	3-25-20 101	8			



# **Field Datasheet**

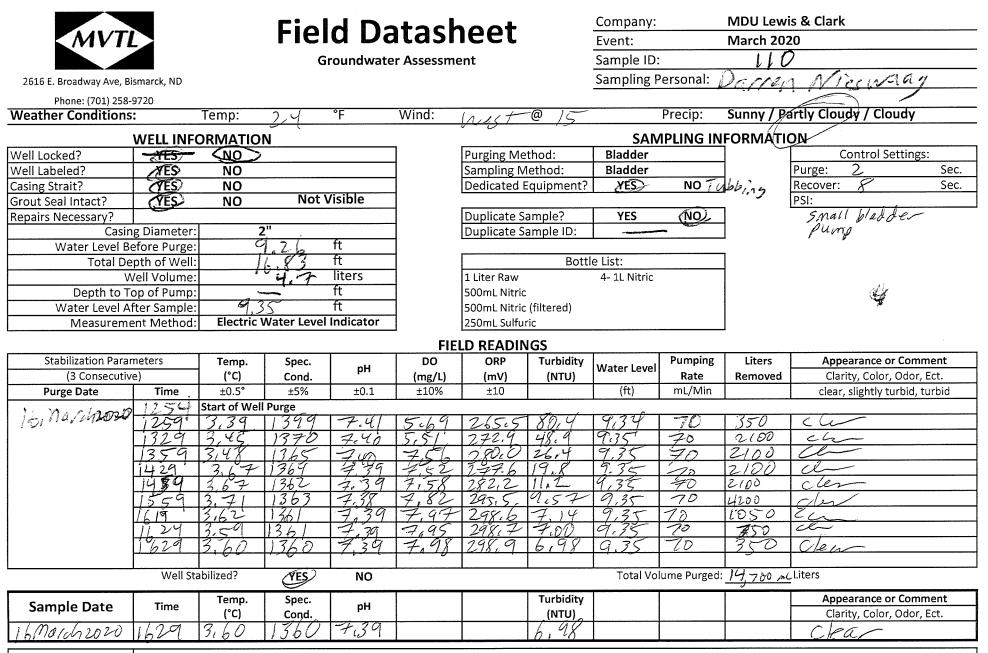
Groundwater Assessment

Company:	MDU Lewis & Clark
Event:	March 2020
Sample ID:	103
Sampling Personal	Dallen Nirswaas
Due et et	Courses Dentha Clausha / Clausha

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

					f		<u> </u>	CAN		CODMANTI	
		ORMATIO	N		1				IPLING IN	FORMATI	
Vell Locked?	YES	NO				Purging Me		Bladder		-	Control Settings:
Well Labeled?	XES	NO			-	Sampling N		Bladder		-	Purge: 3 Sec
Casing Strait?	TES	NO		/isible		Dedicated	Equipment?	YES Tub	NO NO	]	Recover: $\zeta  Sec$
Grout Seal Intact?	YES	NO		TISIDIE		Dunlingto C		YES	NO	1	PSI:
Repairs Necessary?	- Diamatari		<u>-</u> "		-	Duplicate S Duplicate S				4	
Water Level Be	g Diameter:			ft	4	Duplicate 5	ample ID:	Dup-	(	1	
	oth of Well:			ft	-		Rottl	e List:		1	
	ell Volume:		e jā	liters	-	1 Liter Raw	ВОЦІ	4- 1L Nitric		-	
 Depth to To			1813	ft	4	500mL Nitric		4- IL MILIQ			
Water Level Af			77	ft		500mL Nitric					
Measureme			Water Level			250mL Sulfu					
ivieasureme				malcator	]					1	
Stabilization Paran	otoro			r		LD READIN	· · · · · · · · · · · · · · · · · · ·		Pumping	Liters	Appearance or Comment
(3 Consecutive	-	Temp. (°C)	Spec. Cond.	pН	(mg/L)	(mV)	Turbidity (NTU)	Water Level	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min	Keliloved	clear, slightly turbid, turbid
	0806	Start of Well						(,		<b>.</b>	
18 March 2020	OSVI	5,80	1667	7.40	Hall	248.6	212	10,77	100	500	
	0841	5153	1508	7,46	5134	7.40,2	10,0	10.27	100	3000	Clean
	0911	518	1472	7.45	284	240,1	4.56	10,77	1100	3000	clean
	MALL	6.61	1432	4.45	2:80	239,4	447	90,77	100	BOON	
	0921	6.22	1443	7.45	2.88	239.0	4.08	10.72	100	600	Ca
	D971	6 44	1425	7,40	7.90	2.39.9	2.98	140,77	1/00	500	Class
	2931	16.08	1411	148	2,91	239.7	3,81	10.77	100	500	04 -
		10 1 20	1.0					10, 12	- <del>(</del> - <del>)</del>		
		<u> </u>				<u> </u>				La	
	Well St	abilized?	YES	NO				I otal Vol	ume Purged:	<u>DSEN</u>	Liters -
Sample Date	Time	Temp.	Spec.	рН			Turbidity				Appearance or Comment
Sample Dute		(°C)	Cond.			ļ	(NTU) 3681				Clarity, Color, Odor, Ect.
<i>c</i>	0931	6+08	1416	7.45	1						Clean



Comments: Tools out 3 volumes the (MT4) never went below 5 unto the 3 volumes so started Sampli-



# **Field Datasheet**

**Groundwater Assessment** 

Company:	MDU Lewis & Clark
Event:	March 2020
Sample ID:	119
Sampling Personal	Parren Nieswaas
Precip:	Sunny / Partly Cloudy / Cloudy

Purge:

PSI:

Control Settings:

Sec.

Sec.

\$ 3

Recover: 257

30

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Weather Conditions:	Temp:	22	۴F	Wind:	West	@	12	Precip:	//Sunny / Partly Cloudy / Cloudy
· · · · · · · · · · · · · · · · · · ·									

WELL INFO	JRIVIA HOI	N	
YES	-1002		
/YES>	NO		
YES	NO		
YES	NO	No	t Visible
g Diameter:	2	11	
efore Purge:	9	12	ft
pth of Well:	lh;	62	ft
/ell Volume:	Ч.	62	liters
op of Pump:	11.	28	ft
fter Sample:	10	1,20	ft
ent Method:	Electric V	Vater Lev	el Indicator
	YES YES YES	YES NO YES NO YES NO YES NO g Diameter: 2 efore Purge: 7 pth of Well: 76, /ell Volume: 4, op of Pump: 11, fter Sample:	NES       NO         YES       NO         YES       NO         YES       NO         Ing Diameter:       2"         efore Purge:       1/1 Z         upth of Well:       16, 62         Vell Volume:       4, 62         op of Pump:       11, 28         fter Sample:       4, 20

#### SAMPLING INFORMATION Purging Method: Bladder Sampling Method: Bladder Dedicated Equipment? YES) NO Duplicate Sample? YES NO

-----\_

	Bottle List:	
. Liter Raw	4- 1L Nitric	
00mL Nitric		
00mL Nitric (filtered	1)	
50mL Sulfuric		

## EIELD READINGS

5

Duplicate Sample ID:

					LIL C	LD READIN	CDI				
Stabilization Para	meters	Temp.	Spec.	pН	DO	ORP	Turbidity	Water Level	Pumping	Liters	Appearance or Comment
(3 Consecuti	ve)	(°C)	Cond.		(mg/L)	(mV)	(NTU)	water Lever	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
6 March 2020	1512	Start of Wel	l Purge	-			_	•			7
-, -, -, -, -	1817	5,21	1314	7.36	7.04	2.33.8	17.8	9,18	180	500	Cler
	1837	4.03	1303	7,40	2156	2463	7.47	9,20	100	2000	Cler
	1847	3,80	1308	7.00	2,44	252,4	3.78	9,20	102	1000	de
	1852	3,90	1308	7.40	2,42	254,3	3041	9,20	100	500	ch
	1857	3,96	1311	7,40	2,38	256,8	3,14	9,20	100	500	un
			-	,		0.0	· · ·				
			$\square$								
	Well St	abilized?	YES	NO				Total Vol	ume Purged:	4500	Liters
Convela Data	<b>T</b> :	Temp.	Spec.				Turbidity				Appearance or Comment
Sample Date	Time	(°C)	Cond.	рН			(NTU)				Clarity, Color, Odor, Ect.
•		3,96	1311	7,40		1	3,14				Clean

			Einl		Hack	Noot		Company:		MDU Lew	vis & Clark	
MVTI			гіеі	d Da	ILDSI	ieel		Event:		March 20	20	
			G	roundwate	r Assessme	ent		Sample ID:				
2616 E. Broadway Ave, B	ismarck, ND							Sampling P	ersonal: 🌈	Jarlin	Nieswaag	
Phone: (701) 258-	9720								Ψ	A		
<b>Neather Conditions</b>		Temp:	30	°F	Wind: /	Vorth	@ 7	-	Precip:	Sunny / P	artly Cloudy / Cloudy	
		ORMATIO	N					SAM	IPLING IN	FORMATI	ON	
Vell Locked?	YES	-10			]	Purging Me	thod:	Bladder		1	Control Settings:	
Well Labeled?	YES	NO			1	Sampling N		Bladder		1	Purge: 93	Sec.
Casing Strait?	YES	NO			1	Dedicated B		YES?	NO		Recover: 57-	Sec.
Grout Seal Intact?	YES	NO	Not	Visible						_	PSI: _	
Repairs Necessary?	19	·				Duplicate S	ample?	YES	NO			
	ng Diameter		2"		]	Duplicate S	ample ID:					
Water Level B	efore Purge		:00	ft	]					-		
	epth of Well		80	ft	]		Bott	e List:				
	Vell Volume		1 F	liters		1 Liter Raw		4- 1L Nitric				
	op of Pump		~	ft		500mL Nitric						
Water Level A			78	ft	_	500mL Nitric						
Measurem	ent Method	Electric	Water Level	Indicator	]	250mL Sulfu	ric			J		
					FIE	LD READIN	IGS					
Stabilization Para	meters	Temp.	Spec.	рН	DO	ORP	Turbidity	Water Level	Pumping	Liters	Appearance or Comm	ent
(3 Consecutiv	/e)	(°C)	Cond.	hu	(mg/L)	(mV)	(NTU)		Rate	Removed	Clarity, Color, Odor, E	
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, tu	rbid
17 March 2020	1154	Start of Wel						······				
1 T/10/Ch 2020	1159'	5.05	4317	7.20	4.24	246.0	27.5	374	100	500	Cler	
	1229	358	4336	7.33	Con Starl	259.0	28.0	\$7.74	100	3000	Llean	
	1259	1:60	4092	7,34	3,23 3.50		4,44	7.78	100	3000	clea	
	1304	4,67	4096	7,35	3,19	254,5	4.24	7,78	100	500	du	
	1309	4.72	4077	7,36	3.00	257iZ	4.07	7.78	100	500	a	
				1				T-+-!)/-		7500	Litors	
	well St	abilized?	YES	NO				Total Vol	ume Purgeo.	7300		
Sample Date	Time	Temp.	Spec.	рН			Turbidity				Appearance or Comm	
-		(°C)	Cond.				(NTU)				Clarity, Color, Odor, E	.ct.
17 March 2020	1309	4,72	4077	7.36			4.07	1			clear	
	T											
Comments:	1											



# **Field Datashee**

**Groundwater Assessment** 

°F

Not Visible

ft

ft

ft

ft

liters

Wind:

<b>Noot</b>		Company:		MDU Lewis & Clark						
neet		Event:		March 202	2020					
ent		Sample ID:								
		Sampling Personal: Darron Nie Sundag								
			4		70+20-5					
-ight	@		Precip: 📈	Sunny/Pa	artly Cloudy / Cloudy					
		SAN		FORMATIO						
Purging Met	thod:	Bladder			Control Settings:					
	Sampling Method:				Purge: Sec.					
Dedicated Equipment?		YES	NO TO	abing	Recover: 55 Sec.					
			,	9	PSI: / O					
Duplicate Sa		YES	NO							
Duplicate Sa	ample ID:	The State of Party St	NORMAL DATA DATA	J						
	Bottl	e List:		]						
1 Liter Raw		4- 1L Nitric								
500mL Nitric										
500mL Nitric	(filtered)									
250mL Sulfuri	ic									
LD READIN	GS									
ORP	Turbidity	Water Level	Pumping	Liters	Appearance or Comment					
(mV)	(NTU)		Rate	Removed	Clarity, Color, Odor, Ect.					
±10		(ft)	mL/Min		clear slightly turbid turbid					

## FIELD REA

Stabilization Para	neters	Temp.	Spec.	pН	DO	ORP	Turbidity	Water Level	Pumping	Liters	Appearance or Comment
(3 Consecutiv	e)	(°C)	Cond.	μu	(mg/L)	(mV)	(NTU)	water Level	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
16 March 2020	1133.	Start of Well	Purge			. 1 /	- **			~	
101-01-0	1125	3.40	7746	7.14	-7.72	246.7	45N	7.48	1-50	-750	Clear
	1255	2.41	-7741	7.19	8.48	257.2	31.3	9,19	150	4500	clear
	1223	2.1.8	71.23	7,20	7:22	264.8	47.8	9,84	150	2250	
	1233	2.18	7752	7,20	13,22	2691	15.6	407	150	1500	C.C.
					~ *			Delow	~ •		ч <u>л</u> т.
17 March 2020	Pap1025	Purged	well	5 mini	before	Samplin	ÿ	Party			
1 Think Low	1							5.52			
								<u>)</u>			
	Well Sta	abilized?	YES	NO				Total Vol	ume Purged:	9,000	Liters
Samula Data	Time	Temp.	Spec.		рo	011	Turbidity				Appearance or Comment
Sample Date	Time	(°C)	Cond.	рН	0	0,1	(NTU)				Clarity, Color, Odor, Ect.
17 March 2070	1030	0180	8177	713L	8.93	257,8	108				Slight tubid
Comments:		<u> </u>									
L	L										

2616 E. Broadway Ave, Bismarck, ND

Temp:

NO)

NO

NO

NO

**1**......

3.0

 $\mathcal{A}$ 

 $\mathcal{C}_i$ 

64

Electric Water Level Indicator

WELL INFORMATION

YES

YES

YES

(YES)

Casing Diameter:

Total Depth of Well: Well Volume:

Depth to Top of Pump:

Measurement Method:

Water Level After Sample:

Water Level Before Purge:

Phone: (701) 258-9720 Weather Conditions:

Well Locked?

Well Labeled?

Casing Strait?

Grout Seal Intact?

Repairs Necessary?



# **Field Datasheet**

Groundwater Assessment

Wind:

	Company:		MDU Lewis & Clark						
	Event:		March 20	20					
	Sample ID:		118						
	Sampling P	ersonal: 🖌	Varren	Nieswaag					
				/					
@ 4		Precip:	Sunny / P	artly Cloudy / Elo	udy/				
1	SAIV	IPLING IN	FORMATI	ON					
:hod:	Bladder		Control Settings:						
ethod:	Bladder			Purge: 3	Sec.				
quipment?	YES	NO		Recover: 57	Sec.				
	141	بر المطلقة	_	PSI:					
mple?	YES	NO							
mple ID:									
			-						
Bottl	e List:								

	WELL INFO	RMATION	J
Well Locked?	YES	(NO)	
Well Labeled?	YES	NO	
Casing Strait?	YES	NO	
Grout Seal Intact?	VES	NO	Not Visible
Repairs Necessary?	· · ·		
Casir	g Diameter:	2'	11
Water Level B	efore Purge:	8,4	7 ft
Total De	pth of Well:	11.00	9 ft
V	/ell Volume:		iters
Depth to T	op of Pump:	9,52	- ft
Water Level A	fter Sample:	H.	50 ft
Measureme	ent Method:	Electric W	Vater Level Indicator

Temp:

39

°F

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	NO
	14	biss
Duplicate Sample?	YES	NO
Duplicate Sample ID:	·	
Bottle	e List:	

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

## FIELD READINGS

NW

Stabilization Para	meters	Temp.	Spec.		DO	ORP	Turbidity	Water Level	Pumping	Liters	Appearance or Comment
(3 Consecutiv	/e)	(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)	vvalei Levei	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
17March 2020	17:56	Start of Well Purge									
1 41 AZON 20 00	1801	5,41	2168	7.47	6.36	261.6	252	8.46	100	500	Slightly typid
	1834	4,29	2142	7.50	10.53	2693	6,57	8,49	100	3000	Ciea
	1846	4,28	2140	751	9,14	273.5	2.81	8,50'	100	<00	cler
	1851	4:30	2140	751	9:21	274,3	1,91	8.50	700	500	ch
	1856	4.18	2139	7.5	9,03	2-76,3		1.52	100	300	Ch
	1901	4.22	2138	751	9,21	276,6	1.80	8,50	(00	500	a
	,			· · ·							
e manufe i provinci e e e e e e e e e e e e e e e e e e e	Well St	abilized?	YES	NO				Total Vol	ume Purged:	5500	Liters
Causala Data	Time	Temp.	Spec.				Turbidity				Appearance or Comment
Sample Date	Time	(°C)	Cond.	рН			(NTU)				Clarity, Color, Odor, Ect.
17 March 2020	1901	4,22	2138	7.51			1.80				Char
comments:											

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720 Weather Conditions:



# **Field Datasheet**

Groundwater Assessment

Company:	MDU Lewis & Clark
Event:	March 2020
Sample ID:	120
Sampling Personal:	Darren Niesnaag

2616 E. Broadway Ave, Bismarck, ND

sible)		Purging Me Sampling M Dedicated F		Bladder	PLING IN	FORMATI	printing and the second s	
t		Sampling M		Bladder		1	printing and the second s	
t		Sampling M				1	Control Setting	25:
t				Bladder			Purge: \$ 3	Se
t			quipment?	YES/	NO		Recover: 57	Se
				·······		1	PSI:	
		Duplicate Sa	ample?	YES	~(ND			
		Duplicate Sa	ample ID:		-			
						_		
t			Bottl	e List:				
ters		1 Liter Raw		4- 1L Nitric				
t		500mL Nitric						
t		500mL Nitric	(filtered)					
dicator		250mL Sulfur	ic					
	FIE	LD READIN	IGS					
	DO	ORP	Turbidity		Pumping	Liters	Appearance or Com	iment
рН	(mg/L)	(mV)	(NTU)	Water Level	Rate	Removed	Clarity, Color, Odor	
±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid,	
/			_					
6.90	3.21	219.8	3+85	15.42	100	500	clean	
	2.25	221.8	1,19	15.41	100	2000	clerr	
193	2.18	223.6	1.02	15141	100	500	-	
6,92	2,20	223,8	1.06	13.41	100	500	ch	
		, v	)					
NO				Total Volu	ume Purged:	<u> 3570 ()</u>	_ Liters	
nH			Turbidity				Appearance or Com	ment
			(NTU)			L	Clarity, Color, Odor	, Ect.
6.92			1206				Clear	
5	рн , 92			рн (NTU)	PH (NTU)	pH (NTU)	PH (NTU)	pH (NTU) Clarity, Color, Odor

			A	$\Lambda$
Site: MDU Lev	wis and Clark		Technician:	arra Nieswaag
Instrument (Circle One):	#1 650 MDS 08F100203	#2 650 MDS	S 04H14736	#3 556 MPS 12E102056
Date: ( Majo	$\frac{\text{Pre Site Calibr}}{1000} \frac{\text{Time: } 965.5}{1000}$	ration		Post Site Check Time: 0936
pH Buffer 7 Buffer 10 Buffer 4 Conductivity Buffer 1413 ORP 231 mV @ 25C DO	Temp °C       Pre Cal       Post Cal $18,79$ $7,09$ $7,09$ $7,00$ $18,93$ $9,99$ $10,00$ $3,99$ $18,58$ $3,94$ $3,99$ $19,03$ $1441$ $1413$ $8,53$ $216,3$ $231,1$	6.95-7.05 9.95-10.05 4.95-5.05 ±10% Buffe	7.9 -180 +/- 50 8.9 180 +/- 50 Check ar 5000 $50/5$ 6/6 5.96	pHTemp °CReadingBuffer 712,757.02Conductivity7.02Buffer 500013,985018
	21,63 8.73 8.20		710,0	
Date: pH	Time: Temp °C Pre Cal Post Cal	Post Cal Range n	mv Range +/- nv 50	Time: <b>pH</b> Temp °C Reading
Buffer 7 Buffer 10 Buffer 4		6.95-7.05 9.95-10.05 4.95-5.05	0 +/- 50 -180 +/- 50 180 +/- 50	Buffer 7
Conductivity Buffer 1413		±10% Buffe	Check	Conductivity Buffer 5000
ORP 231 mV @ 25C DO		±10 mV	( ()	
		Barometric Pres mg/L		

## **MVTL Calibration Worksheet**

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			$\Lambda$ $\checkmark$
Site: MDU Le	wis and Clark	Technician:	Jarren Nieswaag
Instrument (Circle One):	#1 650 MDS 08F100203	#2 650 MDS 04H14736	#3.556 MPS 12E102056
	Pre Site Calib	ration	Post Site Check
Date: A March	2020 <u>Time: 0650</u>	_	Time: 1905
рH	Temp °C Pre Cal Post Cal	mv Range +/- Post Cal Range 50	pH Temp °C Reading
Buffer 7	19.01 6.99 7.00	6.95-7.05 -/9,4 0+/-50	Buffer 7 10,27 7.03
Buffer 10	19.18 10.00 10.00	9.95-10.05 -/97.4 -180 +/- 50	
Buffer 4	19,22 3,99 4,00	4.95-5.05 159. 180 +/- 50	
Conductivity		Check	Conductivity
Buffer 1413	19.07 1416 1413	±10% Buffer 5000 4991	Buffer 5000 13,56 75039
ORP		CheckpH6 5.97	
231 mV @ 25C	7.33 225,5 231.0	±10 mV	
DO		Barometric Pressure (mm Hg)	
on site	16,79 10,87 9,25	mg/L 718,4	
Date: 17 Marc	( <u>h 2020</u> <u>Time:</u> <u>0650</u>	-	Time: 1907
рН	Temp °C Pre Cal Post Cal	- mv Range +/- Post Cal Range mv 50	<b>pH</b> Temp ℃ Reading
Buffer 7	17.93 7.00 7.00	6.95-7.05 <sup>/4</sup> ,3 - 45,5 - 43 0 +/- 50	Buffer 7 [2,9] 7.02
Buffer 10	17.95 9,98 10,00	9.95-10.05	
Buffer 4	17.96 4,00 4,00	4.95-5.05 143,7 180 +/- 50	
Conductivity		Check	Conductivity
Buffer 1413	18.68 1387 1414	±10% Buffer 5000 5010	Buffer 5000 13,02 5072
ORP	237,3	chedepth 5.97	
231 mV @ 25C	5.66 237.3 231.3	±10 mV	
DO		Barometric Pressure (mm Hg)	
	18,82 7,90 8,72	mg/L 7]],]	

## **MVTL Calibration Worksheet**

55



2616 E. Broadway Ave Bismarck, ND 58501

(701) 258-9720

## **Chain of Custody Record**

Project Name:	MDU Lev	wis & Clark	Event:	Ν	/larch	2020		Work Ord	er Number: 82-(	2636
Report To: Attn: Address: Phone: Email:	MDU Lewis & Clark Todd Peterson 400 N. 4th St Bismarck, ND 58501 701-425-2427 Todd.Peterson@mdu.co	om	CC:					Collected Dari Miesu		
Lab Number	Sample ID	Oate Time	Sample -	Som Rew Som Rew	20 m 1 m 1 c	Temp (c.	Spec Con.	ia. Ho		Analysis Required
WSOY	Dup 1	18 March 2020 NA	GW	1	4	NA	NA	NA	NA	
W505	Field Blank (FB)	18 March 2020 NA	GW		4	NA	NA	NA	NA	
WSOG	MW103	18 March 2020 0931	GW		4	6.08	1416	7.45		
WSOT	MW110	16 March 2020 1629	GW		4	3,60	1360	7.39		
W508	MW119	16 March2020 1857	GW		4	3,96	1311	7.40		
PORW	MW111	17march2020 1309	GW		4	4,72	4077	7.36		Rad 226 & 228
WSID	MW117	17/March 2020 1030	GW		4	0.80	8177	7.36		Nau 220 & 220
10511	MW118	17 March 2020 1901	GW		4	4,22	2138	7.51		
WSIZ	MW120	17 march 2020 19859	GW		4	1,23	6556	6.92		
			· · · · · · · · · · · · · · · · · · ·							
		-								

Comments:

Relinquished By	Sample C	ondition	Received By		
Name	Date/Time	Location	Temp (°C)	Name	Date/Time
to Alt	- 18 Mar 2020	Log In	RoIO,6		18mar 2020
Julies	1638	Walk In #2	TM562 / TM805	Eily Delair	11.38
0.		/	400 18Mar2020 @	)	





Page: 1 of 1

Report Date: 29 Apr 20 Lab Number: 20-W733 Work Order #:82-0910 Account #: 013200 Date Sampled: 20 Apr 20 11:10 Date Received: 21 Apr 20 10:25 Sampled By: Client

Project Name: 26411007.00 Sample Description: MW-111 Sample Site: MDU- Lewis & Clark

Barr Engineering Company

Minneapolis MN 55435

4300 MarketPointe Drive, Suite 200

Terri Olson

Temp	at	Receipt:	4.5C
------	----	----------	------

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion			EPA 200.2	21 Apr 20	SD
Selenium - Total	0.0783 mg/l	0.0050	6020B	28 Apr 20 17:31	CC

Approved by:

(C 30 Apr 2020 Claudette K. Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit





Page: 1 of 1

Report Date: 29 Apr 20 Lab Number: 20-W734 Work Order #:82-0910 Account #: 013200 Date Sampled: 20 Apr 20 11:50 Date Received: 21 Apr 20 10:25 Sampled By: Client

Project Name: 26411007.00 Sample Description: MW-118 Sample Site: MDU- Lewis & Clark

Barr Engineering Company

Minneapolis MN 55435

4300 MarketPointe Drive, Suite 200

Terri Olson

Temp at Receipt: 4.5C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Netel Dispation			EPA 200.2	21 Apr 20	SD
Metal Digestion Selenium - Total	0.0698 mg/l	0.0050	6020B	28 Apr 20 17:31	CC

Approved by:

2020 Claudette K Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

Barr Engineering	Co. Cha	in o	t Cus	tody sam	ple Originatio	□ WI		-		alysis Requested		COC Numbe	: Nº	733-734 47433
	<ul> <li>Duluth</li> <li>Hibbing</li> </ul>		erson City nneapolis			Other:			Water	Soil	T	coc 📘	of	
REPORT T		T		INVOICE		-	11					Matrix Co		Preservative Code:
Company: Bar Eng	neering	Co	mpany:	/			11	s				GW = Groun SW = Surfac	e Water	A = None B = HCl
Address: 234 W. C		Ac	Idress:	Sa			z	Containers				WW = Waste DW = Drinki		$C = HNO_3$ $D = H_2SO_4$
Name: Terri Olso		1000	ime:		ne			ont				S = Soil/S SD = Sedim	blid	E = NaOH F = MeOH
email: Tolson @ ban		en	nail:			1	1 1	55				O = Other		$G = NaHSO_4$
Copy to: datamgt@barr.co		P.C	).			Y	MS/MSD	P C						$H = Na_2S_2O_3$ I = Ascorbic Acid
Project Name: MDU - Lee	wis & Clark	Ba	rr Project	No: 264110	07.00		MS	d m			Solids			J = NH₄Cl K = Zn Acetate
(	5	ample	Depth	Collection	Collection	n Matrix	ε	N S			%			O = Other
Location	Sta	rt Sto			Time (hh:mm)	Code	Perform	Total Number				Preservative		
1			or in.)	(mm/dd/yyyy)	(milini)	-	-	FN				Field Filtered		
* MW-111	-	-	-	04/20/2020	11:10	GW	N	11				· Corr	act	Temi
<sup>1.</sup> MW-111 <sup>2.</sup> MW-118		-			11:50	GW	N	11				Olson	w	1
3.		Ĩ										quest		L
4.														
5.							Π					-		
6.		+												
7.		1	-			-	+							
8.						-								
9.		+												
10.		-					$\left  \right $							
BARR USE O		Rel	inquished	by Marco		On Ice?	Date		Time	Received by	yn.		D	ate Time
Sampled by: MUJ2			inquisileu	by: Mate Are		VN 4-2	11-2		2.35	10h	M	-	21Ap	12020 1025
Barr Proj. Manager: Jerew	r Gacnick	Rel	inquished	by:		On Ice?	Date		Time	Received by:			D	ate 4.5°C
Barr DQ Manager: Terr;	Olson	Sar	nples Ship	ped VIA: 🗌 C		Federal Exp	oress	Sa	mpler	Air Bill Number:			Reque	sted Due Date:
Lab Name: MITI			1		ther:			-						d Turn Around Time

06/16/1

RLG

H:RLG\STDFOR

Rush\_

(mm/dd/yyyy)

Lab Location:

BBMarch ND

Lab WO:

Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.

**MVTL** 

## MINNESOTA VALLEY TESTING LABORATORIES, INC.

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MEMBER ACIL

## **Quality Control Report**

Lab IDs: 20-W733 to 20-W73	34	Pre	o <b>ject:</b> 264	411007.0	0	١	Work Or	der: 202	.082-0910	)							
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	Dup Orig	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Selenium - Total mg/l	0.1000	101	80-120	0.400 0.400	20W783q 20W789q	< 0.005 < 0.005	0.4602 0.4198	115 105	75-125 75-125	0.4602 0.4198	0.4448 0.3476		3.4 18.8	20 20	-	-	< 0.005

Page: 1 of 1

Samples were received in good condition on 21 Apr 2020 at 1025.

Temperature upon receipt at the Bismarck laboratory was 4.5°C.

All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.

All holding times were met.

Approved methodology was followed for all sample analyses.

All acceptance criteria were met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/duplicates unless noted here.

Approved by: <u>C. Cant</u> C 37 Apr 2020





Todd Peterson Montana-Dakota Utilities Co.

58501

Report Date: 28 May 20 Lab Number: 20-W1299 Work Order #: 82-1230 Account #: 002800 Date Sampled: 19 May 20 Date Received: 20 May 20 13:13

Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark

Sample Description: Dup 1

400 N 4th St

Bismarck ND

Event and Year: May 2020

Temp at Receipt: 1.9C

PO #: 180534 OP

1 of 1

Page:

Metal Digestion	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst	
			EPA 200.2	CONTRACTOR AND	HT	
Lithium - Total	0.159 mg/l	0.020	6010D	27 May 20 14:32	SZ	

Approved by:

11 1500 2020 Claudette K. Canto

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: 0 = Due to sample matrix # = Due to concentration of other analytes 1 = Due to sample quantity + = Due to internal standard response CERTIFICATION: ND # ND-00016

and the second second





Page: 1 of 1

Todd Peterson Montana-Dakota Utilities Co. 400 N 4th St Bismarck ND 58501 Report Date: 28 May 20 Lab Number: 20-W1300 Work Order #: 82-1230 Account #: 002800 Date Sampled: 19 May 20 Date Received: 20 May 20 13:13 Sampled By: MVTL Field Services

Project Name: MDU Lewis & Clark

Sample Description: Field Blank

Event and Year: May 2020

Temp at Receipt: 1.9C

PO #: 180534 OP

Metal Digestion	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst	
			EPA 200.2		HT	
Lithium - Total	< 0.02 mg/l	0.020	6010D	27 May 20 14:32	SZ	

Approved by:

CC 1 JUN 2020 Clauditte K. Cunico

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit



1 of 1 Page:

Report Date: 28 May 20 Lab Number: 20-W1301 Work Order #: 82-1230 Account #: 002800 Date Sampled: 19 May 20 14:16 Date Received: 20 May 20 13:13 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 1.9C

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

Project Name: MDU Lewis & Clark

Sample Description: MW103

Event and Year: May 2020

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst	
Metal Digestion			8.6	EPA 200.2		HT	
oH - Field	7.45	units	NA	SM 4500 H+ B	19 May 20 14:16	DJN	
Temperature - Field	12.6	Degrees C	NA	SM 2550B	19 May 20 14:16	DJN	
	1285	umhos/cm	1	EPA 120.1	19 May 20 14:16	DJN	
onductivity - Field 1285 umbo thium - Total 0.043 mg/l			0.020	6010D	27 May 20 14:32		

Approved by:

TUN 2020 Claudette K Canreo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

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Page: 1 of 1

Report Date: 28 May 20 Lab Number: 20-W1302 Work Order #: 82-1230 Account #: 002800 Date Sampled: 18 May 20 13:57 Date Received: 20 May 20 13:13 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 1.9C

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

Bismarck ND 58501

Project Name: MDU Lewis & Clark

Sample Description: MW110

Event and Year: May 2020

Metal Digestion	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst	
				EPA 200.2	The second second second	HT	
pH - Field	7.44	units	NA	SM 4500 H+ B	18 May 20 13:57	DJN	
Temperature - Field	10.2	Degrees C	NA	SM 2550B	18 May 20 13:57	DJN	
Conductivity - Field	1246	umhos/cm	1	EPA 120.1	18 May 20 13:57	DJN	
Lithium - Total	0.033	mg/l	0.020	6010D	27 May 20 14:32	SZ	

Approved by:

1 Jun 2020 Claudette K Canteo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL - Method Reporting Limit

CERTIFICATION: ND # ND-00016





Page: 1 of 1

Report Date: 28 May 20 Lab Number: 20-W1303 Work Order #: 82-1230 Account #: 002800 Date Sampled: 18 May 20 15:29 Date Received: 20 May 20 13:13 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 1.9C

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

Project Name: MDU Lewis & Clark

Sample Description: MW119

Event and Year: May 2020

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion pH - Field Temperature - Field Conductivity - Field Lithium - Total	7.41 11.9 1310 0.035	units Degrees C umhos/cm mg/l	NA NA 1 0.020	EPA 200.2 SM 4500 H+ B SM 2550B EPA 120.1 6010D	18 May 20 15:29 18 May 20 15:29 18 May 20 15:29 18 May 20 15:29 27 May 20 14:32	DJN DJN

Approved by:

Jun 2020 Claudetto K. Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016





MALE ALL

Report Date: 28 May 20 Lab Number: 20-W1304 Work Order #: 82-1230 Account #: 002800 Date Sampled: 19 May 20 10:40 Date Received: 20 May 20 13:13 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 1.9C

1 of 1

Page:

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

Project Name: MDU Lewis & Clark

Sample Description: MW111

Event and Year: May 2020

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst	
Metal Digestion pH - Field Temperature - Field Conductivity - Field	7.34 11.9 3730	units Degrees C umbos/cm	NA NA 1	EPA 200.2 SM 4500 H+ B SM 2550B EPA 120.1	19 May 20 10:40 19 May 20 10:40 19 May 20 10:40 19 May 20 10:40	HT DJN DJN DJN	
Lithium - Total	0.154	mg/l	0.020	6010D	27 May 20 14:32	SZ	

Approved by:

JUNZOZO Clauditto K. Cantop

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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

Project Name: MDU Lewis & Clark

Sample Description: MW117

Event and Year: May 2020

Page: 1 of 1

Report Date: 28 May 20 Lab Number: 20-W1305 Work Order #: 82-1230 Account #: 002800 Date Sampled: 19 May 20 8:33 Date Received: 20 May 20 13:13 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 1.9C

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion pH - Field Temperature - Field Conductivity - Field Lithium - Total	7.26 8.19 7504 0.115	units Degrees C umhos/cm mg/l	NA NA 1 0,020	EPA 200.2 SM 4500 H+ B SM 2550B EPA 120.1 6010D	19 May 20 8:33 19 May 20 8:33 19 May 20 8:33 27 May 20 8:33 27 May 20 14:32	DJN DJN

Approved by:

1 Jun 2020 Clauditte K Canteo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit.





Page: 1 of 1

Report Date: 28 May 20 Lab Number: 20-W1306 Work Order #: 82-1230 Account #: 002800 Date Sampled: 19 May 20 12:26 Date Received: 20 May 20 13:13 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 1.9C

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

Project Name: MDU Lewis & Clark

Sample Description: MW118

Event and Year: May 2020

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion pH - Field Temperature - Field Conductivity - Field Lithium - Total	7.40 11.3 1949 0.076	units Degrees C umhos/cm mg/l	NA NA 1 0.020	EPA 200.2 SM 4500 H+ B SM 2550B EPA 120.1 6010D	19 May 20 12:26 19 May 20 12:26 19 May 20 12:26 27 May 20 12:26	DJN DJN

Approved by:

1C Jun 2020 Claudette K. Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016





Page: 1 of 1

Report Date: 28 May 20 Lab Number: 20-W1307 Work Order #: 82-1230 Account #: 002800 Date Sampled: 19 May 20 8:17 Date Received: 20 May 20 13:13 Sampled By: MVTL Field Services

PO #: 180534 OP

Temp at Receipt: 1.9C

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

Project Name: MDU Lewis & Clark

Sample Description: MW120

Event and Year: May 2020

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion	6,80	units	NA	EPA 200.2 SM 4500 H+ B	19 May 20 8:17	HT DJN
pH - Field Temperature - Field Conductivity - Field	8.42	Degrees C umhos/cm	NA	SM 2550B EPA 120.1	19 May 20 8:17 19 May 20 8:17	DJN DJN
Lithium - Total			0.020	6010D	27 May 20 14:32	SZ

Approved by:

1500 2020 Claudette K. Cantep

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

C

CERTIFICATION: ND # ND-00016

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## Page: 1 of 1

## **Quality Control Report**

Lab IDs: 20-W1299 to 20-W1307 Project: MDU Le			DU Lewis	s & Clark	Clark Work Order: 202082-1230												
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 (<)	Rec	Known % Rec Limits	Method Blank
Lithium - Total mg/l	0.400	100	80-120	0.400	20-W1302	0.033	0.390	89	75-125	0.390	0.379	86	2.9	20		-	< 0.02 < 0.02

Samples were received in good condition on 20 May 2020 at 1313.

Temperature upon receipt at the Bismarck laboratory was 1.9°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.

Approved by: \_

All acceptance criteria were met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/duplicates unless noted here.

C. CANTCO 1 Jun 2020

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

# **Chain of Custody Record**

Project Name:		Event:		May	020	Work Order Number:					
	MDU Lev	CC:		May 2	2020	_	00-1000				
Report To:MDU Lewis & ClarkAttn:Todd PetersonAddress:400 N. 4th StBismarck, ND 58501Phone:701-425-2427Email:Todd.Peterson@mdu.com									Collected B Darre Niesw		
Lab Number	Sample ID	Date	Time	Samor	Son Pan	300 Minic 250 Minic 21. Minic	Temp red	Spec. Con.	io. 40		Analysis Required
W1299	Dup 1	19 May 2020	NA	GW	X		NA	NA	NA	NA	
W1300	Field Blank (FB)	19 May 2020	NA	GW	X		NA	NA	NA	NA	
W130)	MW103	19 May 2020	1412	GW	X		12.62	1285	7.45	11 21	]
61302	MW110		1357	GW	X		10,20	1246	7.44		
W1303	MW119	18 May 2020	1529	GW	X		11,92	1310	7.41	1	l tabium
61304	MW111	19/May 2020	1040	GW	X		11.89	3730	7.34		Lithium
W1305	MW117	19 May 2020	0833	GW	X		8.19	7504	7.26		1
	MW118		1226	GW	X		11,30	1949	7.40		
W1306		1 11.109 000	10 -								

Comments:

Relinquished By		Sample	Condition	Received By				
Name	Date/Time	Location	Temp (°C)	/ Name	Date/Time			
1 gar Ning	20 May 2020	Walk In #2	TM562/ TM805	Juath -	20May 2020 1313			
2			109					

MVT			Fiel	d Da	tash	neet		Company: Event:		MDU Lew May 2020		
			G	roundwate	r Assessme	ent		Sample ID:		103		
2616 E. Broadway Ave, Bi	ismarck, ND							Sampling P	ersonal: /	aren	Njeswaa	3
Phone: (701) 258-	9720		$\sim$			~ (				$\sim$		
Weather Conditions	•	Temp:	65	°F	Wind:	South	@ (0)		Precip:	(Sunny)/ Pa	artly Cloudy / Cloudy	
	WELL INFO	ORMATIO	v		6			SAM	IPLING IN	FORMATI	ON	
Well Locked?	YES	CNO			1	Purging Me	thod:	Bladder		]	Control Setting	,s:
Well Labeled?	(JES	NO				Sampling M		Bladder			Purge: 4	Sec.
Casing Strait?	TES	NO				Dedicated E	quipment?	YES	NO		Recover: 56	Sec.
Grout Seal Intact?	( YES	NO	Not	Visible		r				1	ے PSI:	
Repairs Necessary?						Duplicate Sa		YES	AD			
	g Diameter:	2	0.93	ft		Duplicate Sa	ample ID:		-	]		
Water Level Be	pth of Well:	<u> </u>		ft		<b></b>	Pott	e List:		1		
	/ell Volume:	2	1,20	liters			BUIL	e list.				
	op of Pump:		6.7	ft		500mL Nitric						
Water Level At		11	ae	ft								
	ent Method:	Electric	Water Level									
										4		
Stabilization Parar	meters	Temp.	Spec.	1	DO		Turbidity		Pumping	mL	Appearance or Com	ment
(3 Consecutiv		(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)	Water Level	Rate	Removed	Clarity, Color, Odor,	
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid)	
	12-11	Start of Well	Purge				1	······································			CSTJ	
1anay 2020	1246	13,36	3170	7,43	0,77	201,4	111	10.95	./00	500	0 ST	
VANAY 000-	1316	11.99	81373	7.44	0.46	206.3	42,4	10.95	100	3000	clear	
	1346	12.37	1304	7,45	0,28	209,9	7,24	10,95	700	3000	clu	
	140	12,78	1287	19,45	0,30	210,8	5,88	10,95	100	1500.	clear	
	1406	12,98	1289	7.45	0,28	240	5.21	10:25	100	500	chee	
	1411	12,53	1285	7.05	0137	2/25	54,65	10,95	(00	500	Cla	
	1416	12,62	12.85	7.95	0:36	212,4	405	10,95	/00	500	<u>CC</u>	
t	H-427-											
	Well Sta	abilized?	YES	NO			<u>I</u>	Total Vo	ume Purged:	9500	mL	
Comple Data	Time	Temp.	Spec.				Turbidity				Appearance or Com	ment
Sample Date	Time	(°C)	Cond.	рН			(NTU)				Clarity, Color, Odor,	, Ect.
19 May 2020	1416	12.62	1285	7.45	0.36	212,4	4155	1	!		Clin	
Comments:												



# **Field Datasheet**

**Groundwater Assessment** 

	Company:		MDU Lewis	& Clark	
leet	Event:		May 2020		
ent	Sample ID:	1	11)	_	
	Sampling P	ersonal: 🖌	arren	NESOU	lag
		v			
South @ 25		Precip: (	Sunny/Par	tly Cloudy / Clou	dy
	SAM	PLING IN	FORMATIO	N	
Purging Method:	Bladder			Control Set	tings:
Sampling Method:	Bladder		] <u> </u>	urge: 了	Sec.
Dedicated Equipment?		NO	R I	ecover: 7	Sec.
	Tus	115	P	SI:	

2616 E. Broadway Ave, Bismarck, ND

### Phone: (701) 258-9720

Weather Conditions:	Temp:	72	°F	Wind:	South	@	25	Precip: (Sunny/ Partly Cloudy / Cloudy	udy

	WELL INFO	ORMATION		
Well Locked?	YES	NO)		
Well Labeled?	(YES)	NO		
Casing Strait?	<b>ATES</b>	NO		
Grout Seal Intact?	VES	NO	No	ot Visible
Repairs Necessary?				
Casin	g Diameter:	2"	<u>.</u>	
Water Level Be	efore Purge:	9	42	ft
Total De	pth of Well:	160	85	ft
W	/ell Volume:	ũ	. 6	liters
Depth to T	op of Pump:			ft
Water Level A	fter Sample:	<u>۲</u> ,	54	ft
Measureme	ent Method:	Electric W	ater Le	vel Indicator

Duplicate Sample?	YES	NO							
Duplicate Sample ID:									
Bottl	Bottle List:								
500mL Nitric									

## **FIELD READINGS**

					FIEL	.D READIN	IGS				
Stabilization Para	meters	Temp.	Spec.	-	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comment
(3 Consecutiv	/e)	(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)	water Lever	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
	13=1227	Start of Well	Purge								,
0 010	1232	10,70	1250	733	9.28	110.9	13.0	9.54	100	00	Clear
18 May 2020	1257	10,35	1247	7,43	2,13.	146.1	9,86	9.54	100	2500	du
14 '	1327	1019	1247	7.44	2118	19011	5.48	9:54	100	3000	(Con
	1347	10,18	1245	7.44	2,12	Y92.3	4,91	9.54	100	200	d
	1352	10.23	1246	7.44	214	193,7	-3,19	9154	100	500	ch
	1957	10,20	1246	7,44	216	194.5	2.58	9,54	100	500	u
				,				·	1.0	~	
	Well Sta	abilized?	(YES)	NO				Total Vol	ume Purged:	9,000	.mL
Courselle Dotte		Temp.	Spec.				Turbidity				Appearance or Comment
Sample Date	Time	(°C)	Cond.	рН			(NTU)				Clarity, Color, Odor, Ect.
18M 42020	1357	10,20	1246	7,44	ð		2,58				Clew
Comments:											

			Eial	d Da	tack	voot		Company:		MDU Lew	is & Clark
MVTI			<b>FIEI</b>		ILdSI	ieei		Event:		May 2020	
			G	roundwate	r Assessme	ent		Sample ID:		119	1
2616 E. Broadway Ave, Bi	ismarck, ND							Sampling F	ersonal: /	Davren	Niusuna
Phone: (701) 258-						- 1					
Weather Conditions	•	Temp:	72	°F	Wind: <	south	@ 25		Precip:	Sunny / Pa	artly Cloudy / Cloudy
	WELL INFO	ORMATIO	N					SAN	IPLING IN	FORMATI	ON
Well Locked?		JUD J				Purging Me	thod:	Bladder			Control Settings:
Well Labeled?	<b>XES</b>	NO			1	Sampling M	ethod:	Bladder			Purge: 27 Sec.
Casing Strait?	YES	NO				Dedicated E	quipment?	YES	NO		Recover: 56 Sec.
Grout Seal Intact?	YES	NO	Not V	/isible				142	, ng	_	PSI:
Repairs Necessary?						Duplicate Sa		YES	NO		
	g Diameter:	2				Duplicate Sa	ample ID:				
Water Level Be		9	27	ft						-	
	pth of Well:	16	.64	ft			Bottl	e List:			
	/ell Volume:		Ilp	liters							
	op of Pump:			ft		500mL Nitric					
Water Level A				ft							
Measureme	ent Method:	Electric	Vater Level	Indicator						J	
			···		FIE	LD READIN	GS				·
Stabilization Parar		Temp.	Spec.	pН	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comment
(3 Consecutiv	· <u> </u>	(°C)	Cond.	•	(mg/L)	(mV)	(NTU)		Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10	Stand Here	(ft)	mL/Min	I	clear, slightly turbid, turbid
<b>ת די</b>		Start of Well	<del></del>	<u> </u>		1	( 7 7				
irnay2000	1419	12,08	1290	7.38	1156	1777	63,5	9,33	100	5.00	Chin-
18na 42020	1449	11,98	1296	7:39	1,49	19016	19.9	4.36	190	3000	clear
	1519	1214,	1309	7.40	1.8.2	iqué	40)	9:34	100	3000	cu
	1524	1.96	1306	7.40	1,88	193,3	3.17	9,35	100	500	de
	1529	11,92	-1310	7.41	1.85	190.9	3,08	9,35	<u>[0]</u>	500	dr
						-					
	l Well Sta	bilized?	(YES)	NO	<u> </u>	I		Total Vol	ume Purged:	7500	nL
Comple Data	Time	Temp.	Spec.				Turbidity				Appearance or Comment
Sample Date	Time	(°C)	Cond.	рН			(NTU)				Clarity, Color, Odor, Ect.
18 May 2000	1529	1,92	1310	7,41			3.08				clem
Comments:		•									



.

# **Field Datasheet**

Groundwater Assessment

Company:	MDU Lewis & Clark
Event:	May 2020
Sample ID:	711
Sampling Personal:	Darren Nieswaag

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Phone: (701) 258	-9720		ä			/					-
Weather Conditions	s:	Temp:	65	°F	Wind:	South	@ 5		Precip: 🥖	Sunny Pa	artly Cloudy / Cloudy
	WELL INFO		N		ć			SAN		FORMATIO	ON
Well Locked?	× tes	(NO)			]	Purging Me	thod:	Bladder			Control Settings:
Well Labeled?	YES	NO				Sampling M	ethod:	Bladder			Purge: 4 Sec.
Casing Strait?	ALES .	NO				Dedicated E	quipment?	, YES	, NO		Recover: 56 Sec.
Grout Seal Intact?	YES	NO	Not \	/isible				14	Sily	_	PSI:
Repairs Necessary?						Duplicate Sa	mple?	VES	NO	-	
	ng Diameter:	2	) !! }			Duplicate Sa	ample ID:	Dup.	-1		
Water Level B		8	.03	ft				/	ι	-	
	epth of Well:	17	-82	ft			Bottl	e List:		-	
	Vell Volume:	• /	<u> </u>	liters							
-	op of Pump:			ft		500mL Nitric					
Water Level A			08	ft							
Measurem	ent Method:	Electric \	Nater Level	Indicator	J						
					FIEL	D READIN	GS				
Stabilization Para	meters	Temp.	Spec.	pН	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comment
(3 Consecutiv	/e)	(°C)	Cond.	μu	(mg/L)	(mV)	(NTU)		Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
	0855	Start of Well									
19 May 2020	0900	10,16	3968	715	0,36	2571	45,9	8,08	100	500	de
[] [] [] [] [] [] [] [] [] [] [] [] [] [	D930	'9;7;7	3810	7,26	2,05	247,6	13.6	8.08	100	\$3000	Cle
	7000	11.88	3716	7.32	3.05	24812	7.84	8.08	100	7000	<u>ca</u>
	1030	122	3723	7.33	3,30	21526	2,67	8:08	1,00	3000	Ch
	1035	11.98	373	7,34	3,35	211,9	1,24	8:08	100	500	dar
	1040	11.89	3730	7.34	3,36	20818	1,25	8.08	100	500	clea-
								Č	-	· ·	
1			1	1				i		1	

Well Stabilized?

NO

Total Volume Purged: 10,500 mL

Sample Date	Time	Temp.	Spec.	рH	Turbidity	Appearance or Comment
Sample Date	Time	(°C)	Cond.	рп	(NTU)	Clarity, Color, Odor, Ect.
19/10/2020	1040	11.89	3730	7.34	1,25	Char
	,			L		
Comments:						

			Eial	4 0-	atash	No ot		Company:		MDU Lew	is & Clark
MVTI			ге		alasi	ieei		Event:		May 2020	1
			G	roundwate	er Assessme	ent		Sample ID:		11'	7
2616 E. Broadway Ave, Bi	smarck, ND							Sampling P	ersonal:	Jarran	Niesnon
Phone: (701) 258-			6 -			1 1			a		
Weather Conditions	•	Temp:	60	°F	Wind:	South	@ <		Precip:	Sunny P	artly Cloudy / Cloudy
	WELL INFO	ORMATIO	N		۷.			SAN	IPLING IN	FORMATI	ON
Well Locked?	YES	MO)			1	Purging Me	thod:	Bladder		7	Control Settings:
Well Labeled?	XES	ŇŎ			1	Sampling M		Bladder		1	Purge: 🖌 Sec.
Casing Strait?	ALES	NO			1	Dedicated E	Equipment?	XES /	NO	]	Recover: 56 Sec.
Grout Seal Intact?	YES	NO	Not \	/isible				746	3	_	PSI:
Repairs Necessary?	•				]	Duplicate Sa	ample?	YES	¢	]	
	g Diameter:		H		]	Duplicate Sa	ample ID:				
Water Level Be		5	68	ft						_	
Total De	pth of Well:	1.6	50	ft	]		Bott	le List:		]	
	/ell Volume:		3.6	liters							
	op of Pump:	91	58	ft		500mL Nitric	:				
Water Level A	fter Sample:	6.92	~ 0	ft							
Measureme	ent Method:	Electric \	Nater Level	Indicator	]						
					FIE	LD READIN	IGS				
Stabilization Parar	neters	Temp.	Spec.	pH	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comment
(3 Consecutiv	e)	(°C)	Cond.	рп	(mg/L)	(mV)	(NTU)		Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid turbid
		Start of Well	Purge			•					しらテノ
18 Mar 2020	1553	9.98	7960	7,23	8,45	255,0		6,18	150	7.50	ST
1 0 Mag	1623	9,60	7881	7,25	18,10	282,6	49,1	8,59	150	4500	Clean
1 10"	1653	10,31	7755	7,25	6,35	288,9	5012	915861	150	4500	Gen
1	1700	10,98	7838	7.25	6.61	290,6	24,5	9.58/81)	150	1050	der
		••••				ļ					
	0828		19	May V.	020 pm	red Let	re Sangli	6.11	100	500-	
				ļ				0 1			
					<u> </u>		l				
	Well Sta	abilized?	YES	NÒ				Total Vol	ume Purged:	10,800	mL 11,300
Sample Date	Time	Temp.	Spec.	рН	00	ORP	Turbidity	WL			Appearance or Comment
		(°C)	Cond.		·		(NTU)				Clarity, Color, Odor, Ect.
19May 2020	0833	X114	7504	7.26	9.62	233.0	4.34	6,178	~		Clear
Comments:	¥ (BL) (	3elow f	n mp				1				

MVT				ld Da				Company: Event:		MDU Lew May 2020	
2616 E. Broadway Ave, Bi	smarck ND		G	roundwate	r Assessm	ent		Sample ID: Sampling F		118 Darren	Niesmany
, ,								oumping i	<u>ereenan p</u>	<u>annen</u>	IV IE SWAAL
Phone: (701) 258- Weather Conditions		Temp:	$f \subset$	°F	Wind:	Sz II	@ ~		Precip:	Sunny / P	artly Cloudy / Cloudy
		•	$\flat$	1	white.	Jowy	<u> </u>				
		ORMATIO	N		-				<u>1PLING HN</u>	FORMATI	
Well Locked?	YES	(NO)				Purging Me		Bladder	<u> </u>		Control Settings:
Well Labeled?	YES	NO				Sampling Method:		Bladder			Purge: C Sec.
Casing Strait?	<b>VES</b>	NO			4	Dedicated E	quipment?	YES NO		Recover: 52 <sup>1</sup> Sec.	
Grout Seal Intact?	XES	NO	Not	Visible	4			`````````````````````````````		1	PSI:
Repairs Necessary?						Duplicate S		YES	NO		
	g Diameter:		· · · · · · · · · · · · · · · · · · ·	0	4	Duplicate S	ample ID:		~		
Water Level Be		S.	iff_	ft	4	F				1	
	pth of Well:	174	<u>90</u>	ft	4		Bott	le List:			
	/ell Volume:	·Z.	0	liters	-						
	op of Pump:		1.(	ft ft	-	500mL Nitric					
Water Level At			<u>7-6</u>		-						
Measureme	ent Method:	Electric	Vater Level	Indicator	]						
	and the second				FIE	LD READIN	GS				
Stabilization Parar	neters	Temp.	Spec.	pН	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comment
(3 Consecutiv	e)	(°C)	Cond.		(mg/L)	(mV)	(NTU)		Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
	1056	Start of Well	Purge								
19 Mayloro	100	10,76	1966	7.39	3,34	253.9	743	8.75	1.00	500	Clear
ARV10	113 i	11.00	1962	17,40	3.72	266.5	15,9	8.76	100	3000	Clea
$\nabla Q (m^{n})$	1201	11,22	1956	740	3.54	272,9	7,93	8,76	100	3000	Clean
	1216	11,27	1956	7.40	3,46	2763	3,41,	8,76	100	1500	Clear
	1221	1,05	1953	-7.40	3.th	2775	1.9%	876	100	,500	CI
	1226	11.30	1949	7,40	3.41	27718	1,90	8.76	100	500	chen
								·	<i>L</i>		
		-									
					ļ						
			$\square$	<u> </u>							l
	Well St	abilized?	YES	) NO				Total Vol	lume Purged:	4,000	_mL
- I - ·		Temp.	Spec.	1			Turbidity				Appearance or Comment
Sample Date	Time	(°C)	Cond.	рH			(NTU)				Clarity, Color, Odor, Ect.
19 May 2020	1226	11.30	1949	7.40			1,90				clear
Comments:							<i>i</i>				

MVTL			Field Datasheet						Company: Event: Sample ID:		is & Clark
2616 E. Broadway Ave, E	Bismarck, ND							Sampling P	ersonal: //	arren	Nieswaag
Phone: (701) 258	-9720		/			,					
Weather Condition	s:	Temp:	60	°F	Wind:	South	@ 5		Precip: (	Sunny Pa	artly Cloudy / Cloudy
	WELL INF	ORMATIO	N					SAM	IPLING IN	FORMATI	ON
Well Locked?	YES	NO	-		1	Purging Me	thod:	Bladder		1	Control Settings:
Well Labeled?	YES	NO			1	Sampling M		Bladder			Purge: 4 Sec.
Casing Strait?	YES	NO			]	Dedicated E				]	Recover: Sec.
Grout Seal Intact?	YES	NO	Not V	Visible				- 1 x	2	-	PSI:
Repairs Necessary?						Duplicate Sa		YES	<u>NO</u>		
	ng Diameter:					Duplicate Sa	ample ID:	·			
Water Level B		14	09	ft		r				-	
	epth of Well:		86	ft			Bottl	e List:			
	Vell Volume:		03.0	liters ft							
	op of Pump:		<u> </u>	ft		500mL Nitric					
Water Level A	ent Method:		ر می Nater Level								
wieasurem	ent method.	LIECUIC	Valei Levei	mulcator	]	L				]	
Ctabilization Dava		<u> </u>		1	r	LD READIN		1	D		
Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec.	рН	DO (mg(l))	ORP (m)()	Turbidity	Water Level	Pumping	mL	Appearance or Comment Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	<u>Cond.</u> ±5%	±0.1	(mg/L) ±10%	(mV) ±10	(NTU)	(ft)	Rate mL/Min	Removed	clear, slightly turbid, turbid
i uige bate	0727	Start of Well		1 10.1	1 10/0	110				]	
	11237-	V < 3	1 257	1.70	282	1807	11.7	14,21	100	500	Clean
1,000	0802-	029	2998	67 60	1.29	192.5	4.08	4.48	100	133000	Clar
1 a May 2020	DEDIT	8:21	6038	9.00	11.95	193.8	1.14	14,50	100	500	de
	0817-	8,30	IDLI	600	0.94	199,9	0,79	14,51	100	500	ca
	DEIT	8.41-	2119	2:80	0,99	197.2	0,68	14,51	100	500	ce
	60,		-6			1			i		
											-
	14/-11/Ct	-  - :1:1:2									
	Well St	abilized?	(YES)	NO				lotal Vol	ume Purged:	5,000	
Sample Date	Time	Temp.	Spec.	рН			Turbidity				Appearance or Comment
. Jampie Date		(°C)	Cond.				(NTU)				Clarity, Color, Odor, Ect.
191442020	0817	8,42	6119	6-80	- -		0,68				an
Comments:											





Page: 1 of 1

Report Date: 31 Jul 20 Lab Number: 20-W2562 Work Order #: 82-1957 Account #: 002800 Date Sampled: 20 Jul 20 Date Received: 22 Jul 20 14:30 Sampled By: MVTL Field Services

Temp at Receipt: 5.5C

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

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

Todd Peterson

Event and Year: July 2020

	As Received Result	Method RL	Method Reference EPA 200.2	Date Analyzed	Analyst
Metal Digestion		-		22 Jul 20	HT
Lithium - Total	0.146 mg/l	0.020	6010D	30 Jul 20 9:08	MDE

Approved by:

OK DE MIT Claudette K. Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016





Page: 1 of 1

Report Date: 31 Jul 20 Lab Number: 20-W2563 Work Order #: 82-1957 Account #: 002800 Date Sampled: 21 Jul 20 Date Received: 22 Jul 20 14:30 Sampled By: MVTL Field Services

Temp at Receipt: 5.5C

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

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

Event and Year: July 2020

	As Received Result	Method RL	Method Reference EPA 200.2	Date Analyzed	Analyst HT
Metal Digestion	Contraction of the second second			22 Jul 20	
Lithium - Total	< 0.02 mg/1	0.020	6010D	30 Jul 20 9:08	MDE

Approved by:

Claudette 20 X K Canteo

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





Page: 1 of 1

Report Date: 31 Jul 20 Lab Number: 20-W2564 Work Order #: 82-1957 Account #: 002800 Date Sampled: 21 Jul 20 8:35 Date Received: 22 Jul 20 14:30 Sampled By: MVTL Field Services

## Temp at Receipt: 5.5C

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

Project Name: MDU Lewis & Clark

Sample Description: MW103

Event and Year: July 2020

Method Method Date As Received Analyst Result Reference Analyzed RL EPA 200.2 22 Jul 20 HT Metal Digestion JSM NA SM 4500 H+ B 21 Jul 20 8:35 7.44 units pH - Field NTU 0.1 180.1 21 Jul 20 8:35 JSM Turbidity, Field 3.7 SM 2550B 21 Jul 20 8:35 JSM 12.2 Degrees C NA Temperature - Field 21 Jul 20 8:35 JSM Conductivity - Field EPA 120.1 1316 umhos/cm 1 MDE 30 Jul 20 9:08 Lithium - Total 0.054 mg/l 0.020 6010D

Approved by:

Claudette K. Cantlo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit





Page: 1 of 1

Report Date: 31 Jul 20 Lab Number: 20-W2565 Work Order #: 82-1957 Account #: 002800 Date Sampled: 20 Jul 20 11:00 Date Received: 22 Jul 20 14:30 Sampled By: MVTL Field Services

## Temp at Receipt: 5.5C

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

Project Name: MDU Lewis & Clark

Sample Description: MW110

Event and Year: July 2020

Method Date As Received Method Analyst RL Reference Analyzed Result EPA 200.2 22 Jul 20 HT Metal Digestion 20 Jul 20 11:00 SM 4500 H+ B JSM pH - Field NA 7.40 units 20 Jul 20 11:00 JSM Turbidity, Field 180.1 4.3 NTU 0.1 20 Jul 20 11:00 JSM 15.4 Degrees C NA SM 2550B Temperature - Field EPA 120.1 20 Jul 20 11:00 JSM 1172 umhos/cm 1 Conductivity - Field 0.020 6010D 30 Jul 20 9:08 MDE Lithium - Total 0.044 mg/l

Approved by:

4Av92020 Claudette K Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit





Page: 1 of 1

Report Date: 31 Jul 20 Lab Number: 20-W2566 Work Order #: 82-1957 Account #: 002800 Date Sampled: 20 Jul 20 12:20 Date Received: 22 Jul 20 14:30 Sampled By: MVTL Field Services

#### Temp at Receipt: 5.5C

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

Project Name: MDU Lewis & Clark

Sample Description: MW119

Event and Year: July 2020

As Received Method Method Date Analyst Reference Analyzed Result RL EPA 200.2 22 Jul 20 HT Metal Digestion 20 Jul 20 12:20 JSM SM 4500 H+ B pH - Field 7.39 units NA 20 Jul 20 12:20 JSM 1.2 NTU 0.1 180.1 Turbidity, Field Degrees C NA SM 2550B 20 Jul 20 12:20 JSM 13.1 Temperature - Field EPA 120.1 20 Jul 20 12:20 JSM umhos/cm Conductivity - Field 1209 1 30 Jul 20 9:08 MDE 0.020 6010D Lithium - Total 0.047 mg/1

Approved by:

20 20 Clauditte Atia K. Cantle

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit





Page: 1 of 1

Report Date: 31 Jul 20 Lab Number: 20-W2567 Work Order #: 82-1957 Account #: 002800 Date Sampled: 21 Jul 20 10:15 Date Received: 22 Jul 20 14:30 Sampled By: MVTL Field Services

#### Temp at Receipt: 5.5C

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

Project Name: MDU Lewis & Clark

Sample Description: MW111

Event and Year: July 2020

As Received Method Method Date Analyzed Analyst Result RL Reference EPA 200.2 22 Jul 20 HT Metal Digestion 21 Jul 20 10:15 JSM 7.24 units NA SM 4500 H+ B pH - Field Turbidity, Field NTU 0.1 180.1 21 Jul 20 10:15 JSM 1.4 Degrees C NA SM 2550B 21 Jul 20 10:15 JSM 13.1 Temperature - Field EPA 120.1 21 Jul 20 10:15 JSM Conductivity - Field 4087 umhos/cm 1 MDE 30 Jul 20 9:08 0.020 Lithium - Total 0.204 mg/l 6010D

Approved by:

Clauditte K. Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit





Page: 1 of 1

Report Date: 31 Jul 20 Lab Number: 20-W2568 Work Order #: 82-1957 Account #: 002800 Date Sampled: 21 Jul 20 8:55 Date Received: 22 Jul 20 14:30 Sampled By: MVTL Field Services

#### Temp at Receipt: 5.5C

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

Bismarck ND 58501

Project Name: MDU Lewis & Clark Sample Description: MW117

#### Event and Year: July 2020

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed		Analyst
Metal Digestion	7 77 7		-	EPA 200.2	22 Jul 20	-	HT
pH - Field	7.23	units	NA	SM 4500 H+ B	21 Jul 20	8:55	JSM
Turbidity, Field	4.5	NTU	0.1	180.1	21 Jul 20	8:55	JSM
Temperature - Field	13.6	Degrees C	NA	SM 2550B	21 Jul 20	8:55	JSM
Conductivity - Field	7504	umhos/cm	1	EPA 120.1	21 Jul 20	8:55	JSM
Lithium - Total	0.140	mg/l	0.020	6010D	30 Jul 20	9:08	MDE

Approved by:

Clauditte Na 20 20 K Cantlo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit





Page: 1 of 1

Report Date: 31 Jul 20 Lab Number: 20-W2569 Work Order #: 82-1957 Account #: 002800 Date Sampled: 21 Jul 20 11:15 Date Received: 22 Jul 20 14:30 Sampled By: MVTL Field Services

#### Temp at Receipt: 5.5C

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

Project Name: MDU Lewis & Clark

Sample Description: MW118

Event and Year: July 2020

As Received Method Method Date Analyst Reference Analyzed Result RL EPA 200.2 22 Jul 20 HT Metal Digestion 21 Jul 20 11:15 JSM NA SM 4500 H+ B pH - Field 7.31 units JSM 21 Jul 20 11:15 Turbidity, Field 1.8 NTU 0.1 180.1 JSM 15.6 Degrees C NA SM 2550B 21 Jul 20 11:15 Temperature - Field EPA 120.1 21 Jul 20 11:15 JSM Conductivity - Field umhos/cm 1 1854 0.020 30 Jul 20 9:08 MDE 6010D Lithium - Total 0.106 mg/l

Approved by:

Va do 20 Clauditte K. Cantlo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND 00010

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 sample are the same on any other sample unless and conditions affecting the sample are the same or extracts from or regarding our reports is reserved pending our written approval.





Page: 1 of 1

Report Date: 31 Jul 20 Lab Number: 20-W2570 Work Order #: 82-1957 Account #: 002800 Date Sampled: 20 Jul 20 14:02 Date Received: 22 Jul 20 14:30 Sampled By: MVTL Field Services

#### Temp at Receipt: 5.5C

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

Project Name: MDU Lewis & Clark

Sample Description: MW120

Event and Year: July 2020

Date As Received Method Method Analyst Reference Analyzed Result RL EPA 200.2 22 Jul 20 HT Metal Digestion 20 Jul 20 14:02 JSM NA SM 4500 H+ B pH - Field 6.80 units JSM 20 Jul 20 14:02 Turbidity, Field 0.2 NTU 0.1 180.1 Temperature - Field Conductivity - Field 10.8 Degrees C NA SM 2550B 20 Jul 20 14:02 JSM EPA 120.1 20 Jul 20 14:02 JSM umhos/cm 6361 1 6010D 30 Jul 20 9:08 MDE 0.020 Lithium - Total 0.130 mg/1

Approved by:

Claudette K Cantlo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit



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

## **Chain of Custody Record**

Project Name:	MDU Lev	wis & Clark		Event:		July	2020		Work Ord	er Number:	1957
Report To: Attn: Address: Phone: Email:	MDU Lewis & Clark Todd Peterson 400 N. 4th St Bismarck, ND 58501 701-425-2427 Todd.Peterson@mdu.co	om		CC:					Collected I		
Lab Number	Sample ID	Dote	Time	Sample	Little Type	50 m Minic	I line Sufficient	Spec Con.	io. Ha	Tursidith CUTUS	Analysis Required
N2562	Dup 1	20 Joly 2020	NA	GW	X		NA	NA	NA	NA	
2251.2	Field Blank (FB)	21 July 2020	NA	GW	X		NA	NA	NA	NA	
2000	The second		second point and an	A DECEMBER OF STREET							
	MW103	21 July 2020	0835	GW	X		12,17	1316	7.44	3.72	
22563 22564 22565	MW103 MW110	21 July 2020 20 July 2020	1100	GW GW	X X		12,17 15,37	1316	7.44	3.72	
2256Y									1	4.33	Lithium
22564 22565 22565	MW110	20 July 2020	1100	GW	X		15,37	1172	7,40	4.33	Lithium
22564 22565 22565	MW110 MW119	20 July 2020 20 July 2020	1100 1220	GW GW	X X		15,37 13.10	1172 1209 4087 7504	7,40	4.33 1.16 1.40 4.52	Lithium
NASGY	MW110 MW119 MW111	20 July 2020 20 July 2020 21 July 2020	1100 1220 1015	GW GW GW	X X X		15,37 13.10 13.09	1172 1209 4087	7,40 7,39 7,24	4.33 1.16 1.40	Lithium

Comments:

Relinquished By		Sample	Condition	Receiv	ed By
Name	Date/Time	Location	Temp (°C)	Name	Date/Time
	22242020	Logio	5.5		2201 2020
	1430	Walk In #2	TM562 / TM805	payne	1430
2					





Page: 1 of 9

CERTIFICATE of ANALYSIS - CCR

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

Project Name: MDU Lewis & Clark

Sample Description: Dup 1

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3620 Work Order #: 82-2645 Account #: 002800 Date Sampled: 22 Sep 20 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receive Result	bd	Method RL	Method Reference	Date Analyzed		Analyst
Metal Digestion				EPA 200.2	24 Sep 20		HT
oH	* 7.5	units	0.1	SM4500-H+-B-11	24 Sep 20	17:00	SD
luoride	2.04	mg/l	0.10	SM4500-F-C	25 Sep 20		HT
ulfate	2130	mg/l	5.00	ASTM D516-11	25 Sep 20		EMS
hloride	37.7	mg/l	1.0	SM4500-Cl-E-11	28 Sep 20		SD
lercury - Total	< 0.0002	mg/l	0.0002	7470A	29 Sep 20	12:25	MDE
otal Dissolved Solids	3930	mg/l	10	USGS 11750-85	25 Sep 20	10:35	HT
alcium - Total	194	mg/l	1,0	6010D	29 Sep 20	11:01	MDE
ithium - Total	0,224	mg/l	0.020	6010D	1 Oct 20		MDE
oron - Total	8.32	mg/l	0.10	6010D	30 Sep 20	9:45	MDE
ntimony - Total	< 0.001	mg/1	0.0010	6020B	29 Sep 20	14:03	MDE
rsenic - Total	< 0.002	mg/1	0.0020	6020B	29 Sep 20	14:03	MDE
arium - Total	0.0296	mg/1	0.0020	6020B	29 Sep 20	14:03	MDE
eryllium - Total	< 0.0005	mg/1	0.0005	6020B	29 Sep 20	14:03	MDE
admium - Total	< 0.0005	mg/1	0.0005	6020B	29 Sep 20	14:03	MDE
Chromium - Total	0.0080	mg/l	0.0020	6020B	29 Sep 20	14:03	MDE
obalt - Total	< 0.002	mg/l	0.0020	6020B	29 Sep 20	14:03	MDE
ead - Total	< 0,0005	mg/l	0.0005	6020B	29 Sep 20	14:03	MDE
olybdenum - Total	0.0666	mg/l	0.0020	6020B	29 Sep 20	14:03	MDE
elenium - Total	0.0761	mg/l	0.0050	6020B	29 Sep 20	14:03	MDE
Challium - Total	< 0.0005	mg/l	0,0005	6020B	30 Sep 20		MDE

\* Holding time exceeded

Cc. Approved by: Clauditte 125CT 2020 K. Canteo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

## MVIL

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CERTIFICATE of ANALYSIS - CCR

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

Project Name: MDU Lewis & Clark

Sample Description: Field Blank (FB)

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3621 Work Order #: 82-2645 Account #: 002800 Date Sampled: 22 Sep 20 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receive Result	ed	Method RL	Method Reference	Date Analyze	d	Analyst
Metal Digestion				EPA 200.2	24 Sep	20	HT
Hq	* 6.0	units	0.1	SM4500-H+-B-11	24 Sep	20 17:00	SD
Fluoride	< 0.1	mg/l	0.10	SM4500-F-C	25 Sep	20 17:00	HT
Sulfate	< 5	mg/l	5.00	ASTM D516-11	25 Sep	20 10:30	EMS
Chloride	< 1	mg/l	1,0	SM4500-Cl-E-11	28 Sep	20 8:39	SD
Mercury - Total	< 0.0002	mg/l	0,0002	7470A	29 Sep	20 12:25	MDE
Total Dissolved Solids	< 10	mg/l	10	USGS 11750-85	25 Sep	20 10:35	HT
Calcium - Total	< 1	mg/l	1.0	6010D	29 Sep	20 11:01	MDE
Lithium - Total	< 0.02	mg/l	0.020	6010D	1 Oct	20 11:12	MDE
Boron - Total	< 0.1	mg/l	0.10	6010D	30 Sep	20 9:45	MDE
Antimony - Total	< 0.001	mg/1	0.0010	6020B	29 Sep	20 14:03	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	29 Sep	20 14:03	MDE
Barium - Total	< 0.002	mg/l	0.0020	6020B	29 Sep	20 14:03	MDE
Beryllium - Total	< 0.0005	mg/1	0.0005	6020B	29 Sep	20 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep	20 14:03	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	29 Sep	20 14:03	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	29 Sep	20 14:03	MDE
Lead - Total	< 0.0005	mg/1	0.0005	6020B	29 Sep	20 14:03	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	29 Sep	20 14:03	MDE
Selenium - Total	< 0.005	mg/1	0.0050	6020B	29 Sep	20 14:03	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	30 Sep	20 10:35	MDE

Holding time exceeded

Approved by:

10 126672020 Clauditte K. Cantlo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND || ND-00016





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CERTIFICATE of ANALYSIS - CCR

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

Project Name: MDU Lewis & Clark

Sample Description: MW103

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3622 Work Order #: 82-2645 Account #: 002800 Date Sampled: 22 Sep 20 9:10 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receive Result	bd	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	24 Sep 20	HT
pH - Field	7.30	units	NA	SM 4500 H+ B	22 Sep 20 9:10	JSM
pH	* 7.7	units	0.1	SM4500-H+-B-11	24 Sep 20 17:00	SD
Temperature - Field	13.4	Degrees C	NA	SM 2550B	22 Sep 20 9:10	JSM
Conductivity - Field	1347	umhos/cm	1	EPA 120.1	22 Sep 20 9:10	
luoride	0.73	mg/l	0.10	SM4500-F-C	25 Sep 20 17:00	HT
Sulfate	348	mg/l	5.00	ASTM D516-11	25 Sep 20 10:30	
hloride	23.2	mg/l	1.0	SM4500-C1-E-11	28 Sep 20 8:39	
Mercury - Total	< 0.0002	mg/l	0.0002	7470A	29 Sep 20 12:25	
otal Dissolved Solids	997	mg/l	10	USGS 11750-85	25 Sep 20 10:35	
Calcium - Total	106	mg/l	1.0	6010D	29 Sep 20 11:01	
hithium - Total	0.060	mg/l	0.020	6010D	1 Oct 20 11:12	MDE
Boron - Total	1.21	mg/l	0.10	6010D	30 Sep 20 9:45	
ntimony - Total	0.0042	mg/l	0.0010	6020B	29 Sep 20 14:03	MDE
Arsenic - Total	0.0022	mg/1	0.0020	6020B	29 Sep 20 14:03	
Barium - Total	0.0286	mg/1	0.0020	6020B	29 Sep 20 14:03	
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 14:03	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Cobalt - Total	0.0023	mg/l	0.0020	6020B	29 Sep 20 14:03	
Lead - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 14:03	
Molybdenum - Total	0.0202	mg/l	0.0020	6020B	29 Sep 20 14:03	
Selenium - Total	0.0444	mg/1	0.0050	6020B	29 Sep 20 14:03	
Thallium - Total	< 0.0005	mg/1	0.0005	6020B	30 Sep 20 10:3	MDE

\* Holding time exceeded

Approved by:

CC 12 OCT 2130 Claudette K. Canteo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

# MIVIL

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CERTIFICATE of ANALYSIS - CCR

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

Project Name: MDU Lewis & Clark

Sample Description: MW110

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3623 Work Order #: 82-2645 Account #: 002800 Date Sampled: 21 Sep 20 12:58 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receive Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	24 Sep 20	HT
pH - Field	7.36	units	NA	SM 4500 H+ B	21 Sep 20 12:58	JSM
oH	* 7.8	units	0.1	SM4500-H+-B-11	24 Sep 20 17:00	SD
Temperature - Field	16.9	Degrees C	NA	SM 2550B	21 Sep 20 12:58	JSM
Conductivity - Field	1124	umhos/cm	1	EPA 120.1	21 Sep 20 12:58	JSM
Fluoride	0.54	mg/l	0.10	SM4500-F-C	25 Sep 20 17:00	HT
Sulfate	204	mg/l	5.00	ASTM D516-11	25 Sep 20 10:30	EMS
Chloride	32.1	mg/l	1.0	SM4500-C1-E-11	28 Sep 20 8:39	SD
Mercury - Total	< 0.0002	mg/l	0.0002	7470A	29 Sep 20 12:25	MDE
Total Dissolved Solids	759	mg/l	10	USGS 11750-85	25 Sep 20 10:35	HT
Calcium - Total	97.0	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Lithium - Total	0.045	mg/l	0.020	6010D	1 Oct 20 11:12	MDE
Boron - Total	0.33	mg/l	0.10	6010D	30 Sep 20 9:45	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	29 Sep 20 14:03	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Barium - Total	0.0352	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 14:03	MDE
Cadmium - Total	< 0,0005	mg/l	0.0005	6020B	29 Sep 20 14:03	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Cobalt - Total	< 0.002	mg/1	0.0020	6020B	29 Sep 20 14:03	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 14:03	MDE
Molybdenum - Total	0.0037	mg/1	0.0020	6020B	29 Sep 20 14:03	MDE
Selenium - Total	< 0,005	mg/l	0.0050	6020B	29 Sep 20 14:03	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	30 Sep 20 10:35	MDE

\* Holding time exceeded

Approved by:

126CT 2020 Claudette K Cunto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016





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CERTIFICATE of ANALYSIS - CCR

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

Project Name: MDU Lewis & Clark

Sample Description: MW119

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3624 Work Order #: 82-2645 Account #: 002800 Date Sampled: 21 Sep 20 15:25 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receive Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	24 Sep 20	нт
pH - Field	7.29	units	NA	SM 4500 H+ B	21 Sep 20 15:25	JSM
pH	* 7.7	units	0.1	SM4500-H+-B-11	24 Sep 20 17:00	SD
Temperature - Field	22.0	Degrees C	NA	SM 2550B	21 Sep 20 15:25	JSM
Conductivity - Field	1195	umhos/cm	1	EPA 120.1	21 Sep 20 15:25	JSM
Fluoride	0.49	mg/l	0.10	SM4500-F-C	25 Sep 20 17:00	HT
Sulfate	210	mg/l	5.00	ASTM D516-11	25 Sep 20 10:30	EMS
Chloride	36.8	mg/l	1.0	SM4500-C1-E-11	28 Sep 20 8:39	SD
Mercury - Total	< 0.0002	mg/l	0.0002	7470A	29 Sep 20 12:25	MDE
Total Dissolved Solids	805	mg/l	10	USGS 11750-85	25 Sep 20 10:35	HT
Calcium - Total	104	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Lithium - Total	0.048	mg/l	0.020	6010D	1 Oct 20 11:12	MDE
Boron - Total	0.30	mg/l	0.10	6010D	30 Sep 20 9:45	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	29 Sep 20 14:03	MDE
Arsenic - Total	< 0.002	mg/1	0.0020	6020B	29 Sep 20 14:03	MDE
Barium - Total	0.0356	mg/1	0.0020	6020B	29 Sep 20 14:03	MDE
Beryllium - Total	< 0.0005	mg/1	0.0005	6020B	29 Sep 20 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 14:03	MDE
Chromium - Total	< 0.002	mg/1	0.0020	6020B	29 Sep 20 14:03	MDE
Cobalt - Total	< 0.002	mg/1	0.0020	6020B	29 Sep 20 14:03	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 14:03	MDE
Molybdenum - Total	0.0037	mg/1	0.0020	6020B	29 Sep 20 14:03	MDE
Selenium - Total	< 0.005	mg/1	0.0050	6020B	29 Sep 20 14:03	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	30 Sep 20 10:35	MDE

\* Holding time exceeded

Approved by:

1C Clauditte 120CT 2020 K Canteo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016





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CERTIFICATE of ANALYSIS - CCR

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

Project Name: MDU Lewis & Clark

Sample Description: MW111

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3625 Work Order #: 82-2645 Account #: 002800 Date Sampled: 22 Sep 20 13:25 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receive Result	bed	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	24 Sep 20	HT
pH - Field	7.12	units	NA	SM 4500 H+ B	22 Sep 20 13:25	JSM
pH	* 7.6	units	0.1	SM4500-H+-B-11	24 Sep 20 17:00	SD
Temperature - Field	17.2	Degrees C	NA	SM 2550B	22 Sep 20 13:25	JSM
Conductivity - Field	3846	umhos/cm	1	EPA 120.1	22 Sep 20 13:25	JSM
Fluoride	2.06	mg/l	0.10	SM4500-F-C	25 Sep 20 17:00	HT
Sulfate	1970	mg/l	5.00	ASTM D516-11	25 Sep 20 10:30	EMS
Chloride	35.8	mg/l	1:0	SM4500-Cl-E-11	28 Sep 20 8:39	SD
Mercury - Total	< 0.0002	mg/l	0.0002	7470A	29 Sep 20 12:25	MDE
Total Dissolved Solids	3840	mg/1	10	USGS 11750-85	25 Sep 20 10:35	HT
Calcium - Total	193	mg/1	1.0	6010D	29 Sep 20 11:01	MDE
Lithium - Total	0.227	mg/l	0.020	6010D	1 Oct 20 11:12	MDE
Boron - Total	8.04	mg/l	0.10	6010D	30 Sep 20 9:45	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	29 Sep 20 14:03	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Barium - Total	0.0240	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Beryllium - Total	< 0.0005	mg/1	0.0005	6020B	29 Sep 20 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 14:03	MDE
Chromium - Total	0.0061	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Lead - Total	< 0.0005	mg/1	0.0005	6020B	29 Sep 20 14:03	MDE
Molybdenum - Total	0.0534	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Selenium - Total	0.0634	mg/l	0.0050	6020B	29 Sep 20 14:03	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	30 Sep 20 10:35	MDE

\* Holding time exceeded

Approved by:

126CT 2020 Claudette K Canteo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit





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CERTIFICATE of ANALYSIS - CCR

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

Project Name: MDU Lewis & Clark

Sample Description: MW117

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3626 Work Order #: 82-2645 Account #: 002800 Date Sampled: 22 Sep 20 11:32 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receive Result	be	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	24 Sep 20	HT
pH - Field	6.99	units	NA	SM 4500 H+ B	22 Sep 20 11:32	JSM
ЪН	* 7.5	units	0.1	SM4500-H+-B-11	24 Sep 20 17:00	SD
Cemperature - Field	16.7	Degrees C	NA	SM 2550B	22 Sep 20 11:32	JSM
Conductivity - Field	7066	umhos/cm	1	EPA 120.1	22 Sep 20 11:32	JSM
luoride	0.29	mg/l	0.10	SM4500-F-C	25 Sep 20 17:00	HT
Sulfate	4960	mg/l	5.00	ASTM D516-11	25 Sep 20 10:30	EMS
Chloride	49.9	mg/l	1.0	SM4500-Cl-E-11	28 Sep 20 8:39	SD
fercury - Total	< 0.0002	mg/l	0.0002	7470A	29 Sep 20 12:25	MDE
otal Dissolved Solids	8090	mg/1	10	USGS 11750-85	25 Sep 20 10:35	HT
Calcium - Total	352	mg/1	1.0	6010D	29 Sep 20 11:01	MDE
ithium - Total	0.135	mg/l	0.020	6010D	1 Oct 20 11:12	MDE
Boron - Total	10.8	mg/1	0.10	6010D	30 Sep 20 9:45	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	29 Sep 20 14:03	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Barium - Total	0.0172	mg/1	0.0020	6020B	29 Sep 20 14:03	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 14:03	MDE
Chromium - Total	0.0031	mg/1	0.0020	6020B	29 Sep 20 14:03	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Lead - Total	< 0.0005	mg/1	0.0005	6020B	29 Sep 20 14:03	MDE
folybdenum - Total	0.0048	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Gelenium - Total	0.0322	mg/1	0.0050	6020B	29 Sep 20 14:03	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	30 Sep 20 10:35	MDE

\* Holding time exceeded

Approved by:

12OCT JOD Claudette K Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

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CERTIFICATE of ANALYSIS - CCR

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

Project Name: MDU Lewis & Clark

Sample Description: MW118

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3627 Work Order #: 82-2645 Account #: 002800 Date Sampled: 22 Sep 20 16:30 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receive Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	24 Sep 20	HT
pH - Field	7.11	units	NA	SM 4500 H+ B	22 Sep 20 16:30	JSM
OH	* 7.7	units	0.1	SM4500-H+-B-11	24 Sep 20 17:00	SD
Cemperature - Field	17.2	Degrees C	NA	SM 2550B	22 Sep 20 16:30	JSM
Conductivity - Field	1638	umhos/cm	1	EPA 120.1	22 Sep 20 16:30	JSM
luoride	1.14	mg/1	0.10	SM4500-F-C	25 Sep 20 17:00	HT
Sulfate	571	mg/l	5.00	ASTM D516-11	25 Sep 20 10:30	EMS
Chloride	22.2	mg/l	1.0	SM4500-C1-E-11	28 Sep 20 8:39	SD
Mercury - Total	< 0.0002	mg/l	0.0002	7470A	29 Sep 20 12:25	MDE
otal Dissolved Solids	1310	mg/l	10	USGS 11750-85	25 Sep 20 10:35	HT
Calcium - Total	96.9	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
ithium - Total	0.095	mg/l	0.020	6010D	1 Oct 20 11:12	MDE
Boron - Total	1.74	mg/l	0.10	6010D	30 Sep 20 9:45	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	29 Sep 20 14:03	MDE
Arsenic - Total	< 0.002	mg/1	0.0020	6020B	29 Sep 20 14:03	MDE
Barium - Total	0.0232	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 14:03	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 14:03	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Lead - Total	0.0024	mg/l	0.0005	6020B	29 Sep 20 14:03	MDE
Molybdenum - Total	0.0393	mg/l	0.0020	6020B	29 Sep 20 14:03	MDE
Selenium - Total	0.0689	mg/1	0.0050	6020B	29 Sep 20 14:03	MDE
Challium - Total	< 0.0005	mg/l	0.0005	6020B	30 Sep 20 10:35	MDE

\* Holding time exceeded

Approved by:

10 120152020 Clauditte K. Canreo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

# MIVIL

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: 9 of 9

CERTIFICATE of ANALYSIS - CCR

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

Project Name: MDU Lewis & Clark

Sample Description: MW120

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3628 Work Order #: 82-2645 Account #: 002800 Date Sampled: 22 Sep 20 10:35 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receive Result	bed	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion		7.4.15.2		EPA 200.2	24 Sep 20	HT
pH - Field	6.70	units	NA	SM 4500 H+ B	22 Sep 20 10:35	JSM
pH	* 7.6	units	0.1	SM4500-H+-B-11	24 Sep 20 18:00	SD
l'emperature - Field	12.5	Degrees C	NA	SM 2550B	22 Sep 20 10:35	JSM
Conductivity - Field	5828	umhos/cm	1	EPA 120.1	22 Sep 20 10:35	JSM
Fluoride	0.41	mg/l	0.10	SM4500-F-C	25 Sep 20 17:00	HT
Sulfate	4180	mg/l	5.00	ASTM D516-11	25 Sep 20 10:30	
Chloride	60.4	mg/l	1.0	SM4500-C1-E-11	28 Sep 20 8:39	SD
Mercury - Total	< 0.0002	mg/l	0.0002	7470A	29 Sep 20 12:25	
Total Dissolved Solids	6880	mg/l	10	USGS 11750-85	25 Sep 20 10:35	
Calcium - Total	456	mg/l	1.0	6010D	29 Sep 20 12:01	
Lithium - Total	0.135	mg/l	0.020	6010D	1 Oct 20 11:12	
Boron - Total	10.1	mg/l	0.10	6010D	30 Sep 20 9:45	
Antimony - Total	< 0.001	mg/l	0.0010	6020B	29 Sep 20 14:03	
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	29 Sep 20 14:03	
Barium - Total	0.0226	mg/l	0.0020	6020B	29 Sep 20 14:03	
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 14:03	
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 14:03	
Chromium - Total	0.0032	mg/l	0.0020	6020B	29 Sep 20 14:03	
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	29 Sep 20 14:03	
Lead - Total	0.0013	mg/l	0.0005	6020B	29 Sep 20 14:03	
Molybdenum - Total	0.0039	mg/1	0.0020	6020B	29 Sep 20 14:03	
Selenium - Total	< 0.005	mg/1	0.0050	6020B	29 Sep 20 14:03	
Thallium - Total	< 0.0005	mg/l	0.0005	60208	30 Sep 20 10:35	MDE

\* Holding time exceeded

Approved by:

CC 12 OCT dia Claudette K. Canteo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND | ND-00016



**Groundwater Assessment** 

Company:	MDU Lewis & Clark	
Event:	September 2020	
Sample ID:	103,	
Sampling Personal:	Jorh	

2616 E. Broadway Ave, Bismarck, ND

2616 E. Broadway Ave, B	ismarck, ND							Samping P		<u></u>	rem =	
Phone: (701) 258		<b>T</b> =	F	٥٢-	Wind:		@ 5-10		Precip:	Sunny (Pa	irtly Cloudy / Clou	idy
Weather Conditions	5:	Temp:	60	F	wing.	>	@ 3-10					
	WELL INFO	ORMATION	1						PLING IN	FORMATIC		
Well Locked?	YES	NO				Purging Met		Bladder			Control Set	the second s
Well Labeled?	YES	NO				Sampling M		Bladder			Purge: 5	Sec.
Casing Strait?	(YES)	NO				Dedicated E	quipment?	YES	NO		Recover: 55	Sec.
Grout Seal Intact?	YES	NO	Not V	isible						1	PSI: 20	
Repairs Necessary?						Duplicate Sa		YES	NO			
Casi	ng Diameter:	2				Duplicate Sa	ample ID:			l		
Water Level E				ft		r				I		
	epth of Well:	<u> </u>		ft			Botti	e List:				
	Nell Volume:	<u> </u>		liters		1 Liter Raw		4-1L Nitric				
	Fop of Pump:			ft		500mL Nitric						
Water Level A			U + 1 1	ft		500mL Nitric (filtered)						
Measurem	ent Method:	Electric V	Nater Level	Indicator	j	250mL Sulfur				1		
					FIE	LD READIN	IGS				· · · · · · · · · · · · · · · · · · ·	
Stabilization Para	meters	Temp.	Spec.	pH	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or	
(3 Consecuti	ve)	(°C)	Cond.	рн	(mg/L)	(mV)	(NTU)		Rate	Removed	Clarity, Color,	
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10	I	(ft)	mL/Min	l	clear, slightly tu	rbid, turbid
and the second se	0745	Start of Well	Purge									
22 Sept 2020	0750	12.44	1841	7.42	1.56	342.1	104.23	10.40	100,0	560.0	Clear	
	0570	13,39	1374	7.29	0.15	149.7	12.84	10,48	190.0	3000,0	Clear	
	0840	13.08	1352	7,30	0,14	89.2	8.60	10.48	100,0	2000,0		
	6900	13,30	1346	7.30	0.16	71.9	4,48	10.48	100,0	2000.0	cler	
	0905	(3,29	1347	7,30	0,16	72.6	4.17	10,49	100,5	500,0	dea	
	0910	13,35	1347	7,30	0.15	75.3	4.29	10.49	100.0	500.0	Ulen	
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					<u> </u>	+	ļ	<u> </u>	<u> </u>			
			1	1								

Well Stabilized? (YES)

NO

Total Volume Purged: 85000 mL

Sample Date	Time	Temp. (°C)	Spec. Cond.	рН	Turbidity (NTU)	Appearance or Comment Clarity, Color, Odor, Ect.
22 Sept 2020	0910	13,38	1347	7.30	4,29	Clen
Comments:	Field B	1mh 225	r+2020 @	ಂಕಿಯ		



**Groundwater Assessment** 

	Company:	MDU Lewis & Clark
	Event:	September 2020
	Sample ID:	1.10 ,
	Sampling Persona	1: Jen the
5-16	Precip	Sunny / Partly Cloudy / Cloudy
	SAMPLING	INFORMATION
d:	Bladder	Control Settings:
od:	Bladder	Purge: 3 Sec.
pment?	YES NC	Recover: <del>7</del> Sec.
		PSI: 20
ole?	YES NO	· · · · · · · · · · · · · · · · · · ·
1 10	T	

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

	Temp:	70	٩	Wind:	S	@ 5-10	>	Precip:	Sunny / Pa	artly Cloudy / Cloud	dy
	ORMATION	J					SAN	IPLING IN	FORMATIC	ON	
					Purging Me	thod:	Bladder			Control Sett	ings:
<b>VES</b>	NO			]	Sampling M	ethod:	Bladder			Purge: 3	Sec.
YES?	NO				Dedicated E	quipment?	YES	(NO)		necover.	Sec.
YES,	NO	Not V	'isible	]						PSI: 20	
					Duplicate Sa	ample?	YES	(NØ			
Diameter:	2	11		]	Duplicate Sa	imple ID:		-			
fore Purge:	B.96	2	ft	]					-		
oth of Well:			ft	]		Bottl	e List:				
ell Volume:	^		liters		1 Liter Raw		4-1L Nitric				
p of Pump:			ft		500mL Nitric						
ter Sample:					500mL Nitric	(filtered)					
nt Method:	Electric V	Vater Level	Indicator		250mL Sulfu	ic					
				FIE	LD READIN	GS					
eters	Temp.	Spec.	11	DO	ORP	Turbidity	Mator Loval	Pumping	mL	Appearance or C	Comment
2)	(°C)	Cond.	рн	(mg/L)	(mV)	(NTU)	water Lever	Rate	Removed	Clarity, Color, O	dor, Ect.
Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turl	oid, turbid
1143	Start of Well	Purge									
1148	16:49	1129	7.36	2.27	141.3	52.46	9.01	100,0			
1218	16.35	1124	7.35	1.85	179.7			1000			
1248	16.72	1123	7.35	the second s					3000,0	Clean	
1253	16.80							100.00	500,0	Clear	
1253	16.87	1124	1.36	1,60	185.0	4.91	9.06	100,0	500,0	clas	
	VELL INFC YES YES TES Diameter: fore Purge: oth of Well: ell Volume: p of Pump: ter Sample: nt Method: neters ) Time 11 4 3 11 4 6 12 4 6 12 4 6 12 5 3	VELL INFORMATIONYESNOYESNOYESNOYESNOYESNOStart of Well: $16.69$ ell Volume: $$ p of Pump: $$ ter Sample: $9.6$ I Method:Electric VtetersTemp.I Method:Electric VTime $\pm 0.5^{\circ}$ II M 3Start of WellI M 4 $16.49$ I M 5 $16.35$ I 246 $16.35$ I 246 $16.60$	VELL INFORMATIONYESNOYESNOYESNOYESNOYESNONot V3 Diameter:2"fore Purge: $\beta_1 9.6$ oth of Well: $16.65$ ell Volume:	VELL INFORMATIONYESNOYESNOYESNOYESNOYESNONot Visible3 Diameter:2"Gree Purge: $B, 9, 6$ Gree Purge: $B, 9, 6$ ftftell Volume:litersp of Pump:ftter Sample: $9, 0, 6$ ftftter Sample: $10, 6$ ft <tr< td=""><td>VELL INFORMATIONYESNOYESNOYESNOYESNONot VisibleTore Purge:<math>B, 9.6</math>Bill<math>16, 85</math>Tore Purge:<math>B, 9.6</math>Tore Purge:<math>B, 9.6</math>Itersp of Pump:Time<math>16, 85</math>Temp.Spec.p of Pump:Time<math>\pm 0.5^{\circ}</math><math>\pm 0.5^{\circ}</math><math>\pm 5\%</math>Time<math>\pm 0.5^{\circ}</math><math>\pm 10.5^{\circ}</math><math>\pm 5\%</math>Time<math>\pm 0.5^{\circ}</math><math>\pm 10.4^{\circ}</math><math>1129</math>Time<math>16, 49</math><math>1143</math>Start of Well Purge<math>1148</math><math>16, 49</math><math>1124</math><math>7, 35</math><math>1248</math><math>16, 35</math><math>1248</math><math>16, 35</math><math>1248</math><math>16, 30</math><math>1253</math><math>7, 35</math><math>1, 86</math><math>1263</math><math>16, 80</math><math>123</math><math>7, 35</math><math>1, 86</math></td><td>VELL INFORMATIONYESNOPurging MetVESNONot VisibleYESNONot VisibleYESNONot VisibleJameter:2"Giameter:2"Join of Well:<math>l6.85</math>Itersftell Volume:Iitersp of Pump:ftSoomL NitricSoomL NitricSoomL NitricSoomL SuffurFIELD READINII Here to 5°Temp.Spec.pHDOORP(°C)Cond.PHDOII H 3Start of Well PurgeII H 3Start of Well PurgeII H 3II 2 48II H 3II 2 47II H 3II 2 48II 2 48I 6.35II 2 49I. 35II 2 48I 6.35II 2 43II 23II 2 53I. 68I 2 53I 2 60I 12 3II 2 53I 68I 12 3II 2 63</td><td>VELL INFORMATIONYES<math>(MO)</math>Purging Method: Sampling Method: Dedicated Equipment?YESNONot VisibleYESNONot Visibleg Diameter:2"Groe Purge:<math>\beta_1 \circ (\beta_1) \in ft</math>g Diameter:2"fore Purge:<math>\beta_1 \circ (\beta_2) \in ft</math>ell Volume:litersp of Pump:fteter sample:<math>\gamma_1 \circ (\beta_2) \in ft</math>Iter ramp.Spec.pHDOORTurbiditymetersTemp.<math>(°C)</math>cond.pHDOORP<math>(°C)</math>cond.PH<math>(°C)</math>cond.pH<math>(1 + 3)</math>Start of Well Purge<math>(1 + 4)</math><math>(1 + 3)</math><math>(1 + 4)</math><math>(1 + 4)</math></td><td>SAWYES(NOYESNOYESNOYESNOYESNOYESNOYESNOYESNOYESNOYESNOYESNOYESNOYESNOYESNOYESNOYESNOYESNOYESNOYESNOYESNONoNot VisibleDiameter:2"<td>SAMPLING INYESNOPurging Method:BladderYESNONot VisibleDedicated Equipment?YESYESNONot Visiblegiameter:2"Duplicate Sample?YESgioameter:2"CNO?YESNONot Visiblegioameter:2"Duplicate Sample?YESgioameter:2"CNO?YESNONot 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LevelPumpingmetersTemp.Spec.pHDOORP(rc)cond.pHDO(mg/L)(mV)(mV)(NTU)Water LevelRateRemovedTime<math>10.5^\circ</math><math>17.45</math><math>10.45</math><math>17.45</math><math>10.45</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>11.43</math><math>12.44</math>&lt;</td><td>SAMPLING INFORMATIONYESNOPurging Method:BladderControl Sett<math>\underline{VES}</math>NODedicated Equipment?YESNOYESNONot VisibleDedicated Equipment?YESNO<math>\underline{VES}</math>NONot VisibleDuplicate Sample?YESNO<math>\underline{VES}</math>NONot VisibleDuplicate Sample?YESNO<math>\underline{VES}</math>NONot VisibleDuplicate Sample?YESNO<math>\underline{VES}</math>NOIttersDoDuplicate 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Sample?YESNO<math>\underline{VES}</math><math>\underline{VES}</math><math>\underline{VES}</math><math>\underline{NO}</math>Duplicate Sample?YES<math>\underline{NO}</math><math>\underline{VES}</math>NOIttersBottle List:<math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{VES}</math><math>\underline{VES}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{VES}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math></td></td>	SAMPLING INYESNOPurging Method:BladderYESNONot VisibleDedicated Equipment?YESYESNONot Visiblegiameter:2"Duplicate Sample?YESgioameter:2"CNO?YESNONot Visiblegioameter:2"Duplicate Sample?YESgioameter:2"CNO?YESNONot Visiblegioameter:2"CNO?YESCNO?Duplicate Sample?YESCNO?Duplicate Sample?YESCNO?Duplicate Sample?YESCNO?Duplicate Sample?YESCNO?Duplicate Sample?YESCNO?Duplicate Sample?YESCNO?Duplicate Sample?YESCNO?Duplicate Sample?YESCNO?Difter Sample?YESCNO?Difter Sample?YESCNO?SoomL NitricSoomL NitricSoomL SuffuricFIELD READINGSFIELD READINGSPetersTemp.Spec.OOORPTurbidityI' 4' 3Start of Well PurgeI' 4' 3Start of Well PurgeI' 4' 4' 1/297.362.27I' 4' 5' 1/6:35I'24'7.35I' 5' 1/20:35I'24'I'23'I' 4' 5' 1/6:35I'24'I'23'I' 4' 5' 1/6:36I'24'I'23'I' 4' 5' 1/6:30I'24'I' 4' 5' 1/6:30 <td>SAMPLING INFORMATIONYESNOBladder<math>\sqrt{ES}</math>NONot VisibleYESNONot VisibleDiameter:2"Core Purge:<math>8,96</math>ftBit of Well:<math>16,85</math>It itersBottle List:DifferenceIttersp of Purp:ftSompling Method:Bottle List:Bottle List:1 Liter Raw4 - 1L NitricSoomL NitricSoomL NitricSoomL NitricSoomL NitricSoomL SulfuricFIELD READINGSFile ReadingsWater LevelPumpingmetersTemp.Spec.pHDOORP(rc)cond.pHDO(mg/L)(mV)(mV)(NTU)Water LevelRateRemovedTime<math>10.5^\circ</math><math>17.45</math><math>10.45</math><math>17.45</math><math>10.45</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>17.45</math><math>1.92</math><math>11.43</math><math>12.44</math>&lt;</td> <td>SAMPLING INFORMATIONYESNOPurging Method:BladderControl Sett<math>\underline{VES}</math>NODedicated Equipment?YESNOYESNONot VisibleDedicated Equipment?YESNO<math>\underline{VES}</math>NONot VisibleDuplicate Sample?YESNO<math>\underline{VES}</math>NONot VisibleDuplicate Sample?YESNO<math>\underline{VES}</math>NONot VisibleDuplicate Sample?YESNO<math>\underline{VES}</math>NOIttersDoDuplicate Sample?YESNO<math>\underline{VES}</math><math>\underline{VES}</math><math>\underline{VES}</math><math>\underline{NO}</math>Duplicate Sample?YES<math>\underline{NO}</math><math>\underline{VES}</math>NOIttersBottle List:<math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{VES}</math><math>\underline{VES}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{VES}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math><math>\underline{I}</math></td>	SAMPLING INFORMATIONYESNOBladder $\sqrt{ES}$ NONot VisibleYESNONot VisibleDiameter:2"Core Purge: $8,96$ ftBit of Well: $16,85$ It itersBottle List:DifferenceIttersp of Purp:ftSompling Method:Bottle List:Bottle List:1 Liter Raw4 - 1L NitricSoomL NitricSoomL NitricSoomL NitricSoomL NitricSoomL SulfuricFIELD READINGSFile ReadingsWater LevelPumpingmetersTemp.Spec.pHDOORP(rc)cond.pHDO(mg/L)(mV)(mV)(NTU)Water LevelRateRemovedTime $10.5^\circ$ $17.45$ $10.45$ $17.45$ $10.45$ $17.45$ $1.92$ $17.45$ $1.92$ $17.45$ $1.92$ $17.45$ $1.92$ $17.45$ $1.92$ $17.45$ $1.92$ $17.45$ $1.92$ $17.45$ $1.92$ $17.45$ $1.92$ $17.45$ $1.92$ $11.43$ $12.44$ <	SAMPLING INFORMATIONYESNOPurging Method:BladderControl Sett $\underline{VES}$ NODedicated Equipment?YESNOYESNONot VisibleDedicated Equipment?YESNO $\underline{VES}$ NONot VisibleDuplicate Sample?YESNO $\underline{VES}$ NONot VisibleDuplicate Sample?YESNO $\underline{VES}$ NONot VisibleDuplicate Sample?YESNO $\underline{VES}$ NOIttersDoDuplicate Sample?YESNO $\underline{VES}$ $\underline{VES}$ $\underline{VES}$ $\underline{NO}$ Duplicate Sample?YES $\underline{NO}$ $\underline{VES}$ NOIttersBottle List: $\underline{I}$ $\underline{I}$ $\underline{I}$ $\underline{I}$ $\underline{VES}$ $\underline{VES}$ $\underline{I}$ $\underline{VES}$ $\underline{I}$

								Water Level			
(3 Consecuti	ve)	] (°C)	Cond.	рН	(mg/L)	(mV)	(NTU)	Water Level	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
21 Sep + 2020	1143	Start of Well	Purge								
4 Jept 0-20	1148	16.49	1129	7.36	2.27	141.3	52.46	9.01	100,0	500.0	Clear
	1218	16.35	1124	7.35	1.85	179.7	11.30	9,05	1000	3000.0	Clear
	1248	16.72	1123	7.35	1.88	182.9	4.97	9.05	100.0	3000.0	Clea
	1253	16.80	1123	7.35	1.88	189.3	4.82	9.06	100.00	500.0	Clear
	1253	16.37	1124	1.36	1,60	185.0	4.91	9.06	100,0	500,0	clas
				1							
	Well S	tabilized?	YES	NO				Total Vo	lume Purged	: 7500,0	_mL
		Temp.	Spec.	·			Turbidity				Appearance or Comment
Sample Date	Time	(°C)	Cond.	рН			(NTU)				Clarity, Color, Odor, Ect.
	1258	16.87	1124	7.36			4.91				Clear



**Groundwater Assessment** 

MDU Lewis & Clark
September 2020
119
Sm Hhm

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Weather Conditions:	Temp:	7-5°F	Wind:	505-10	Precip:	Sunny / Partly Cloudy / Cloudy
WELL	INFORMATION				SAMPLING I	NFORMATION

	WELL INFO	RIVIATION	
Well Locked?	YES	(NO)	
Well Labeled?	¥ES	NO	
Casing Strait?	YES	NO	
Grout Seal Intact?	YES	NO	Not Visible
Repairs Necessary?			
Casin	g Diameter:	2"	
Water Level B	efore Purge:	8, 6,	2 ft
Total De	pth of Well:		- ft
V	Vell Volume:		liters
Depth to T	op of Pump:	·	
Water Level A	fter Sample:	8.92	2 ft
	ent Method:	Electric W	ater Level Indicator

	SAIV	IPLING IN	ΓC
Purging Method:	Bladder		
Sampling Method:	Bladder		
Dedicated Equipment?	YES	NO)	
Duplicate Sample?	YES	NO	
Duplicate Sample ID:			

MATION	
Control Settings:	
Purge: 5	Sec.
Recover: 35	Sec.

PSI: 20

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

#### **FIELD READINGS**

Stabilization Parar	neters	Temp.	Spec.		DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comment
(3 Consecutive	e)	(°C)	Cond.	pН	(mg/L)	(mV)	(NTU)	water Lever	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
216 +2-20	1400	Start of Well	Purge								
21 Sept 2020	1405	18.18	1189	7.29	1.61	163,3	28,59	8.87	100.0	500,0	Clear
	1435	19.40	1186	7.29	0.80	101.1	37.66	8,63	100.0		Clear
	1455	21.77	1197	7.29	0.83	105.1	11.98	6,09	120	8000.0	Clear
	1515	21,83	1192	7.29	0.92	191.2	4.87	8,89	100.0	2000.0	Clean
	1520	21.96	1202	7.29	0.94	192.5	3.05	8,89	100.0	50.0	Clear
	1525	21.95	1195	7.29	0.97	186.2	2.93	8,88	120.0	500.0	Clim
	Well Sta	abilized?	YES	NO				Total Vo	ume Purged:	8500,0	mL

Comula Data	Time	Temp.	Spec.	рH	Turbidity	Appearance or Comment
Sample Date	Time	(°C)	Cond.	рп	(NTU)	Clarity, Color, Odor, Ect.
21 Ser 72020	1525	21.95	1195	7.29	2.93	Class
Comments:	I					



Groundwater Assessment

 $\sim$ 

YES

Spec.

Cond. 3846 NO

pН

7.12

Well Stabilized?

Time

1325

Temp.

(°C)

17.16

-	Company:		MDU Lewis & Clark September 2020					
et	Event:							
	Sample ID:			,				
	Sampling Per	sonal:	Jant	by-				
			$\sim$					
5 @5-14	) Pr	ecip:	Sunny / Partly C	Cloudy & Cloud	ју			
	SAMP	LING IN	FORMATION					
g Method:	Bladder		1	Control Sett	ings:			
ing Method:	Bladder		Purge	: 5	Sec.			
ated Equipment?	YES	(NO)	Recov	ver: 55	Sec.			
		(	PSI:	20				
ate Sample?	YES >	CNO-	1					

Total Volume Purged: 7500.0 mL

Appearance or Comment

Clarity, Color, Odor, Ect.

Clis

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9		<del></del>		· 0 F	Mind	<u> </u>	8	3	Dragin	Cummer / Dr	the Cloudy & Cloudy	
Weather Conditions:		Temp:	<u>BS</u>	- F	Wind:	<u> </u>	@5-10		Precip:	Sunny / ea	artly Cloudy & Cloudy	
١	<b>NELL INFO</b>	ORMATIO	N					SAN	IPLING IN	FORMATIC	N	
Well Locked?	YES	NÒ			]	Purging Me	thod:	Bladder			Control Settings	:
Well Labeled?	YES	NO			]	Sampling M	ethod:	Bladder			Purge: 5	Sec
Casing Strait?	(YES)	NO		- ~	]	Dedicated E	quipment?	YES		]	Recover: 55	Sec
Grout Seal Intact?	YES	NO	Not V	/isible						-	PSI: 20	
Repairs Necessary?					]	Duplicate Sa		(YES)	VNO-			
Casing	g Diameter:		2"			Duplicate Sa	ample ID:	Du	1			
Water Level Be	fore Purge:	Fet	33	ft				•	ι <u> </u>	-		
Total Dep	oth of Well:		~	ft	1		Bottl	e List:		]		
	ell Volume:		<b>`</b>	liters	_	1 Liter Raw 4- 1L Nitric						
Depth to To				ft	500mL Nitric							
Water Level Af	ter Sample:			ft	500mL Nitric (filtered)							
Measureme	nt Method:	Electric	Water Level	Indicator		250mL Sulfuric				J		
					FIE	LD READIN	IGS					
Stabilization Param	neters	Temp.	Spec.	-11	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Com	nent
(3 Consecutive	2)	(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)	Waler Lever	Rate	Removed	Clarity, Color, Odor,	Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, t	urbid
ZzSeptzozo	1210	Start of Wel	Purge				1					
CC Sept Com	1215	16.93	4416	7.00	0,68	221.9	19.10	7.88	(2).0	500.0	Clear	
	1245	16.87	4153	7.04	0,49	186.1	17.90	7.88	[ivo. 0	3090,0	Clear	
	1305	17.06	3917	7.10	1.57	122.0	8.64	7.80	100.0	2000.0	Clear	
	1315	16.80	3874	1.12	1.87	78.1	4.98	7.88	100.0	1000.0	Ckr	
	1320	17.00	3861	7.12	1.93	72,3	3,53	7,89	120.0	50.0	Clear	······
[	1325	17,16	3846	7.12	2.04	70,1	2.65	7,89	100.0	500.0	Clu	
[					1	]					1	

Turbidity

(NTU)

2.65

Sample Date

22 Sept 2020



Groundwater Assessment

MDU Lewis & Clark
September 2020
. 117,
Dipto

Purge: 5

PSI: 20

Recover: 55

**Control Settings:** 

Sec.

Sec.

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Weather Conditions:	Temp:	60 °F	Wind:	5@5-10	Precip:	Sunny / Partly Cloudy / Cloudy
WELL	INFORMATION	1			SAMPLING I	NFORMATION

	WELL INFO	KIVIATION	
Well Locked?	YES	(NO)	
Well Labeled?	YES	NO	
Casing Strait?	YES	NO	
Grout Seal Intact?	YES	NO	Not Visible
Repairs Necessary?			
Casir	ng Diameter:	2"	
Water Level B	efore Purge:	5.8	o ft
Total De	epth of Well:	11.5	7 ft
V	Vell Volume:	3.5	5 liters
Depth to T	op of Pump:	9.40	3 ft
Water Level A	fter Sample:	Below	Pump ft
	ent Method:		ater Level Indicator

	3711	IL LING
Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	NO
Duplicate Sample?	YES	NO
Duplicate Sample ID:	1 63	

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	NO
Duplicate Sample?	YES	(NIO
Duplicate Sample ID:		

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

#### FIELD READINGS

					1 3 8-0						
Stabilization Para	meters	Temp.	Spec.		DO	ORP	Turbidity	Water Level	Pumping	ու	Appearance or Comment
(3 Consecuti	ve)	(°C)	Cond.	pН	(mg/L)	(mV)	(NTU)	Waler Lever	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
21 Sut 2020	1640	Start of Well	Purge	· · · · · · · · · · · · · · · · · · ·							
- ( -   '	1645	Thils	7384	7,05	7.69	267.2	18,77	6.65	150.0	750,0	Clear
	1700	16.14	7432	7.05	8.01	232.6	Z4.06	9,00	150.0	2250,0	Clear
	1715	16.38	7458	7.13	7.19	267.8	5.30	BelowPury	150.0	2250,0	Clear
		Purged	Drie					ì			
			,								
22 Sept 2020	1127	Pursed	well for	- Smin	to cle	or line		6.08			
(	1132	16.68	7066	6.99	6.47	237.4	2.79	6.30	100,0	500.0	Clis
	Well St	tabilized?	YES	NO				Total Vol	ume Purged:	5750.0	mL
Causala Data	<b></b>	Temp.	Spec.				Turbidity				Appearance or Comment
Sample Date	Time	100	Cond	рH	1		(AITER)			1	Clarity Color Odor Ect

22 Sept 2020	1(32	16,68	7066	6.99	(NTU) 2. 79	
Comments:			5 <sup>3</sup> 5 201			



**Groundwater Assessment** 

Company:	MDU Lewis & Clark
Event:	September 2020
Sample ID:	118
Sampling Personal:	Jes the

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Filone. (701) 200-5720				-		
Weather Conditions:	Temp:	ି ଅନ	Wind:	5 @ 5-10	Precip:	Sunny / Partly Cloudy / Cloudy
WFU	INFORMATION				SAMPLING I	NFORMATION

	WELL INFO	KIVIATION	
Well Locked?	YES	(NO)	
Well Labeled?	YES	NO	
Casing Strait?	(YES)	NO	
Grout Seal Intact?	(YES)	NO	Not Visible
Repairs Necessary?			
Casir	ng Diameter:	2"	
Water Level B	efore Purge:	Bi3	3 ft
Total De	epth of Well:	······	— ft
V	Vell Volume:		– liters
Depth to T	op of Pump:		- ft
Water Level A	fter Sample:	8,4	50 ft
Measurem	ent Method:	Electric W	ater Level Indicator

	SAIV	FLING IN
Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	(NO)
Duplicate Sample?	YES	NO

Bottle List:

4-1L Nitric

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

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

#### FIELD READINGS

1 Liter Raw 500mL Nitric 500mL Nitric (filtered) 250mL Sulfuric

Stabilization Para	meters	Temp.	Spec.		DO	ORP	Turbidity	Matan Laural	Pumping	mL	Appearance or Comment
(3 Consecuti	ve)	(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)	Water Level	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
+2-7-0	1540	Start of Well	l Purge								2
22 septrozo	1545	21.92	1795	7.27	3.81	201.7	181.35	8.44	1205	5020	Clear
·	1615	17.25	1569	7.09	4.03	201.0	2.66	8,46	100.0	3000,0	Clear
	1620	17.15	1613	7.09	3,91	199.0	1.51	8,46	100,0	5000	Clim
	(625	12.15	1630	7.10	3,87	195,8	1,89	8.47	00.0	500,0	Char
	1630	17,19	1638	7.11	3,65	191.4	1.32	B,47	100.0	500,0	Clear
		•									
							-				
<u>.</u>		<u> </u>		<u></u>	<u></u>	L			·.		
	Well St	abilized?	(YES)	NO				Total Vol	ume Purged:	50000	mL
Sample Date	Time	Temp.	Spec.	рН	1		Turbidity				Appearance or Comment
Sample Date	Time	(°C)	Cond.	рп			(NTU)				Clarity, Color, Odor, Ect.
	1630	17.19	1638	7.4			584				Clear

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**Groundwater Assessment** 

Company:	MDU Lewis & Clark	
Event:	September 2020	
Sample ID:	120 ,	
Sampling Personal:	Janj Phy-	
·····	1 1	

2616 E. Broadway Ave, Bismarck, ND

2616 E. Broadway Ave, Bisi								Sampling P	croonal.	^	7 Pm-
Phone: (701) 258-9 Weather Conditions:	/20	Temp:	65	°F	Wind:	2	0,~20		Precip:	Sunny / P	artly Cloudy/ Cloudy
V	VELL INFO	ORMATION	1		· · · · · · · · · · · · · · · · · · ·		<u></u>			IFORMATI	ON
Well Locked?	YES	NO			]	Purging Me	thod:	Bladder		1	Control Settings:
Well Labeled?	YES?	NO			1	Sampling N	lethod:	Bladder		1	Purge: Se
Casing Strait?	YES	NO	$\sim$	$\rightarrow$	]	Dedicated I	Equipment?	YES	(NO)	]	Recover: 55 Se
Grout Seal Intact?	YES	NO	(Not V	isible	]						PSI: 20
Repairs Necessary?						Duplicate S	ample?	YES	NO		
	Diameter:	2'				Duplicate S	ample ID:			]	
Water Level Ber		14.	41	ft							
Total Dep	oth of Well:			ft			Bottl	e List:			
	ell Volume:			liters	]	1 Liter Raw		4-1L Nitric			
Depth to To		L		ft	]	500mL Nitric	:				
Water Level Aft				ft		500mL Nitric	•				
Measuremer	nt Method:	Electric W	Vater Level	Indicator	J	250mL Sulfu	ric				
					FIE		IGS				
Stabilization Param	eters	Temp.	Spec.	рH	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comment
(3 Consecutive	)	(°C)	Cond.	μn	(mg/L)	(mV)	(NTU)		Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10	1	(ft)	mL/Min		clear, slightly turbid, turbid
22 Sept 2020	1000	Start of Well	-								
l L	1005	11.7S	6099	6,70	0.44	212.1	0.84	14.56	100.0	500,0	Clear
	1015	12.13	5562	6,70	0,64	156.8	1.13	14.65	100.0	1000.0	Cha
Ý L	1020	12.22	5535	b.70	0.73	93.4	0.75	14.68	100,0	500.0	Class
	1025	12.34	5620	6.70	0.65	66.0	0.24	14,70	100.0	500.0	Cluar
Ļ	1030	12,48	5686	6.70	0.62	59,4	0,19	14.71	(00.0	5220	Oler
-	1035	12.49	5828	6.70	0.62	57.3	0.21	14,73	100.0	500.0	(led
Ļ											
ŀ		<b> </b>			<b> </b>	<u> </u>		ļ			
ŀ											
I	Well Sta	bilized?	(YES)	NO	J	l	<u>L</u>	I Total Vo	l lume Purged	: 3500,0	1 mL
Carrie Data		Temp.	Spec.		1		Turbidity				Appearance or Comment
Sample Date	Time	(°C)	Cond.	рН	1		(NTU)				Clarity, Color, Odor, Ect.
			conu.		1	1	, ,,,,,,,		1	1	

Comments:



Surface water Assessment

Company:	MDU Lewis & Clark	
Event:	September 2020	_
Sample ID:	— ,	
Sampling Personal:	Jen the	_
		_

2616 E. Broadway Ave, Bismarck, ND 223

Phone: (701) 258-9720

Weather Conditions:	Temp:	60	°F	Wind:	3	@ 5-10	Precip: Sunny / Partly Cloudy / Cloudy
Well ID	Date	Time	Casing Diameter	Water Level (ft)			Comments
MW101	22 Sept 2020	0952	2"	9.06			
MW105	22 Sept 2020	1730	2"	8,75			
MW106	22 Sept 2020	1536	2"	9.44			
MW107	22 Sept 2020	0954	2"	ન'3૬			
MW108	22 Sept 2020	1203	2"	16.03			
MW116	2 Sept 2020	1201	2"	11.82			

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### MINNESOTA VALLEY TESTING LABORATORIES, INC.

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#### Quality Control Report

Lab IDs: 20-W3620 to 20	LCS Spike Amt	LCS Rec %	oject: MI LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix	082-264: Matrix Spike % Rec Limits		MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Antimony - Total mg/l	0.1000	102	80-120	0.400 0.400 0.400	20W3529q 20W3627q 20W3646q	0.0037 < 0.001 < 0.001	0.3928 0.3962 0.4056	97 99 101	75-125 75-125 75-125	0.3928 0.3962 0.4056	0.4134 0.3990 0.4124	102 100 103	5.1 0.7 1.7	20 20 20	- - -		< 0.001
Arsenic - Total mg/l	0.1000	96	80-120	0.400 0.400 0.400	20W3529q 20W3627q 20W3646q	0.0039 < 0.002 0.0026	0.3810 0.3876 0.3956	94 97 98	75-125 75-125 75-125	0.3810 0.3876 0.3956	0.3982 0.3874 0.4000	99 97 99	4.4 0.1 1.1	20 20 20	-	-	< 0.002
Barium - Total mg/l	0.1000	96	80-120	$\begin{array}{c} 0.400 \\ 0.400 \\ 0.400 \end{array}$	20W3529q 20W3627q 20W3646q	0.2434 0.0232 0.0660	0.5874 0.4074 0.4472	86 96 95	75-125 75-125 75-125	0.5874 0.4074 0.4472	0.6052 0.3964 0.4608	90 93 99	3.0 2.7 3.0	20 20 20	-	-	< 0.002
Beryllium - Total mg/l	0.1000	96	80-120	0.400 0.400 0.400	20W3529q 20W3627q 20W3646q	<0.0005 <0.0005 <0.0005	0.3708 0.4204 0.4278	93 105 107	75-125 75-125 75-125	0.3708 0.4204 0.4278	0.3946 0.4136 0.4344	99 103 109	6.2 1.6 1.5	20 20 20		- - -	< 0.000
Boron - Total mg/l	0.40	98	80-120	2.00	20-W3627	1.74	3.54	90	75-125	3.54	3.51	88	0.9	20	-	-	< 0.1 < 0.1
Cadmium - Total mg/l	0.1000	102	80-120	0.400 0.400 0.400	20W3529q 20W3627q 20W3646q	< 0.0005 < 0.0005 < 0.0005	0.3704 0.3974 0.4068	93 99 102	75-125 75-125 75-125	0.3704 0.3974 0.4068	0.3926 0.3978 0.4132	98 99 103	5.8 0.1 1.6	20 20 20	- -	- - -	< 0.0005
Calcium - Total mg/l	20.0 20.0	114 114	80-120 80-120	500 500 500	20W3626q 20W3651q 20W3654q	352 22.8 266	880 545 760	106 104 99	75-125 75-125 75-125	880 545 760	880 540 765	106 103 100	0.0 0.9 0.7	20 20 20		- - -	< 1 < 1 < 1 < 1
Chloride mg/l	30.0 30.0	97 97	80-120 80-120	30.0	20-W3621	< 1	31.0	103	80-120	31.0	30.8	103	0.6	20	-	-	< 1 < 1
Chromium - Total mg/l	0.1000	95	80-120	$\begin{array}{c} 0.400 \\ 0.400 \\ 0.400 \end{array}$	20W3529q 20W3627q 20W3646q	0.0066 < 0.002 < 0.002	0.3820 0.3940 0.3954	94 98 99	75-125 75-125 75-125	0.3820 0.3940 0.3954	0.3894 0.3894 0.4036	96 97 101	1.9 1.2 2.1	20 20 20		-	< 0.002
Cobalt - Total mg/l	0.1000	95	80-120	0.400 0.400 0.400	20W3529q 20W3627q 20W3646q	<0.002 <0.002 <0.002	0.3714 0.3896 0.3924	93 97 98	75-125 75-125 75-125	0.3714 0.3896 0.3924	0.3886 0.3888 0.4038	97 97 101	4.5 0.2 2.9	20 20 20	-		< 0.002

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MEMBER ACIL

#### **Quality Control Report**

Lab IDs: 20-W3620 to 20-W	/3628	Pr	oject: MI	DU Lewis	s & Clark		Work Oi		.082-2645		r			r	1	r	
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
Fluoride mg/l	0.50	106	90-110	0.500	20-W3624	0.49	1.00	102	80-120	1.00	1.01	104	1.0	20	-	-	< 0.1 < 0.1
Lead - Total mg/l	0.1000	96	80-120	0.400 0.400 0.400	20W3529q 20W3627q 20W3646q	< 0.0005 0.0024 < 0.0005	0.3528 0.3880 0.3906	88 96 98	75-125 75-125 75-125	0.3528 0.3880 0.3906	0.3694 0.3816 0.3986	92 95 100	4.6 1.7 2.0	20 20 20			< 0.0005
Lithium - Total mg/l	0.400	108	80-120	0.400	20-W3627	0.095	0.523	107	75-125	0.523	0.530	109	1.3	20			< 0.02 < 0.02 < 0.02
Mercury - Total mg/l	0.0020	95	85-115	0.002 0.002 0.002	20-D3095 20-W3627 20-W3665	<0.0002 <0.0002 <0.0002	0.0017 0.0017 0.0015	85 85 75	70-130 70-130 70-130	0.0017 0.0017 0.0015	0.0017 0.0017 0.0015	85 85 75	0.0 0.0 0.0	20 20 20		-	< 0.0002
Molybdenum - Total mg/l	0.1000	102	80-120	0.400 0.400 0.400	20W3529q 20W3627q 20W3646q	0.1346 0.0393 0.0023	0.5064 0.4310 0.3952	93 98 98	75-125 75-125 75-125	0.5064 0.4310 0.3952	0.5516 0.4292 0.4028	104 97 100	8.5 0.4 1.9	20 20 20		- - -	< 0.002
pH units				-	-	-	-			7.7 7.4	8.1 7.5	-	5.1 1.3	20 20			-
Selenium - Total mg/l	0.1000	98	80-120	$\begin{array}{c} 0.400 \\ 0.400 \\ 0.400 \\ 0.400 \end{array}$	20W3529q 20W3627q 20W3646q	0.0124 0.0689 < 0.005	0.3872 0.5140 0.4320	94 111 108	75-125 75-125 75-125	0.3872 0.5140 0.4320	0.3810 0.4890 0.4414	92 105 110	1.6 5.0 2.2	20 20 20	- - -	- - -	< 0.005
Sulfate mg/l	100	97	80-120	100	20-W3621	< 5	97.1	97	80-120	97.1	96.6	97	0.5	20	-	-	< 5
Thallium - Total mg/l	0.1000	90	80-120	$\begin{array}{c} 0.400\\ 0.400\end{array}$	20-W3627 20-W3646	< 0.0005 < 0.0005	0.3528 0.3614	88 90	75-125 75-125	0.3528 0.3614	0.3472 0.3638	87 91	1.6 0.7	20 20	-	-	< 0.0005
Total Dissolved Solids mg/l	-	-	- `	-	-	-	-	-	-	3410 1660	3410 1660		0.0 0.0	20 20	-	-	< 10

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**Quality Control Report** Lab IDs: 20-W3620 to 20-W3628

**Project:** MDU Lewis & Clark

Work Order: 202082-2645

Samples were received in good condition on 24 Sep 2020 at 0740.

Temperature upon receipt at the Bismarck laboratory was 5.3°C.

All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.

With the exception of pH, all holding times were met.

Approved methodology was followed for all sample analyses.

All acceptance criteria were met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/duplicates unless noted here.

Approved by: \_\_\_\_\_ C. Gurl 120CT 2020

2616 E. Broadway Ave MVTL Bismarck, ND 58501

#### (701) 258-9720

### **Chain of Custody Record**

Project Name:	MDU Lev	wis & Clark		Event:		Se	ept	em	ber 2020		1.1. White the second secon	er Number: 82-20	
Report To: Attn: Address: Phone: Email:	MDU Todd Peterson 400 N. 4th St Bismarck, ND 58501 701-425-2427 Todd.Peterson@mdu.co	om		CC:							Collected	By: - 1 hr-	
Lab Number	Sample ID	Oate	lime	Sample	11/00	Son Raw	Soo Miter	250 militie	Tenor Continue	Spec. Con.	in Ha	Turbidi (NTU)	Analysis Required
WBe20	Dup 1	22 Sept 2020	NA	GW	X	X	X	X	NA	NA	NA	NA	
W362)	Field Blank (FB)	22 Sept 200	NA	GW	X	X	X	x	NA	NA	NA	NA	
WZODD	MW103	22 Sept 2020	0910	GW	X	X	X	X	13.38	1347	7.30	4.29	
W3623	MW110	21 Sept2020	1258	GW	X	X	X	X	16.87	1124	7.36	4.91	
W3624	MW119	21 Sept 2020	1525	GW	X	X	X	X	21.95	1195	7.29	2.93	
W3625	MW111	22 50+2020	1325	GW	_	X	X	X	17.16	3846	7.12	2.65	MDU Lewis & Clark List
W3626	MW117	22 Sept 2020	1132	GW	X	X	X	X	16.68	7066	6.99	2.79	
WELDOT	MW118	22 Sept 2020	1630	GW	X	X	X	X	17.19	1638	7.11	1.32	
W3698	MW120	22 Set 2020	1035	GW	X	X	x	x	12,49	2628	6.70	0.21	-
						_	-	-	-			-	

Comments:

Relinguished By		Sample	Condition	Recei	ived By
Name	Date/Time	Location	Temp (°C)	Name	Date/Time
1 ~ ~ ~	245472020	Walk In #2	5.3 TM562 / TM809	Ely Delaw	045cpt 220 0740
2 1. 7				<u> </u>	

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CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: Dup 1

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3620 Work Order #: 82-2645 Account #: 002800 Date Sampled: 22 Sep 20 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receive Result	be	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	24 Sep 20	HT
Total Suspended Solids	5	mg/l	2	USGS 13765-85	24 Sep 20 14:12	HT
Total Alkalinity	444	mg/l CaCO3	20	SM2320B-11	24 Sep 20 17:00	SD
Nitrate-Nitrite as N	10.4	mg/l	0.10	EPA 353.2	1 Oct 20 8:57	EV
Mercury - Dissolved	< 0.0002	mg/1	0.0002	EPA 245.1	29 Sep 20 13:10	MDE
Magnesium - Total	561	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Sodium - Total	144	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Potassium - Total	13.6	mg/1	1.0	6010D	29 Sep 20 11:01	MDE
Calcium - Dissolved	191	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Magnesium - Dissolved	537	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Sodium - Dissolved	138	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Potassium - Dissolved	12.7	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Lithium - Dissolved	0.219	mg/l	0.020	6010D	1 Oct 20 11:12	MDE
Boron - Dissolved	8.15	mg/l	0.10	6010D	30 Sep 20 12:45	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	29 Sep 20 15:50	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Barium - Dissolved	0.0236	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	
Cadmium - Dissolved	< 0.0005	mg/1	0.0005	6020B	29 Sep 20 15:50	MDE
Chromium - Dissolved	0.0057	mg/l	0.0020	6020B	29 Sep 20 15:50	
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Lead - Dissolved	< 0,0005	mg/l	0.0005	6020B	29 Sep 20 15:50	MDE
Molybdenum - Dissolved	0.0518	mg/l	0.0020	6020B	29 Sep 20 15;50	MDE
Selenium - Dissolved	0.0652	mg/l	0.0050	6020B	29 Sep 20 15:50	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	30 Sep 20 10:35	

\* Holding time exceeded

10 120(12020 Approved by: Clauditte K. Cantlo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

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CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: Field Blank (FB)

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3621 Work Order #: 82-2645 Account #: 002800 Date Sampled: 22 Sep 20 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

Date

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receive Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	24 Sep 20	HT
Total Suspended Solids	< 2	mg/l	2	USGS 13765-85	24 Sep 20 14:12	HT
Total Alkalinity	< 20	mg/l CaCO3	20	SM2320B-11	24 Sep 20 17:00	SD
Nitrate-Nitrite as N	< 0.1	mg/l	0.10	EPA 353.2	1 Oct 20 8:57	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	29 Sep 20 13:10	MDE
Magnesium - Total	< 1	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Sodium - Total	< 1	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Potassium - Total	< 1	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Calcium - Dissolved	< 1	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Agnesium - Dissolved	< 1	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Sodium - Dissolved	< 1	mg/1	1.0	6010D	29 Sep 20 11:01	MDE
Potassium - Dissolved	< 1	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Lithium - Dissolved	< 0.02	mg/l	0.020	6010D	1 Oct 20 11:12	MDE
Boron - Dissolved	< 0.1	mg/l	0,10	6010D	30 Sep 20 12:45	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	29 Sep 20 15:50	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Barium - Dissolved	< 0.002	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	MDE
Molybdenum - Dissolved	< 0.002	mg/1	0.0020	6020B	29 Sep 20 15:50	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	29 Sep 20 15:50	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	30 Sep 20 10:35	MDE

A 44.54

\* Holding time exceeded

Approved by:

1C

12 OCT 20 20

Claudetle K. Carroll, Laboratory Manager, Bismarck, ND

K Canto

RL = Method Reporting Limit

Clauditte





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CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: MW103

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3622 Work Order #: 82-2645 Account #: 002800 Date Sampled: 22 Sep 20 9:10 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receiv Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	24 Sep 20	HT
Total Suspended Solids	< 2	mg/l	2	USGS 13765-85	24 Sep 20 14:1	2 HT
pH - Field	7.30	units	NA	SM 4500 H+ B	22 Sep 20 9:1	0 JSM
Temperature - Field	13.4	Degrees C	NA	SM 2550B	22 Sep 20 9:1	0 JSM
Fotal Alkalinity	368	mg/l CaCO3	20	SM2320B-11	24 Sep 20 17:0	0 SD
Conductivity - Field	1347	umhos/cm	1	EPA 120.1	22 Sep 20 9:1	0 JSM
Nitrate-Nitrite as N	12.2	mg/l	0.10	EPA 353.2	1 Oct 20 8:5	7 EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	29 Sep 20 13:1	0 MDE
Magnesium - Total	109	mg/1	1.0	6010D	29 Sep 20 11:0	1 MDE
Sodium - Total	82.3	mg/l	1.0	6010D	29 Sep 20 11:0	1 MDE
Potassium - Total	8.9	mg/l	1.0	6010D	29 Sep 20 11:0	1 MDE
Calcium - Dissolved	99.2	mg/l	1,0	6010D	29 Sep 20 11:0	1 MDE
Magnesium - Dissolved	108	mg/l	1.0	6010D	29 Sep 20 11:0	1 MDE
Sodium - Dissolved	79.7	mg/l	1.0	6010D	29 Sep 20 11:0	1 MDE
Potassium - Dissolved	8.7	mg/l	1.0	6010D	29 Sep 20 11:0	1 MDE
Lithium - Dissolved	0.058	mg/l	0.020	6010D	1 Oct 20 11:1	2 MDE
Boron - Dissolved	1.16	mg/l	0.10	6010D	30 Sep 20 12:4	5 MDE
Antimony - Dissolved	0.0037	mg/l	0.0010	6020B	29 Sep 20 15:5	0 MDE
Arsenic - Dissolved	0.0025	mg/1	0.0020	6020B	29 Sep 20 15:5	0 MDE
Barium - Dissolved	0.0236	mg/l	0.0020	6020B	29 Sep 20 15:5	0 MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:5	0 MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:5	0 MDE
Chromium - Dissolved	< 0.002	mg/1	0.0020	6020B	29 Sep 20 15:5	0 MDE
Cobalt - Dissolved	< 0.002	mg/1	0.0020	6020B	29 Sep 20 15:5	
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:5	0 MDE
Aolybdenum - Dissolved	0.0192	mg/l	0.0020	6020B	29 Sep 20 15:5	
Selenium - Dissolved	0.0465	mg/l	0.0050	6020B	29 Sep 20 15:5	
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	30 Sep 20 10:3	5 MDE

\* Holding time exceeded

1C 120CT 30.30 Approved by: Claudette K. Cantlo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

## MVT

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



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CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: MW110

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3623 Work Order #: 82-2645 Account #: 002800 Date Sampled: 21 Sep 20 12:58 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receive Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	24 Sep 20	НТ
Total Suspended Solids	4	mg/1	2	USGS 13765-85	24 Sep 20 14:12	HT
oH - Field	7.36	units	NA	SM 4500 H+ B	21 Sep 20 12:58	JSM
Cemperature - Field	16.9	Degrees C	NA	SM 2550B	21 Sep 20 12:58	JSM
otal Alkalinity	367	mg/l CaCO3	20	SM2320B-11	24 Sep 20 17:00	SD
Conductivity - Field	1124	umbos/cm	1	EPA 120.1	21 Sep 20 12:58	JSM
litrate-Nitrite as N	7.00	mg/l	0.10	EPA 353.2	1 Oct 20 8:57	EV
lercury - Dissolved	< 0.0002	mg/1	0.0002	EPA 245.1	29 Sep 20 13:10	MDE
Magnesium - Total	62.1	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Sodium - Total	95.1	mg/1	1.0	6010D	29 Sep 20 11:01	MDE
Potassium - Total	8.2	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Calcium - Dissolved	93.6	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Magnesium - Dissolved	58.9	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Sodium - Dissolved	90.3	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Potassium - Dissolved	7.7	mg/l	1.0	6010D	29 Sep 20 11:01	
Jithium - Dissolved	0.044	mg/l	0.020	6010D	1 Oct 20 11:12	MDE
Boron - Dissolved	0.33	mg/l	0.10	6010D	30 Sep 20 12:45	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	29 Sep 20 15:50	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Barium - Dissolved	0.0299	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	MDE
Cadmium - Dissolved	< 0,0005	mg/1	0.0005	6020B	29 Sep 20 15:50	
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	29 Sep 20 15:50	
Cobalt - Dissolved	< 0.002	mg/1	0.0020	6020B	29 Sep 20 15:50	
Lead - Dissolved	< 0,0005	mg/1	0.0005	6020B	29 Sep 20 15;50	
Molybdenum - Dissolved	0.0034	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Selenium - Dissolved	< 0.005	mg/1	0,0050	6020B	29 Sep 20 15:50	MDE
Thallium - Dissolved	< 0.0005	mg/l	0,0005	6020B	30 Sep 20 10:35	MDE

\* Holding time exceeded

Approved by:

16 Clauditte 120CT 2020 K Canreo

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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CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: MW119

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3624 Work Order #: 82-2645 Account #: 002800 Date Sampled: 21 Sep 20 15:25 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receive Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	24 Sep 20	HT
Total Suspended Solids	3	mg/1	2	USGS 13765-85	24 Sep 20 14:12	HT
pH - Field	7.29	units	NA	SM 4500 H+ B	21 Sep 20 15:25	JSM
Temperature - Field	22.0	Degrees C	NA	SM 2550B	21 Sep 20 15:25	JSM
Total Alkalinity	381	mg/1 CaCO3	20	SM2320B-11	24 Sep 20 17:00	SD
Conductivity - Field	1195	umhos/cm	1	EPA 120.1	21 Sep 20 15:25	JSM
Nitrate-Nitrite as N	8.65	mg/l	0.10	EPA 353.2	1 Oct 20 8:57	EV
Mercury - Dissolved	< 0,0002	mg/l	0.0002	EPA 245.1	29 Sep 20 13:10	MDE
Magnesium - Total	62.5	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Sodium - Total	97.6	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Potassium - Total	8.8	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Calcium - Dissolved	100	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Magnesium - Dissolved	61.8	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Sodium - Dissolved	96.1	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Potassium - Dissolved	8.7	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Lithium - Dissolved	0.046	mg/l	0.020	6010D	1 Oct 20 11:12	MDE
Boron - Dissolved	0.29	mg/1	0.10	6010D	30 Sep 20 12:45	MDE
Antimony - Dissolved	< 0.001	mg/1	0.0010	6020B	29 Sep 20 15:50	MDE
Arsenic - Dissolved	< 0.002	mg/1	0.0020	6020B	29 Sep 20 15:50	MDE
Barium - Dissolved	0.0330	mg/1	0.0020	6020B	29 Sep 20 15:50	MDE
Beryllium - Dissolved	< 0.0005	mg/1	0.0005	6020B	29 Sep 20 15:50	MDE
Cadmium - Dissolved	< 0.0005	mg/1	0.0005	6020B	29 Sep 20 15:50	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	MDE
Molybdenum - Dissolved	0.0036	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	29 Sep 20 15:50	MDE
Fhallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	30 Sep 20 10:35	MDE

\* Holding time exceeded

Approved by:

CC 12007 20 20 Claudette K. Cantlo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

## MIVIL

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CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: MW111

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3625 Work Order #: 82-2645 Account #: 002800 Date Sampled: 22 Sep 20 13:25 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receiv Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	24 Sep 20	HT
Total Suspended Solids	4	mg/l	2	USGS 13765-85	24 Sep 20 14:12	HT
oH - Field	7.12	units	NA	SM 4500 H+ B	22 Sep 20 13:25	JSM
Cemperature - Field	17.2	Degrees C	NA	SM 2550B	22 Sep 20 13:25	JSM
otal Alkalinity	454	mg/l CaCO3	20	SM2320B-11	24 Sep 20 17:00	SD
Conductivity - Field	3846	umhos/cm	1	EPA 120.1	22 Sep 20 13:25	JSM
litrate-Nitrite as N	10.5	mg/l	0.10	EPA 353.2	1 Oct 20 8:57	EV
lercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	29 Sep 20 13:10	MDE
Magnesium - Total	551	mg/1	1.0	6010D	29 Sep 20 11:01	MDE
Sodium - Total	142	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Potassium - Total	13.2	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
alcium - Dissolved	190	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
lagnesium - Dissolved	534	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
odium - Dissolved	138	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
otassium - Dissolved	12.7	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
ithium - Dissolved	0.218	mg/1	0.020	6010D	1 Oct 20 11:12	MDE
Soron - Dissolved	7.78	mg/l	0.10	6010D	30 Sep 20 12:45	MDE
ntimony - Dissolved	< 0.001	mg/1	0.0010	6020B	29 Sep 20 15:50	MDE
rsenic - Dissolved	< 0.002	mg/1	0.0020	6020B	29 Sep 20 15:50	MDE
Sarium - Dissolved	0.0231	mg/1	0.0020	6020B	29 Sep 20 15:50	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	MDE
Cadmium - Dissolved	< 0.0005	mg/1	0.0005	6020B	29 Sep 20 15:50	MDE
Chromium - Dissolved	0.0057	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Cobalt - Dissolved	< 0,002	mg/1	0.0020	6020B	29 Sep 20 15:50	MDE
ead - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	MDE
olybdenum - Dissolved	0.0506	mg/1	0.0020	6020B	29 Sep 20 15:50	MDE
elenium - Dissolved	0.0691	mg/1	0.0050	6020B	29 Sep 20 15:50	MDE
hallium - Dissolved	< 0,0005	mg/l	0.0005	6020B	30 Sep 20 10:35	MDE

\* Holding time exceeded

Approved by:

Clauditte 120052020 K. Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

#### MINNES 1126 North F 2616 East Bro 1201 Lincoln

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CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: MW117

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3626 Work Order #: 82-2645 Account #: 002800 Date Sampled: 22 Sep 20 11:32 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receive Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion		1		EPA 200.2	24 Sep 20	HT
Total Suspended Solids	5	mg/1	2	USGS 13765-85	24 Sep 20 14:12	HT
oH - Field	6.99	units	NA	SM 4500 H+ B	22 Sep 20 11:32	JSM
Cemperature - Field	16.7	Degrees C	NA	SM 2550B	22 Sep 20 11:32	JSM
Total Alkalinity	375	mg/l CaCO3	20	SM2320B-11	24 Sep 20 17:00	SD
Conductivity - Field	7066	umhos/cm	1	EPA 120.1	22 Sep 20 11:32	JSM
Nitrate-Nitrite as N	39.4	mg/l	0.10	EPA 353.2	1 Oct 20 8:57	EV
lercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	29 Sep 20 13:10	MDE
Magnesium - Total	965	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Jodium - Total	570	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Potassium - Total	28.4	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Calcium - Dissolved	340	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
lagnesium - Dissolved	940	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
odium - Dissolved	560	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
otassium - Dissolved	28.1	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
ithium - Dissolved	0.130	mg/l	0.020	6010D	1 Oct 20 11:12	MDE
Boron - Dissolved	10.3	mg/l	0.10	6010D	30 Sep 20 12:45	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	29 Sep 20 15:50	MDE
rsenic - Dissolved	< 0.002	mg/1	0.0020	6020B	29 Sep 20 15:50	MDE
Barium - Dissolved	0.0164	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Bervllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	MDE
Chromium - Dissolved	0.0023	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
obalt - Dissolved	< 0.002	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
ead - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	MDE
olybdenum - Dissolved	0.0046	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Selenium - Dissolved	0.0362	mg/l	0.0050	6020B	29 Sep 20 15:50	MDE
Challium - Dissolved	< 0.0005	mg/l	0.0005	6020B	30 Sep 20 10:35	MDE

\* Holding time exceeded

Claudette 120072020 Approved by: K. Canico

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL - Method Reporting Limit

CERTIFICATION: ND # ND-00016





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CERTIFICATE OF ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: MW118

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3627 Work Order #: 82-2645 Account #: 002800 Date Sampled: 22 Sep 20 16:30 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receiv Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	24 Sep 20	HT
Total Suspended Solids	3	mg/1	2	USGS 13765-85	24 Sep 20 14:12	HT
pH - Field	7.11	units	NA.	SM 4500 H+ B	22 Sep 20 16:30	JSM
Temperature - Field	17.2	Degrees C	NA	SM 2550B	22 Sep 20 16:30	JSM
Cotal Alkalinity	342	mg/l CaCO3	20	SM2320B-11	24 Sep 20 17:00	SD
Conductivity - Field	1638	umhos/cm	1	EPA 120.1	22 Sep 20 16:30	JSM
Nitrate-Nitrite as N	8.05	mg/l	0.10	EPA 353.2	1 Oct 20 8:57	EV
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	29 Sep 20 13:10	MDE
Magnesium - Total	155	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Sodium - Total	88.5	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Potassium - Total	8.9	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Calcium - Dissolved	101	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Magnesium - Dissolved	161	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Sodium - Dissolved	90.5	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Potassium - Dissolved	9.3	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
ithium - Dissolved	0.097	mg/l	0.020	6010D	1 Oct 20 11:12	MDE
Boron - Dissolved	1.68	mg/l	0.10	6010D	30 Sep 20 13:45	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	29 Sep 20 15:50	MDE
Arsenic - Dissolved	< 0.002	mg/l	0,0020	6020B	29 Sep 20 15:50	MDE
Barium - Dissolved	0.0230	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
ead - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	MDE
Molybdenum - Dissolved	0.0404	mg/l	0.0020	6020B	29 Sep 20 15:50	MDE
Selenium - Dissolved	0.0752	mg/1	0.0050	6020B	29 Sep 20 15:50	MDE
Thallium - Dissolved	< 0,0005	mg/l	0.0005	6020B	30 Sep 20 10:35	MDE

\* Holding time exceeded

Approved by:

1C Claudette 120CT 2020 K. Cantep

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016





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CERTIFICATE of ANALYSIS - STATE

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

Project Name: MDU Lewis & Clark

Sample Description: MW120

Event and Year: September 2020

Report Date: 9 Oct 20 Lab Number: 20-W3628 Work Order #: 82-2645 Account #: 002800 Date Sampled: 22 Sep 20 10:35 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 5.3C

	As Receiv Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	24 Sep 20	HT
Total Suspended Solids	5	mg/l	2	USGS 13765-85	24 Sep 20 14:12	HT
pH - Field	6.70	units	NA	SM 4500 H+ B	22 Sep 20 10:35	JSM
Temperature - Field	12.5	Degrees C	NA	SM 2550B	22 Sep 20 10:35	JSM
Fotal Alkalinity	674	mg/l CaCO3	20	SM2320B-11	24 Sep 20 18:00	SD
Conductivity - Field	5828	umhos/cm	1	EPA 120.1	22 Sep 20 10:35	JSM
Nitrate-Nitrite as N	4.30	mg/l	0.10	EPA 353.2	1 Oct 20 8:57	
Mercury - Dissolved	< 0.0002	mg/1	0.0002	EPA 245.1	29 Sep 20 13:10	
Magnesium - Total	875	mg/1	1.0	6010D	29 Sep 20 12:01	MDE
Sodium - Total	368	mg/l	1.0	6010D	29 Sep 20 12:01	MDE
Potassium - Total	30.6	mg/l	1.0	6010D	29 Sep 20 12:01	MDE
Calcium - Dissolved	426	mg/1	1.0	6010D	29 Sep 20 11:01	MDE
Magnesium - Dissolved	790	mg/l	1.0	6010D	29 Sep 20 11:01	
Sodium - Dissolved	338	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
Potassium - Dissolved	27.8	mg/l	1.0	6010D	29 Sep 20 11:01	MDE
ithium - Dissolved	0.125	mg/l	0.020	6010D	1 Oct 20 11:12	
Boron - Dissolved	9.25	mg/l	0.10	6010D	30 Sep 20 13:45	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	29 Sep 20 15:50	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	29 Sep 20 15:50	
Barium - Dissolved	0.0204	mg/1	0.0020	6020B	29 Sep 20 15:50	
Beryllium - Dissolved	< 0.0005	mg/1	0.0005	6020B	29 Sep 20 15:50	MDE
Cadmium - Dissolved	< 0.0005	mg/1	0.0005	6020B	29 Sep 20 15:50	MDE
Chromium - Dissolved	0.0026	mg/1	0.0020	6020B	29 Sep 20 15:50	MDE
Cobalt - Dissolved	< 0.002	mg/1	0.0020	6020B	29 Sep 20 15:50	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Sep 20 15:50	
Molybdenum - Dissolved	0.0030	mg/1	0.0020	6020B	29 Sep 20 15:50	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	29 Sep 20 15:50	
Challium - Dissolved	< 0.0005	mg/l	0.0005	6020B	30 Sep 20 10:35	MDE

\* Holding time exceeded

Approved by:

10 20(72020 Clauditte K Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016



Groundwater Assessment

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2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258		<b>T</b>	5.0	<u>ог</u>	Mind		0 7 7		Precip:	Suppy / D-	artly Cloudy / Cloudy	
Veather Conditions		Temp:	60		Wind:	>_	@ 5-10		•			
		ORMATIO	V		1	<u> </u>			IPLING IN	FORMATIO		
Vell Locked?	YES	NO				Purging Me		Bladder			Control Settings	
Vell Labeled?	VES/	NO				Sampling N		Bladder			Purge: 5	See
Casing Strait?	YES	NO	Math			Dedicated I	quipment?	YES	NO		Recover: 55	Se
irout Seal Intact?	YES	NO		isible				<u> </u>	10	1	PSI: 20	
Repairs Necessary?	<u> </u>					Duplicate S		YES	NO	-		
	ng Diameter:	2		6		Duplicate S	ample ID:			1		
Water Level B			0	ft		r				1		
	epth of Well:		~	ft			Botti	e List:		4		
	Vell Volume:			liters		1 Liter Raw		4- 1L Nitric				
	op of Pump			ft		500mL Nitric						
Water Level A			0.49	ft		500mL Nitric						
Measurem	ent Method:	Electric	Nater Level	Indicator		250mL Sulfu	ric			]		
					FIE	LD READIN	IGS					
Stabilization Para	meters	Temp.	Spec.	pН	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comr	
(3 Consecutiv	ve)	(°C)	Cond.	рп	(mg/L)	(mV)	(NTU)		Rate	Removed	Clarity, Color, Odor,	
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, t	urbid
22 5-+2:222	0745	Start of Well					<u>.</u>			•		
22 Sept 2020	0750	12.44	1841	7.42	1,56	342.1	104.23	10.46	100.0	SWD	Clear	
	0520	13,39	1374	7.29	0.15	149.7	12.84	10,48	190.0	3000,0	Clos	
	0870	13.08	1352	7,30	0,14	892	8.60	10.48	100,0	2000.0	Clear	
	6900	13,30	1346	7.30	0.16	71.9	4,48	10.48	100.0	2000.0	den	
	0905	(3,29	1347	7,30	0,16	72.6	4.17	10,49	100,3	500,0	dea	
	0910	13,35	1347	7,30	0.15	75.3	4.29	10.49	100.0	500.0	Cles	
							````					
	Well St	abilized?	YES	NO				Total Vo	lume Purged	8500.0	- <sup>mL</sup>	
Samala Data	Time	Temp.	Spec.	рН		1	Turbidity				Appearance or Com	
Sample Date	lime	(°C)	Cond.	Ри			(NTU)				Clarity, Color, Odor,	Ect.
22 Sept 2020	0910	13,30	1347	7.30			4,29				Clen	
Comments:			Lango o	0900								
Johnmenns.	Field B	lank 225	7 1. Su &	0500								



**Groundwater Assessment** 

**Electric Water Level Indicator** 

Com	bany:	MDU Lewis & Clark
Even	t:	September 2020
Samp	ole ID:	7,10
Samp	oling Personal:	Jen the
	Deserte	Contraction ( Development of the Classical Strength of the Classical S
-10	Precip:	Sunny / Partly Cloudy / Cloudy
	SAMPLING I	NFORMATION

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Measurement Method:

Weather Conditions:	T	emp:	70 °F	Wind:	<u> </u>	2	Precip:	Sunny / I	artiy Cloudy /	Cloudy	
V	VELL INFOR	RMATION				SAN	<b>IPLING IN</b>	FORMAT	ION		
Well Locked?	YES	NO			Purging Method:	Bladder			Contr	ol Settings:	
Well Labeled?	<b>VES</b>	NO			Sampling Method:	Bladder		]	Purge: 3		Sec.
Casing Strait?	(YES)	NO			Dedicated Equipment?	YES	(NO)		Recover: 7		Sec.
Grout Seal Intact?	YES,	NO	Not Visible					_	PSI: 20		
Repairs Necessary?					Duplicate Sample?	YES	(NO)				
	Diameter:	2"			Duplicate Sample ID:						
Water Level Be	fore Purge:	B.96	ft					_			
Total Dep	oth of Well:	16.85	ft		Bottle	e List:					
	ell Volume:		liters		1 Liter Raw	4-1L Nitric					
Depth to To	p of Pump:		ft		500mL Nitric						
Water Level Aft		9.00	ہ ft	_	500mL Nitric (filtered)						

## FIELD READINGS

250mL Sulfuric

Stabilization Para	meters	Temp.	Spec.	-11	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comment
(3 Consecutiv	re)	(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)	waler Lever	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
21 Sep + 2020	1143	Start of Well	Purge								
4 sept of the	1148	16.49	1129	7.36	227	141.3	52.46	9.01	100,0	500.0	Clear
	1218	16.35	1124	7.35	1.85	179.7	11.30	9,05	100.0	3000.0	Clear
	1248	16.72	1123	7.35	1.68	182.9	4.97	9,05	120.0	3000.0	Clea
	1253	16.80	1123	7.35	1.83	189.3	4.82	9.06	100.0	500.0	Clear
	1253	16.37	1124	7,36	1.60	185.0	4.91	9.06	100,0	500.0	cla
				T	T						
					1						
				1							
		T									
	Well St	abilized?	YES	NO		• · · · · · · · · · · · · · · · · · · ·		Total Vo	lume Purged:	7500,0	mL
Coursela Data		Temp.	Spec.	-11		1	Turbidity				Appearance or Comment
Sample Date	Time	(°C)	Cond.	рН			(NTU)			[	Clarity, Color, Odor, Ect.
21 Sept 202	1258	16.87	1124	7.36			4.91				Clear

Comments:



**Groundwater Assessment** 

1DU Lewis & Clark
eptember 2020
119
Sm Hhr

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Weather Conditions:	Temp:	7-S °F	Wind:	50 5-10	Precip:	Sunny / Partly Cloudy / Cloudy
WEL	LINFORMATION				SAMPLING I	NFORMATION

WELLINFORMATION										
Well Locked?	YES	(NO)								
Well Labeled?	<b>VES</b>	NO								
Casing Strait?	YES	NO								
Grout Seal Intact?	YES	NO	Not Visible							
Repairs Necessary?										
Casin	g Diameter:	2"								
Water Level B	efore Purge:	8, 6,	2 ft							
Total De	pth of Well:		- ft							
W	/ell Volume:		liters							
Depth to T	op of Pump:	~	- ft							
Water Level A	fter Sample:	8.92	2 ft							
Measureme	ent Method:	Electric W	ater Level Indicator							

	SAN	1PLING IN
Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	NO)
Duplicate Sample?	YES	NO
Duplicate Sample ID:		

Control Sett	ings:
Purge: 5	Sec.
Recover: 35	Sec.
PSI: 20	

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

## FIELD READINGS

Stabilization Para	meters	Temp.	Spec.	pН	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comment
(3 Consecutiv	/e)	(°C)	Cond.	рп	(mg/L)	(mV)	(NTU)	water Lever	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
215 +2-20	1400	Start of Well	l Purge								
21Set2020	1405	18.18	1189	7.29	1.61	183.3	28,59	8.87	100.0	500,0	Clear
	1435	19.48	1186	7.29	0.80	181.1	37.66	BBB	100.0	3000,0	Clear
	1455	21.77	1197	7.29	0.63	105.1	11.98	6,9,9	10,0	B000.0	Clear
	1515	21,83	1192	7.29	0.92	191.2	4.87	8,69	(00.0	2000.0	Clear
	1520	21.96	1202	7.29	0.94	192.5	3.05	8,89	100.0	50.0	Clear
	1525	21.95	1195	7.29	0.97	186.2	2.93	8,88	120.0	500.0	Clim
				· · · · · · · · ·							
		L		L							
	Well St	abilized?	TES	NO				Total Vol	ume Purged:	8500,0	mL
Sample Date	Time	Temp.	Spec.	ъH			Turbidity				Appearance or Comment

Sample Date	Time	(°C)	Cond.	рп	(NTU)	Clarity, Color, Odor, Ect.
21 Ser + 2020	1525	21.95	1195	7.29	2.93	Clear
Comments:						



**Groundwater Assessment** 

Company:	MDU Lewis & Clark						
Event:	September 2020						
Sample ID:							
Sampling Personal:	Jan Man						
······································	$\sim$						
-, O Precip:	Sunny / Partly Cloudy & Cloudy						

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Weather Conditions:	Ţ	emp:	<u>BS°F</u>	Wind:	5 @5-10	)	Precip:	Sunny / P	artly Cloudy 🖇 Clo	oudy
W	ELL INFO	RMATION				SAN	IPLING IN	NFORMATI	ON	
Well Locked?	YES	(NO)			Purging Method:	Bladder		7	Control S	ettings:
Well Labeled?	YES	NO			Sampling Method:	Bladder	_	7	Purge: 5	Sec.
Casing Strait?	(YES)	NO	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Dedicated Equipment?	YES	(NO)	1	Recover: 55	Sec.
Grout Seal Intact?	YES	NO	Not Visible			_	(		PSI: 20	
Repairs Necessary?					Duplicate Sample?	(YES)	NO-	7		
Casing	Diameter:	2"			Duplicate Sample ID:	- The	1	1		
Water Level Befo	ore Purge:	7.83	ft				t	4		
Total Dept	h of Well:	$\sim$	ft		Bottle	e Lîst:		7		
Wel	I Volume:	<u> </u>	liters		1 Liter Raw	4-1L Nitric		1		
Depth to Top	of Pump:		ft		500mL Nitric					
Water Level Afte	r Sample:	791	ft		500mL Nitric (filtered)					
Measurement	t Method:		er Level Indicator		250mL Sulfuric					

					FIE	ld readin	IGS						
Stabilization Para	meters	Temp.	Spec.		DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comment		
(3 Consecutive)		(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)	Water Level	Rate	Removed	Clarity, Color, Odor, Ect.		
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid		
22 Septero	1210	Start of Wel	Start of Well Purge										
CC spi con	1215	16.93	4416	7.00	0.68	221.9	19.10	7.88	12.0	500.0	Clear		
	1245	16.87	4153	7.04	0.49	186.1	17.90	7.65	100.0	3000.0	clear		
	1305	17.06	3917	7.10	1.57	122.0	8.64	7.80	100.0	2000.0			
	1315	16.80	3824	1.12	1.87	76.1	4.98	7.88	100.0	1000.0	<u>Clear</u>		
	1320	17.00	3861	7.12	1.93	72.3	3,53	7.69	120	50.0	Clear		
	1325	17,16	3846	7.12	2.04	70,1	2.65	7,89	100.0	500.0	Clar		
	Well St	abilized?	YES	NO				Total Vol	ume Purged:	7500.0	mL		
Sample Date	Time	Temp.	Spec.	рН			Turbidity				Appearance or Comment		
Jampie Date	Time	(°C)	Cond.				(NTU)				Clarity, Color, Odor, Ect.		
22 Sept 2020	1325	17.16	3846	7.12			2.65				Cles		
Comments:	T	· · · · · · · · · · · · · · · · · · ·											



Groundwater Assessment

Company:	MDU Lewis & Clark	
Event:	September 2020	
Sample ID:	. 117,	
Sampling Personal:	In Mar	
· · · · · · · · · · · · · · · · · · ·		

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

WELL INFORMATION								
Well Locked?	YES	(NO)						
Well Labeled?	VES-	NO						
Casing Strait?	YES	NO						
Grout Seal Intact?	YES	NO	Not Visible					
Repairs Necessary?								
Casir	ng Diameter:	2"						
Water Level B	efore Purge:	5.80	o ft					
Total De	epth of Well:	11.5	ft ft					
V	Vell Volume:	3.5	5 liters					
Depth to T	op of Pump:	9.40	3 ft					
Water Level A	fter Sample:	Below	Pump ft					
Measureme	ent Method:	Electric W	ater Level Indicator					

## SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	NO
Duplicate Sample?	YES	NO
Duplicate Sample!	ILJ	

Bottle List:

4-1L Nitric

UN	
Control Set	tings:
Purge: 5	Sec.
Recover: 55	Sec.
PSI: 20	

250mL Sulfuric	

500mL Nitric (filtered)

1 Liter Raw

500mL Nitric

					FIEL	.D READIN	GS				
Stabilization Para	meters	Temp.	Spec.	pН	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comment
(3 Consecutiv	(3 Consecutive)		Cond.	рп	(mg/L)	(mV)	(NTU)	water Lever	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
21 Suf 2020	1640	Start of Well	Purge								
	1645	16.15	7384	7,05	7.69	267.2	18.77	6.65	150.0	750,0	Clear
	1700	16.14	7432	7.05	8.01	232.6	Z4.06	9,00	150.0	2250,0	Clear
	1715	16.38	7458	7.13	7.19	267.B	5.30	BelowPury	150.0	2250,0	Clear
		Purged	Drie								
22 Sept 2020	1127	Purged	well for			or line		6.08			
L	132	16,68	7066	6.99	6.47	237.4	2.79	6.30	100,0	500.0	Cles
	well St	abilized?	YES	NO				lotal Vol	ume Purged:	5750.0	mL
Comple Date	Time	Temp.	Spec.	-11			Turbidity				Appearance or Comment
Sample Date	l	(°C)	Cond.	рН			(NTU)				Clarity, Color, Odor, Ect.
22 Sept 2020	1132	16.68	7066	6.99			2.79				Clie
Comments:											/ . / . /
	1		5 10 17 17								



**Groundwater Assessment** 

Company:	MDU Lewis & Clark
Event:	September 2020
Sample ID:	118
Sampling Personal:	Jes Mar
· · · · · · · · · · · · · · · · · · ·	

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Weather Conditions:	Temp:	60°F	Wind:	5 @ 5-10	Precip:	Sunny / Partly Cloudy / Cloudy
			· · · · · · · · · · · · · · · · · · ·			
34/211	INCODERATION					

	WELL INFO	RMATION	
Well Locked?	YES	(NO)	
Well Labeled?	YES	NO	
Casing Strait?	(YES)	NO	
Grout Seal Intact?	(YES)	NO	Not Visible
Repairs Necessary?			
Casin	g Diameter:	2"	
Water Level B	efore Purge:	Bi3	B ft
Total De	pth of Well:		— ft
W	/ell Volume:	/	- liters
Depth to T	op of Pump:	_	ft
Water Level A	fter Sample:	8,4	50 ft
Measureme	ent Method:	Electric W	ater Level Indicator

## SAMPLING INFORMATION

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	NO
Duplicate Sample? Duplicate Sample ID:	YES	NO

Control Setti	ngs:
Purge: 5	Sec.
Recover: 55	Sec.
PSI: 20	

	Bottle List:						
1 Liter Ra	W	4- 1L Nitric					
500mL N	itric						
500mL N	itric (filtered	)					
250mL Sı	ulfuric						

## FIELD READINGS

Stabilization Para	meters	Temp.	Spec.	-11	DO	ORP	Turbidity	Watan Laval	Pumping	mL	Appearance or Comment
(3 Consecuti	ve)	(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)	Water Level	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
+2-2-0	1540	Start of Well	Purge								
22 septrozo	1545	21.92	1795	7.27	3.81	201.7	181.35	8,44	120.5	5020	Clear
· ·	1615	17.25	1569	7.09	4.03	201.0	2.66	8,46	100.0	3000,0	Clear
	1620	17.15	1613	7.09	3.91	199.0	1.51	8,46	100,0	5000	Clisa
	(625	12.15	1630	7.10	3,87	195,8	1,89	8,47	C.001	$S_{\omega}$ , $\circ$	Char
	1630	17,19	1638	7.11	3,65	191.4	1.32	BYT	100.0	500.0	Clear
				L							
	Well St	abilized?	(YES)	NO				Total Vol	ume Purged:	50000	mL
Sample Date	Time	Temp.	Spec.	pН			Turbidity				Appearance or Comment
Sample Date	June	(°C)	Cond.	-			, (NTU)				Clarity, Color, Odor, Ect.
225qf2020	1630	17.19	1638	7.4			584				Clear
Comments:	T										



Groundwater Assessment

Company:	MDU Lewis & Clark
Event:	September 2020
Sample ID:	120 ,
Sampling Personal:	Jay Man-

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

1 1101121 (1 01) 250 51 20						
Weather Conditions:	Temp:	۶°F	Wind:	$\zeta @ \leq \neg \varphi$	Precip:	Sunny / Partly Cloudy / Cloudy
· · · · · · · · · · · · · · · · · · ·						
WELL	<b>INFORMATION</b>				SAMPLING I	NFORMATION

WELL INFORMATION							
YES	NO)						
YES	NO	. ·					
(YES	NO	$\sim$					
YES	NO	Not Visible					
g Diameter:	2"						
efore Purge:	14,4	{  ft					
pth of Well:	<u> </u>	ft					
/ell Volume:		liters					
op of Pump:		ft					
fter Sample:	14	,80 ft					
ent Method:	Electric W	ater Level Indicator					
	YES VES YES	YES     NO       YES     NO       YES     NO       g Diameter:     2"       efore Purge:     14.0       pth of Well:					

	SAIV	IPLING IN
Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equipment?	YES	(NO)
		$\sim$
Duplicate Sample?	YES	ND
Duplicate Sample ID:		-

Control Sett	ings:
Purge: <	Sec.
Recover: 55	Sec.
PSI: 20	

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

## FIELD READINGS

Stabilization Para	ameters	Temp.	Spec.	pН	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comment
(3 Consecuti	ive)	(°C)	Cond.	рп	(mg/L)	(mV)	(NTU)	water Lever	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
22 Sept 2020	1000	Start of Well	l Purge								1
7.	1005	11.75	6099	6,70	0.44	212.1	0.84	14,56	100.0	500,0	Clear
	1015	12.13	5562	6,70	0,64	156.8	1.13	14.65	100.0	1000.0	Cha
	1020	12.22	5535	h.70	0.73	93.4	0.75	14.60	100,0	500.0	Clear
	1025	17.24	5620	6.70	0.65	66.0	0.24	14,70	100.0	500.0	Cluer
	1030	12,48	5686	b.to	0.62	59,4	0,19	14,71	(00,0	5000	Clerr
	1035	12.49	5328	6.70	0.62	57.3	0.21	14,73	100.0	500.0	(led
	Well St	abilized?	MES	NO				Total Vol	ume Purged:	3500.0	mL
Sample Date	Time	Temp.	Spec.	-11			Turbidity				Appearance or Comment
Sample Date	inne	(°C)	Cond.	рН			(NTU)				Clarity, Color, Odor, Ect.
7.2 Sept 2020	1035	1749	2070	6.70			021				Clear

cc sept 2020	1035	16,9115	2812	6.70	0,01	L'ez	
Comments:	T				 <u>, , ,, ,, ,, , , ,, ,, ,, ,, ,, ,, ,, ,</u>		



Surface water Assessment

Company:	MDU Lewis & Clark
Event:	September 2020
Sample ID:	
Sampling Personal:	Jen, h
	(

2616 E. Broadway Ave, Bismarck, ND

÷.,

Phone: (701) 258-9720

Weather Conditions:	Temp:	60	°F	Wind:	3	@ 5-10	Precip:	Sunny / Partly Cloudy / Cloudy
Well ID	Date	Time	Casing Diameter	Water Level (ft)			Сог	nments
MW101	22 Sept 2020	0952	2"	9.06				
MW105	22 Sept 2020	1730	2"	8.75				
MW106	22 Sept 2020	1536	2"	9.44				
MW107	22 Sept 2020		2"	५,3७				
MW108	22 Sept 2020	1203	2"	16.03				
MW116	<u>2</u> Sept 2020	1201	2"	11.82				· · · · · · · · · · · · · · · · · · ·

## MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 N. Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890 2616 E. Broadway Ave. ~ Bismarck, ND 58502 ~ 800-279-6885 ~ Fax 701-258-9724 1201 Lincoln Highway ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885 www.mvtl.com

MEMBER ACIL

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### **Quality Control Report** Lab IDs: 20-W3620 to 20-W3628 Project: MDU Lewis & Clark Work Order: 202082-2645 Matrix Matrix Matrix MSD/ MSD/ LCS Matrix LCS LCS Matrix Spike Matrix Spike Spike Dup MSD/ MSD MSD/ Dup Known Known Spike Rec % Rec Spike Spike Orig Spike Rec % Rec Orig Dup Rec Dup RPD Rec % Rec Method % D % Analyte Amt Limits Amt Result Result % Limits Result Result RPD Limit (< (%) Limits Blank Antimony - Dissolved mg/l 0.1000 98 80-120 0.100 20W3628Dq < 0.0010.0999 100 75-125 0.0999 0.0995 100 0.420< 0.001 \_ -0.100 20W3629Dq < 0.001 0.1004 100 75-125 0.1004 0.0965 96 20 4.0 -Arsenic - Dissolved mg/l 0.1000 97 80-120 0.100 20W3628Dq < 0.002 0.0995 100 75-125 0.0995 0.0964 96 3.2 20 < 0.002 -0.100 20W3629Dq < 0.002 0.1012 101 75-125 0.1012 0.0947 95 6.6 20--Barium - Dissolved mg/l 0.1000 98 80-120 0.100 20W3628Dq 0.0204 0.1142 94 75-125 0.1142 0.1124 92 20< 0.002 1.6 --96 88 0.100 20W3629Dq 0.0798 0.1760 75-125 0.1760 0.1680 4.7 20 --Beryllium - Dissolved mg/l 0.1000 105 80-120 < 0.0005 0.0994 99 < 0.00050.100 20W3628Da 0.1010 101 75-125 0.1010 1.6 20 --0.100 20W3629Dq < 0.0005 0.1036 104 75-125 0.1036 0.0967 97 6.9 20 --Boron - Dissolved mg/l 0.40100 80-120 4.0020-W3626 10.3 13.5 80 75-125 13.5 13.3 75 1.5 20 < 0.1 . -0.40 100 80-120 4.00 20-W3628 9.25 12.6 84 75-125 12.6 12.7 86 0.8 20 < 0.1-\_ < 0.1 --< 0.1--Cadmium - Dissolved mg/l 0.1000 102 80-120 20W3628Da < 0.0005 0.0948 95 0.0948 0.0921 92 0.100 75-125 2.9 20--< 0.00050.100 20W3629Dq < 0.00050.0977 98 75-125 0.0977 0.0934 93 4.5 20 --Calcium - Dissolved mg/l 20.0114 80-120 500 20W3626q 103 75-125 105 20 340 855 855 865 1.2 --<1 < 1 \_ 99 Chromium - Dissolved mg/l 0.1000 80-120 0.100 20W3628Dg 0.0026 0.1064 104 75-125 0.1064 0.1072 105 0.720 -< 0.002 -0.100 20W3629Dq < 0.002 105 75-125 0.1050 0.0982 98 0.1050 6.7 20 -\_ 20W3628Dq Cobalt - Dissolved mg/l 0.1000 99 80-120 < 0.002 0.1030 0.1026 20 0.100 103 75-125 0.1030 103 0.4 < 0.002 --0.100 20W3629Dq < 0.002 0.1041 104 75-125 0.1041 0.0976 98 6.4 20 \_ -Lead - Dissolved mg/l 80-120 0.1000 100 0.100 20W3628Dg < 0.0005 0.0916 92 75-125 0.0916 0.0908 91 0.9 20 < 0.0005--20W3629Dq 94 0.100 < 0.0005 0.0938 75-125 0.0938 0.0894 89 20 4.8 --Lithium - Dissolved mg/l 0.400 108 80-120 2.00 20-W3626 0.130 2.16 102 75-125 2.16 2.18 102 0.9 20 < 0.02\_ -< 0.02 -< 0.02--Magnesium - Dissolved mg/l 20.0110 80-120 500 940 88 92 20W3626q 1380 75-125 1380 1400 1.4 20< 1--

## Page: 1 of 3

## MINNESOTA VALLEY TESTING LABORATORIES, INC.

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MEMBER ACIL

## **Quality Control Report**

Lab IDs: 20-W3620 to 20-W	3628	Pr	oject: MI	DU Lewis	s & Clark	۲	Work Or	<b>der:</b> 202	2082-264	5							
Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Magnesium - Total mg/l	20.0 20.0	110 110	80-120 80-120	500 500 500	20W3626q 20W3651q 20W3654q	965 8.8 308	1440 520 790	95 102 96	75-125 75-125 75-125	1440 520 790	1440 520 795	95 102 97	0.0 0.0 0.6	20 20 20	- - - -		< 1 < 1 < 1 < 1 < 1
Mercury - Dissolved mg/l	0.0020	90	85-115	0.002	20-W3629	< 0.0002	0.0017	85	70-130	0.0017	0.0017	85	0.0	20	_	-	< 0.0002
Molybdenum - Dissolved mg/l	0.1000	100	80-120	0.100 0.100	20W3628Dq 20W3629Dq	0.0030 0.0557	0.1111 0.1606	108 105	75-125 75-125	0.1111 0.1606	0.1084 0.1540	105 98	2.5 4.2	20 20	-	-	< 0.002
Nitrate-Nitrite as N mg/l	0.50	104	90-110	1.00	20-W3621	< 0.1	1.11	111	90-110	1.11	1.12	112	0.9	20	-	-	< 0.1
Potassium - Dissolved mg/l	10.0	104	80-120	100	20W3626q	28.1	126	98	75-125	126	130	102	3.1	20	-	-	< 1 < 1
Potassium - Total mg/l	10.0 10.0	104 105	80-120 80-120	100 100 100	20W3626q 20W3651q 20W3654q	28.4 6.4 11.4	131 108 112	103 102 101	75-125 75-125 75-125	131 108 112	132 108 112	104 102 101	0.8 0.0 0.0	20 20 20		- - - -	< 1 < 1 < 1 < 1 < 1
Selenium - Dissolved mg/l	0.1000	96	80-120	0.100 0.100	20W3628Dq 20W3629Dq	< 0.005 0.0182	0.1026 0.1234	103 105	75-125 75-125	0.1026 0.1234	0.1031 0.1156	103 97	0.5 6.5	20 20	-	-	< 0.005
Sodium - Dissolved mg/l	20.0	108	80-120	500	20W3626q	560	1000	88	75-125	1000	1010	90	1.0	20	-	-	< 1 < 1
Sodium - Total mg/l	20.0 20.0	106 107	80-120 80-120	500 500 1000	20W3626q 20W3651q 20W3654q	570 1220 740	1060 1610 1670	98 78 93	75-125 75-125 75-125	1060 1610 1670	1040 1600 1670	94 76 93	1.9 0.6 0.0	20 20 20	- - - -	- - -	< 1 < 1 < 1 < 1

## Page: 2 of 3

## MINNESOTA VALLEY TESTING LABORATORIES, INC.

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## Page: 3 of 3

## **Quality Control Report**

Lab IDs: 20-W3620 to 20-W3	3628	Pro	oject: MI	DU Lewis	s & Clark	V	Work Or	der: 202	082-2645	5							
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
Thallium - Dissolved mg/l	0.1000	90	80-120	0.100	20-W3629	< 0.0005	0.0867	87	75-125	0.0867	0.0810	81	6.8	20	-	-	< 0.0005
Total Alkalinity mg/l CaCO3	410 410 410 410	96 95 103 104	90-110 90-110 90-110 90-110	410 410 410	20-D3052 20-W3620 20-W3628	454 444 674	835 835 1079	93 95 99	80-120 80-120 80-120	835 835 1079	835 841 1051	93 97 92	0.0 0.7 2.6	20 20 20	98	80-120	< 20 < 20 < 20 < 20 < 20
Total Suspended Solids mg/l	-		-		-	-	-	-	-	152 91	156 97	-	2.6 6.4	20 20	-	-	< 2

Samples were received in good condition on 24 Sep 2020 at 0740.

Temperature upon receipt at the Bismarck laboratory was 5.3°C.

All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.

With the exception of pH, all holding times were met.

Approved methodology was followed for all sample analyses.

All acceptance criteria were met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/duplicates unless noted here.

The recoveries for one nitrate matrix spike/matrix spike duplicate were outside the acceptable limits. RPD for the recoveries was within limits. Poor recoveries were determined to be due to sample matrix. LCS was • acceptable. No further action was taken.

Approved by: \_\_\_\_\_ (m) () 120/7 2020



2616 E. Broadway Ave MVTL Bismarck, ND 58501

(701) 258-9720

# **Chain of Custody Record**

Project Name:	MDILLO	wis & Clark		Event:		S	ont	om	ber 2020		1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	er Number: 82 - 20	
Report To: Attn: Address: Phone: Email:	MDU Todd Peterson 400 N. 4th St Bismarck, ND 58501 701-425-2427 Todd.Peterson@mdu.co	_		CC:			ept	.en			Collected		
Lab Number	Sample ID	Dote	Time	Sample	11 0 Type	Son Rain	Son Min	250 Minic	I Life Minic	Spec. Con.	b. Ha	Turbidit	Analysis Required
WBe20	Dup 1	22 Sept 2020	NA	GW	X	X	X	X	NA	NA	NA	NA	
WZ62)	Field Blank (FB)	22 Sept 2000	NA	GW	X	X	X	X	NA	NA	NA	NA	
WB622	MW103	22 Sept 2020	0910	GW	X	X	X	X	13:38	1347	7.30	4.29	
W3623	MW110	21 Sept2020	1258	GW	X	X	X	X	16.87	1124	7.36	4.91	
W3624	MW119	21 Sept 2020	1525	GW	X	X	X	X	21.95	1195	7.29	2.93	
W3625	MW111	2254+2020	1325	GW	X	X	X	X	17.16	3846	7.12	2.65	MDU Lewis & Clark List
WZOZO	MW117	22 Sept2020	1132	GW	X	X	X	X	16.68	7066	6.99	2.79	
WELDAT	MW118	22 Sept 2020	1630	GW	X	X	X	X	17.19	1638	7.11	1.32	
W3698	MW120	22 Set 2020	1035	GW	X	X	X	x	12,49	5658	6.70	0.21	-
		-											

Comments:

Relinquished By		Sample	Condition	Recei	ived By
Name	Date/Time	Location	Temp (°C)	Name	Date/Time
1 July	245472020	Walk In #2	5.3 TM562 / TM809	Eily Delaw	24Sept 2020 0740
2				5	

## MINNESOTA VALLEY TESTING LABORATORIES, INC.



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7:40

Page: 1 of 1

Report Date: 22 Oct 20 Lab Number: 20-W3630

Work Order #: 82-2647

Date Sampled: 22 Sep 20 Date Received: 24 Sep 20

Temp at Receipt: 17.2C

Sampled By: MVTL Field Service

Account #: 002800

PO #: 180534 OP

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

Project Name: MDU Lewis & Clark

Sample Description: Dup 1

Event and Year: September 2020

As Received Method Method Date Analyzed Analyst Result RL Reference See Attached Report 12 Oct 20 OL Radium 226 6 Oct 20 Radium 228 See Attached Report OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

10 220052020 Clauditte K. Canilo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit





Page: 1 of 1

PO #: 180534 OP

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

Report Date: 22 Oct 20 Lab Number: 20-W3631 Work Order #: 82-2647 Account #: 002800 Date Sampled: 22 Sep 20 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

Project Name: MDU Lewis & Clark

Sample Description: Field Blank (FB)

Event and Year: September 2020

Temp at Receipt: 17.2C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Radium 226	See Attached Report			12 Oct 20	OL
Radium 228	See Attached Report			6 Oct 20	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

290CT 2030 Claudette K Canrep

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

CC





1 of 1 Page:

Montana-Dakota Utilities Co.

Project Name: MDU Lewis & Clark

58501

Sample Description: MW103

Todd Peterson

400 N 4th St

Bismarck ND

Event and Year: September 2020

Report Date: 22 Oct 20 Lab Number: 20-W3632 Work Order #: 82-2647 Account #: 002800 Date Sampled: 22 Sep 20 9:10 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 17.2C

	As Rece: Result	ived	Method RL	Method Reference	Date Analy:	Analyst		
pH - Field Turbidity, Field Temperature - Field Conductivity - Field Radium 226 Radium 228	THE R. 1 1 1 1 1 1	units NTU Degrees C umhos/cm ached Report ached Report	NA 0.1 NA 1	SM 4500 H+ B 180.1 SM 2550B EPA 120.1	22 Sep 22 Sep 22 Sep 22 Sep 12 Oct 6 Oct	20 20 20 20 20 20 20	9:10 9:10 9:10 9:10	JSM JSM JSM JSM OL OL

OL = Analysis performed by an Outside Laboratory.

10 226572020 Clauditte Approved by: K. Cantep

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016





1 of 1 Page:

Montana-Dakota Utilities Co.

Project Name: MDU Lewis & Clark

Bismarck ND 58501

Sample Description: MW110

Todd Peterson

400 N 4th St

Event and Year: September 2020

Report Date: 22 Oct 20 Lab Number: 20-W3633 Work Order #: 82-2647 Account #: 002800 Date Sampled: 21 Sep 20 12:58 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 17.2C

	As Rece: Result	ived	Method RL	Method Reference	Date Analy	zed	Analyst
pH - Field Turbidity, Field Temperature - Field Conductivity - Field Radium 226 Radium 228	T 7 T 1 1 1 1 1 1	units NTU Degrees C umhos/cm ached Report ached Report	NA 0,1 NA 1	SM 4500 H+ B 180.1 SM 2550B EPA 120.1	21 Se 21 Se 21 Se 12 Oc	p 20 p 20 p 20	JSM JSM JSM JSM OL OL

OL = Analysis performed by an Outside Laboratory.

a 220(72020 Claudite K. Canto Approved by:

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND || ND-00016



1 of 1 Page:

Report Date: 22 Oct 20 Lab Number: 20-W3634 Work Order #: 82-2647 Account #: 002800 Date Sampled: 21 Sep 20 15:25 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 17.2C

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

Project Name: MDU Lewis & Clark

Sample Description: MW119

Event and Year: September 2020

	As Rece: Result	ived	Method RL	Method Reference	Date Analyzed	Analyst
pH - Field	7.29	units	NA	SM 4500 H+ B	21 Sep 20 15:25	JSM
Turbidity, Field	2.9	NTU	0.1	180.1	21 Sep 20 15:25	JSM
Temperature - Field	22.0	Degrees C	NA	SM 2550B	21 Sep 20 15:25	JSM
Conductivity - Field	1195	umhos/cm	1	EPA 120.1	21 Sep 20 15:25	JSM
Radium 226		ached Report			12 Oct 20	OL
Radium 228		ached Report			6 Oct 20	OL

OL = Analysis performed by an Outside Laboratory.

Approved by:

1C K Canrep ZZOCT 2020 Clauditte

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

# = Due to concentration of other analytes
+ = Due to internal standard response

CERTIFICATION: ND # ND-00016





Page: 1 of 1

Report Date: 22 Oct 20 Lab Number: 20-W3635 Work Order #: 82-2647 Account #: 002800 Date Sampled: 22 Sep 20 13:25 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 17.2C

Bismarck ND 58501 Project Name: MDU Lewis & Clark

Montana-Dakota Utilities Co.

Sample Description: MW111

Todd Peterson

400 N 4th St

Event and Year: September 2020

As Recei Result	lved	Method RL	Method Reference		zed		Analyst
7.12	units	NA	SM 4500 H+ B	22 S	p 20	13:25	JSM
	NTU	0.1	180.1	22 S	ep 20	13:25	JSM
			SM 2550B	22 S	ep 20	13:25	JSM
		1	EPA 120.1	22 S	p 20	13:25	JSM
	and the second sec			12 0	et 20	)	OL
				6 0	et 20	)	OL
	Result 7.12 2.6 17.2 3846 See Atta	7.12 units 2.6 NTU 17.2 Degrees C	ResultRL7.12unitsNA2.6NTU0.117.2Degrees CNA3846umhos/cm1See Attached Report1	ResultRLReference7.12unitsNASM 4500 H+ B2.6NTU0.1180.117.2Degrees CNASM 2550B3846umhos/cm1EPA 120.1See Attached ReportSet 100.1Set 100.1	ResultRLReferenceAnaly7.12unitsNASM 4500 H+ B22 Se2.6NTU0.1180.122 Se17.2Degrees CNASM 2550B22 Se3846umhos/cm1EPA 120.122 SeSee Attached Report12 Oc	ResultRLReferenceAnalyzed7.12unitsNASM 4500 H+ B22 Sep 202.6NTU0.1180.122 Sep 2017.2Degrees CNASM 2550B22 Sep 203846umhos/cm1EPA 120.122 Sep 20See Attached Report12 Oct 20	Result         RL         Reference         Analyzed           7.12         units         NA         SM 4500 H+ B         22 Sep 20 13:25           2.6         NTU         0.1         180.1         22 Sep 20 13:25           17.2         Degrees C         NA         SM 2550B         22 Sep 20 13:25           3846         umhos/cm         1         EPA 120.1         22 Sep 20 13:25           See Attached Report         12 Oct 20         12         12

OL = Analysis performed by an Outside Laboratory.

Approved by:

10 ZZOCTOON Claudette K. Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

CERTIFICATION: ND # ND-00016

## MINNESOTA VALLEY TESTING LABORATORIES, INC.



Todd Peterson

400 N 4th St

Bismarck ND

Sample Description: MW117

Project Name: MDU Lewis & Clark

Montana-Dakota Utilities Co.

58501

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Page: 1 of 1

Report Date: 22 Oct 20 Lab Number: 20-W3636 Work Order #: 82-2647 Account #: 002800 Date Sampled: 22 Sep 20 11:32 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 17.2C

Event and Year: September 2020 Method Method Date As Received Analyst Result RL Reference Analyzed JSM SM 4500 H+ B 22 Sep 20 11:32 units NA pH - Field 6.99 22 Sep 20 11:32 JSM 180.1 Turbidity, Field 2.8 NTU 0.1 22 Sep 20 11:32 JSM Temperature - Field 16.7 Degrees C NA SM 2550B umhos/cm 1 EPA 120.1 22 Sep 20 11:32 JSM Conductivity - Field 7066 12 Oct 20 OL See Attached Report Radium 226 6 Oct 20 OL Radium 228 See Attached Report

OL = Analysis performed by an Outside Laboratory.

Approved by:

10 22005 2020 Clauditte K. Cunto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit



Todd Peterson

400 N 4th St

Bismarck ND

Sample Description: MW118

Project Name: MDU Lewis & Clark

Event and Year: September 2020

Montana-Dakota Utilities Co.

58501

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1 of 1 Page:

Report Date: 22 Oct 20 Lab Number: 20-W3637 Work Order #: 82-2647 Account #: 002800 Date Sampled: 22 Sep 20 16:30 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 17.2C

As Received Method Method Date RL Reference Analyzed Analyst Result 22 Sep 20 16:30 JSM pH - Field SM 4500 H+ B 7.11 units NA 22 Sep 20 16:30 1.3 NTU 0.1 180.1 JSM Turbidity, Field SM 2550B 22 Sep 20 16:30 JSM 17.2 Degrees C NA Temperature - Field EPA 120.1 22 Sep 20 16:30 JSM umhos/cm 1 Conductivity - Field 1638 12 Oct 20 OL Radium 226 See Attached Report 6 Oct 20 OL See Attached Report Radium 228

OL = Analysis performed by an Outside Laboratory.

Approved by:

laudite. DAUCT XIZO K. Cantlo

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 @ = Due to sample matrix
! = Due to sample quantity CERTIFICATION: ND # ND-00016

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Page: 1 of 1

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

Project Name: MDU Lewis & Clark

## Sample Description: MW120

### Event and Year: September 2020

Report Date: 22 Oct 20 Lab Number: 20-W3638 Work Order #: 82-2647 Account #: 002800 Date Sampled: 22 Sep 20 10:35 Date Received: 24 Sep 20 7:40 Sampled By: MVTL Field Service

PO #: 180534 OP

Temp at Receipt: 17.2C

	As Rece: Result	ived	Method RL	Method Reference	Date Analyzed		Analyst
pH - Field	6.70	units	NA	SM 4500 H+ B	22 Sep 2 22 Sep 2		JSM JSM
Turbidity, Field	0.2	NTU Degrees C	0.1 NA	180.1 SM 2550B	22 Sep 2 22 Sep 2		JSM
Temperature - Field Conductivity - Field	12.5	umhos/cm	1	EPA 120.1	22 Sep 2		JSM
Radium 226		ached Report			12 Oct 2	0	OL
Radium 228	See Atta	ached Report			6 Oct 2	0	OL

OL = Analysis performed by an Outside Laboratory.

CC K Camper ZZOCT 2020 Approved by: Clauditte

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit



## ANALYTICAL SUMMARY REPORT

October 19, 2020

Minnesota Valley Testing Laboratories 1126 N Front St New Ulm, MN 56073-1176

Work Order: C20091113 Project Name: 202082-2647

Energy Laboratories, Inc. Casper WY received the following 9 samples for Minnesota Valley Testing Laboratories on 9/28/2020 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C20091113-001	20-W3630; Dup 1	09/22/20 0:00	09/28/20	Groundwater	pH Check for Nitric Radiochem FIRST Radium 226 + Radium 228 Radium 226, Total Radium 228, Total
C20091113-002	20-W3631; Field Blank (FB)	09/22/20 0:00	09/28/20	Groundwater	Same As Above
C20091113-003	20-W3632; MW103	09/22/20 9:10	09/28/20	Groundwater	Same As Above
C20091113-004	20-W3633; MW110	09/21/20 12:58	09/28/20	Groundwater	Same As Above
C20091113-005	20-W3634; MW119	09/21/20 15:25	5 09/28/20	Groundwater	Same As Above
C20091113-006	20-W3635; MW111	09/22/20 13:25	5 09/28/20	Groundwater	Same As Above
C20091113-007	20-W3636; MW117	09/22/20 11:32	09/28/20	Groundwater	Same As Above
C20091113-008	20-W3637; MW118	09/22/20 16:30	09/28/20	Groundwater	Same As Above
C20091113-009	20-W3638; MW120	09/22/20 10:35	5 09/28/20	Groundwater	Same As Above

The analyses presented in this report were performed by Energy Laboratories, Inc., 2393 Salt Creek Hwy., Casper, WY 82601, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

Report Approved By:

Kasey Lidick Digitally signed by Kasey Vidick Date: 2020.10.19 12:14:19 -06:00





Prepared by Casper, WY Branch

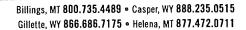
Client:Minnesota Valley Testing LaboratoriesProject:202082-2647Lab ID:C20091113-001Client Sample ID:20-W3630; Dup 1

Report Date: 10/19/20 Collection Date: 09/22/20 DateReceived: 09/28/20 Matrix: Groundwater

				MCL/	
Analyses	Result Units	Qualifiers	RL	QCL Method	Analysis Date / By
RADIONUCLIDES, TOTAL					
Radium 226	0.3 pCi/L			E903.0	10/12/20 14:35 / trs
Radium 226 precision (±)	0.2 pCi/L			E903.0	10/12/20 14:35 / trs
Radium 226 MDC	0.2 pCi/L			E903.0	10/12/20 14:35 / trs
Radium 228	1.1 pCi/L			RA-05	10/06/20 13:52 / plj
Radium 228 precision (±)	0.7 pCi/L			RA-05	10/06/20 13:52 / plj
Radium 228 MDC	1.0 pCi/L			RA-05	10/06/20 13:52 / plj
Radium 226 + Radium 228	1.4 pCi/L			A7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 precision (±)	0.7 pCi/L			A7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 MDC	1.0 pCi/L			A7500-RA	10/13/20 12:00 / dmf

Report Definitions: RL - Analyte Reporting Limit QCL - Quality Control Limit





Prepared by Casper, WY Branch

Client:Minnesota Valley Testing LaboratoriesProject:202082-2647Lab ID:C20091113-002Client Sample ID:20-W3631; Field Blank (FB)

Report Date: 10/19/20 Collection Date: 09/22/20 DateReceived: 09/28/20 Matrix: Groundwater

Analyses	Result Units	Qualifiers	RL	MCL/ QCL Method	Analysis Date / By
RADIONUCLIDES, TOTAL					
Radium 226	0.3 pCi/L			E903.0	10/12/20 14:35 / trs
Radium 226 precision (±)	0.2 pCi/L			E903.0	10/12/20 14:35 / trs
Radium 226 MDC	0.3 pCi/L			E903.0	10/12/20 14:35 / trs
Radium 228	0.1 pCi/L	U		RA-05	10/06/20 13:52 / plj
Radium 228 precision (±)	0.8 pCi/L			RA-05	10/06/20 13:52 / plj
Radium 228 MDC	1.3 pCi/L			RA-05	10/06/20 13:52 / plj
Radium 226 + Radium 228	0.4 pCi/L	U		A7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 precision (±)	0.8 pCi/L			A7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 MDC	1.3 pCi/L			A7500-RA	10/13/20 12:00 / dmf

Report RL -Definitions: QCL

RL - Analyte Reporting Limit QCL - Quality Control Limit U - Not detected at Minimum Detectable Concentration (MDC) MCL - Maximum Contaminant Level ND - Not detected at the Reporting Limit (RL)





Prepared by Casper, WY Branch

Client:Minnesota Valley Testing LaboratoriesProject:202082-2647Lab ID:C20091113-003Client Sample ID:20-W3632; MW103

Report Date: 10/19/20 Collection Date: 09/22/20 09:10 DateReceived: 09/28/20 Matrix: Groundwater

				MCL/	No. 41	Analysia Data / Ry
Analyses	Result Unit	G Qualifiers	RL	QCL	Method	Analysis Date / By
RADIONUCLIDES, TOTAL						
Radium 226	0.3 pCi/l				E903.0	10/12/20 14:35 / trs
Radium 226 precision (±)	0.2 pCi/l				E903.0	10/12/20 14:35 / trs
Radium 226 MDC	0.2 pCi/l				E903.0	10/12/20 14:35 / trs
Radium 228	-0.01 pCi/l	. U			RA-05	10/06/20 13:52 / plj
Radium 228 precision (±)	0.7 pCi/l	-			RA-05	10/06/20 13:52 / plj
Radium 228 MDC	1.1 pCi/l	-			RA-05	10/06/20 13:52 / plj
Radium 226 + Radium 228	0.3 pCi/l	. U			A7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 precision (±)	0.7 pCi/l	-			A7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 MDC	1.2 pCi/l	-			A7500-RA	10/13/20 12:00 / dmf

Report Definitions: RL - Analyte Reporting Limit QCL - Quality Control Limit U - Not detected at Minimum Detectable Concentration (MDC) MCL - Maximum Contaminant Level ND - Not detected at the Reporting Limit (RL)





Prepared by Casper, WY Branch

Client:Minnesota Valley Testing LaboratoriesProject:202082-2647Lab ID:C20091113-004Client Sample ID:20-W3633; MW110

Report Date:10/19/20Collection Date:09/21/20DateReceived:09/28/20Matrix:Groundwater

				MCL/	
Analyses	Result Units	Qualifiers	RL	QCL Method	Analysis Date / By
RADIONUCLIDES, TOTAL					
Radium 226	0.3 pCi/L			E903.0	10/12/20 14:35 / trs
Radium 226 precision (±)	0.2 pCi/L			E903.0	10/12/20 14:35 / trs
Radium 226 MDC	0.2 pCi/L			E903.0	10/12/20 14:35 / trs
Radium 228	-0.1 pCi/L	U		RA-05	10/06/20 13:52 / plj
Radium 228 precision (±)	0.6 pCi/L			RA-05	10/06/20 13:52 / plj
Radium 228 MDC	1.0 pCi/L			RA-05	10/06/20 13:52 / plj
Radium 226 + Radium 228	0.2 pCi/L	U		A7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 precision (±)	0.6 pCi/L			A7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 MDC	1.0 pCi/L			A7500-RA	10/13/20 12:00 / dmf

Report Definitions:





Prepared by Casper, WY Branch

Client:Minnesota Valley Testing LaboratoriesProject:202082-2647Lab ID:C20091113-005Client Sample ID:20-W3634; MW119

Report Date: 10/19/20 Collection Date: 09/21/20 15:25 DateReceived: 09/28/20 Matrix: Groundwater

Analyses	Result Units	Qualifiers	RL	MICL/ QCL N	lethod	Analysis Date / By
RADIONUCLIDES, TOTAL						
Radium 226	0.2 pCi/L			E	903.0	10/12/20 14:35 / trs
Radium 226 precision (±)	0.2 pCi/L			E	903.0	10/12/20 14:35 / trs
Radium 226 MDC	0.2 pCi/L			E	E903.0	10/12/20 14:35 / trs
Radium 228	0.5 pCi/L	U		F	RA-05	10/06/20 13:52 / plj
Radium 228 precision (±)	0.7 pCi/L			F	RA-05	10/06/20 13:52 / plj
Radium 228 MDC	1.1 pCi/L			F	RA-05	10/06/20 13:52 / plj
Radium 226 + Radium 228	0.7 pCi/L	U		A	\7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 precision (±)	0.7 pCi/L			A	\7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 MDC	1.1 pCi/L			A	47500-RA	10/13/20 12:00 / dmf

Report Definitions:



Prepared by Casper, WY Branch

Client:Minnesota Valley Testing LaboratoriesProject:202082-2647Lab ID:C20091113-006Client Sample ID:20-W3635; MW111

Report Date: 10/19/20 Collection Date: 09/22/20 13:25 DateReceived: 09/28/20 Matrix: Groundwater

				MCL/	
Analyses	Result Units	Qualifiers	RL	QCL Method	Analysis Date / By
RADIONUCLIDES, TOTAL					
Radium 226	0.3 pCi/L			E903.0	10/12/20 14:35 / trs
Radium 226 precision (±)	0.2 pCi/L			E903.0	10/12/20 14:35 / trs
Radium 226 MDC	0.2 pCi/L			E903.0	10/12/20 14:35 / trs
Radium 228	0.9 pCi/L	U		RA-05	10/06/20 15:36 / pij
Radium 228 precision (±)	0.8 pCi/L			RA-05	10/06/20 15:36 / plj
Radium 228 MDC	1.3 pCi/L			RA-05	10/06/20 15:36 / plj
Radium 226 + Radium 228	1.2 pCi/L	U		A7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 precision (±)	0.9 pCi/L			A7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 MDC	1.3 pCi/L			A7500-RA	10/13/20 12:00 / dmf

Report Definitions:





Prepared by Casper, WY Branch

 Client:
 Minnesota Valley Testing Laboratories

 Project:
 202082-2647

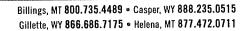
 Lab ID:
 C20091113-007

 Client Sample ID:
 20-W3636; MW117

Report Date: 10/19/20 Collection Date: 09/22/20 11:32 DateReceived: 09/28/20 Matrix: Groundwater

				MCL/	
Analyses	Result Units	Qualifiers	RL	QCL Method	Analysis Date / By
RADIONUCLIDES, TOTAL					
Radium 226	0.8 pCi/L			E903.0	10/12/20 16:13 / trs
Radium 226 precision (±)	0.2 pCi/L			E903.0	10/12/20 16:13 / trs
Radium 226 MDC	0.2 pCi/L			E903.0	10/12/20 16:13 / trs
Radium 228	1.9 pCi/L			RA-05	10/06/20 15:36 / plj
Radium 228 precision (±)	0.9 pCi/L			RA-05	10/06/20 15:36 / plj
Radium 228 MDC	1.1 pCi/L			RA-05	10/06/20 15:36 / plj
Radium 226 + Radium 228	2.7 pCi/L			A7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 precision (±)	0.9 pCi/L			A7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 MDC	1.1 pCi/L			A7500-RA	10/13/20 12:00 / dmf





Prepared by Casper, WY Branch

Client:Minnesota Valley Testing LaboratoriesProject:202082-2647Lab ID:C20091113-008Client Sample ID:20-W3637; MW118

Report Date: 10/19/20 Collection Date: 09/22/20 16:30 DateReceived: 09/28/20 Matrix: Groundwater

				MCL/	
Analyses	Result Units	Qualifiers	RL	QCL Method	Analysis Date / By
RADIONUCLIDES, TOTAL					
Radium 226	0.1 pCi/L	U		E903.0	10/12/20 16:13 / trs
Radium 226 precision (±)	0.2 pCi/L			E903.0	10/12/20 16:13 / trs
Radium 226 MDC	0.2 pCi/L			E903.0	10/12/20 16:13 / trs
Radium 228	0.1 pCi/L	U		RA-05	10/06/20 15:36 / plj
Radium 228 precision (±)	0.8 pCi/L			RA-05	10/06/20 15:36 / plj
Radium 228 MDC	1.4 pCi/L			RA-05	10/06/20 15:36 / plj
Radium 226 + Radium 228	0.2 pCi/L	U		A7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 precision (±)	0.8 pCi/L			A7500-RA	10/13/20 12:00 / dmf
Radium 226 + Radium 228 MDC	1.4 pCi/L			A7500-RA	10/13/20 12:00 / dmf

Report Definitions: RL - Analyte Reporting Limit QCL - Quality Control Limit U - Not detected at Minimum Detectable Concentration (MDC) MCL - Maximum Contaminant Level ND - Not detected at the Reporting Limit (RL)





Prepared by Casper, WY Branch

 Client:
 Minnesota Valley Testing Laboratories

 Project:
 202082-2647

 Lab ID:
 C20091113-009

 Client Sample ID:
 20-W3638; MW120

Report Date: 10/19/20 Collection Date: 09/22/20 10:35 DateReceived: 09/28/20 Matrix: Groundwater

Analyses	Result Units	Qualifiers	RL	MCL/ QCL Method	Analysis Date / By	
RADIONUCLIDES, TOTAL						
Radium 226	0.2 pCi/L	U		E903.0	10/12/20 16:13 / trs	
Radium 226 precision (±)	0.1 pCi/L			E903.0	10/12/20 16:13 / trs	
Radium 226 MDC	0.2 pCi/L			E903.0	10/12/20 16:13 / trs	
Radium 228	1 pCi/L	U		RA-05	10/06/20 15:36 / plj	
Radium 228 precision (±)	0.7 pCi/L			RA-05	10/06/20 15:36 / plj	
Radium 228 MDC	1.1 pCi/L			RA-05	10/06/20 15:36 / plj	
Radium 226 + Radium 228	1.2 pCi/L			A7500-RA	10/13/20 12:00 / dmf	
Radium 226 + Radium 228 precision (±)	0.8 pCi/L			A7500-RA	10/13/20 12:00 / dmf	
Radium 226 + Radium 228 MDC	1.2 pCi/L			A7500-RA	10/13/20 12:00 / dmf	

Report Definitions: RL - Analyte Reporting Limit QCL - Quality Control Limit U - Not detected at Minimum Detectable Concentration (MDC) MCL - Maximum Contaminant Level ND - Not detected at the Reporting Limit (RL)



## **QA/QC Summary Report**

Prepared by Casper, WY Branch

Client:	Minnesota Valley Tes	sting Lab	oratories		Work Order:	C2009	1113	Repo	ort Date:	10/13/20	
Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	E903.0									Batch: RA	226-9790
Lab ID:	LCS-RA226-9790	3 Lat	poratory Cor	ntrol Sample	е		Run: G542	M_200929E		10/12/	20 14:35
Radium 2	226		8.8	pCi/L		82	70	130			
Radium 2	226 precision (±)		1.7	pCi/L							
Radium 2	226 MDC		0.21	pCi/L							
Lab ID:	MB-RA226-9790	3 Me	thod Blank				Run: G542	M_200929E		10/12	/20 14:35
Radium 2	226		0.2	pCi/L							U
Radium 2	226 precision (±)		0.2	pCi/L							
Radium 2	226 MDC		0.2	pCi/L							
Lab ID:	C20091113-005ADU	• 3 Sa	mple Duplic	ate			Run: G542	M_200929E		10/12	/20 16:13
Radium 2	226		0.21	pCi/L					9.1	30	U
Radium 2	226 precision (±)		0.16	pCi/L							
Radium 2	226 MDC		0.21	pCi/L							

RL - Analyte Reporting Limit

U - Not detected at Minimum Detectable Concentration (MDC)



## **QA/QC Summary Report**

Prepared by Casper, WY Branch

Client:	Minnesota Valley Tes	sting Lab	oratories		Work Order:	C2009	91113	Repor	: 10/13/20		
Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	RA-05									Batch: RA	228-6330
Lab ID:	LCS-228-RA226-9790	) 3 Lab	oratory Cor	ntrol Sample	9		Run: TENN	ELEC-4_200929	С	10/06	/20 13:52
Radium 2	228		8.9	pCi/L		102	70	130			
Radium 2	228 precision (±)		1.9	pCi/L							
Radium 2	228 MDC		1.0	pCi/L							
Lab ID:	MB-RA226-9790	3 Me	thod Blank				Run: TENN	ELEC-4_200929	С	10/06	/20 13:52
Radium 2	228		0.5	pCi/L							U
Radium 2	228 precision (±)		0.6	pCi/L							
Radium 2	228 MDC		1	pCi/L							
Lab ID:	C20091113-005ADUF	<b>&gt;</b> 3 Sai	mple Duplic	ate			Run: TENN	ELEC-4_200929	С	10/06	/20 15:36
Radium 2	228		-0.22	pCi/L					580	30	UR
Radium 2	228 precision (±)		0.74	pCi/L							
Radium 2	228 MDC		1.3	pCi/L							

- Duplicate RPD is outside of the acceptance range for this analysis. However, the RER is less than the limit of 3, the RER result is 0.68.

Qualifiers:

RL - Analyte Reporting Limit

R - Relative Percent Difference (RPD) exceeds advisory limit

ND - Not detected at the Reporting Limit (RL)

U - Not detected at Minimum Detectable Concentration (MDC)



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C20091113

## Work Order Receipt Checklist

## Minnesota Valley Testing Laboratories

Login completed by:	Kylie A. Griffee		Date	Received: 9/28/2020
Reviewed by:	Misty Stephens		Red	ceived by: kag
Reviewed Date:	9/28/2020		Cari	rier name: Ground
Shipping container/cooler in	good condition?	Yes 🗸	No 🗌	Not Present
Custody seals intact on all s	hipping container(s)/cooler(s)?	Yes	No 🗌	Not Present
Custody seals intact on all s	sample bottles?	Yes 🗌	No 🗌	Not Present 🗹
Chain of custody present?		Yes 🗹	No 🗌	
Chain of custody signed wh	en relinquished and received?	Yes 🗸	No 🗌	
Chain of custody agrees wit	h sample labels?	Yes 🗹	No 🗌	
Samples in proper containe	r/bottle?	Yes 🗸	No 🗌	
Sample containers intact?		Yes 🗹	No 🗌	
Sufficient sample volume for	r indicated test?	Yes 🗸	No 🗌	
All samples received within (Exclude analyses that are of such as pH, DO, Res CI, S	considered field parameters	Yes 🗸	No 🗌	
Temp Blank received in all s	shipping container(s)/cooler(s)?	Yes	No 🗹	Not Applicable
Container/Temp Blank temp	perature:	14.4°C No Ice		
Water - VOA vials have zer	o headspace?	Yes	Νο	No VOA vials submitted
Water - pH acceptable upor	n receipt?	Yes 🗹	No 🗌	Not Applicable

## **Standard Reporting Procedures:**

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

## **Contact and Corrective Action Comments:**

None



LABORATORIES, Inc. 2616 E Broadway Ave

## Chain of Custody Record

Page_	1	_of_	1	<u> </u>

202082-2647

Bismarck, ND 58501 Phone: (701) 258-9720

	Account #	
Fax: (701) 258-9724		
258-9720		

Toll Free: (8	300) <b>279-6885</b>	Fax: (701) 2	258-9724									202082	-264	4			
Company Nam	Account #:							Phone #:									
		VTL										701-258-9720					
	Contact:	<u> </u>	- 44 -					Fax #:			ъ. Г						
		Broadway (, ND 58501			Name of Sa	Claud	ene					E-mail:	axed :	eport check ccarroll(			
Rilling Addroce	s (indicate if different	A DESCRIPTION OF THE OWNER OWNER OF THE OWNER OWNER OF THE OWNER	o);		Name of Sa	mpier:							mall	report check			
Dining Address	s (mulcale a unicien		e).		Quote Num	her						Date Subr					
	PO E	lox 249			daoro man	201								24-Sep-2	0		
		, MN 56073			Project Na	ne/Numbe	r:					Purchase	Orde				
														BL6335			
		Sample In	nformation					B	ottle	Туј	)e			Analys	sis		
IML Lab				Sample	Date	Time	Jntreated	00 ml HNO3	VOC Vials Umpreserved	Glass Jar	Other	Cõ		21113			
Number	MVTL Lab Number	Client	Sample ID	Туре	Sampled	Sampled	<u>, </u>	12	ځځ	Ū	õ		A	nalysis Re	quired		
·	20-W3630		Dup 1	GW	22-Sep-20	NA		4						Ra226 & F	Ra228		
	20-W3631	Field	Blank (FB)	GW	22-Sep-20	NA		4						Ra226 & F	Ra228		
	20-W3632	N	IW103	GW	22-Sep-20	910		4		<u> </u>				Ra226 & F	Ra228		
	20-W3633	N	IW110	GW	21-Sep-20	1258		4						Ra226 & F	Ra228		
	20-W3634	N	IW119	GW	21-Sep-20	1525		4						Ra226 & F	Ra228		
	20-W3635	N	W111	GW	22-Sep-20	1325		4						Ra226 & F	Ra228		
	20-W3636 ·	N	W117	GW	22-Sep-20	1132		4						Ra226 & F	Ra228		
	20-W3637	N	IW118	GW	22-Sep-20	1630		4						Ra226 & F	Ra228		
20-W3638		N	IW120	GW	22-Sep-20	1035		4				Ra226 & Ra228					
······································		All	results mu	st be re	eported a	as a nur	ne	ric	al v	alu	e						
Tran	sferred by:	Date:	Time:	Sample	Condition:	R	ecei	iveç	l þy:			Date:				Temp:	
T. Olson		24-Sep-20	1700			Musling	30	J		188	To	0 1033					
2.						7		11						1			



**Groundwater Assessment** 

Company:	MDU Lewis & Clark	
Event:	September 2020	
Sample ID:	103,	
Sampling Personal:	Jrh-	

2616 E. Broadway Ave, Bismarck, ND

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

Phone: (701) 258-9 Weather Conditions:		Temp:	60	°F	Wind:	5	@ 5-10		Precip:	Sunny P	artly Cloudy / Cloudy	/
	WELL INFO	ORMATIO	v					SAN	IPLING IN	FORMATI		
Vell Locked?	YES	NO)			]	Purging Me	thod:	Bladder		]	Control Settin	gs:
Vell Labeled?	YES	NO				Sampling M	ethod:	Bladder			Purge: 5	Sec
Casing Strait?	(YES)	NO			1	Dedicated E	quipment?	YES	NO		Recover: 55	Sec
Grout Seal Intact?	YES	NO	Not V	isible						-	PSI: 20	
Repairs Necessary?					1	Duplicate Sa	ample?	YES	NO			
	g Diameter:	2			1	Duplicate Sa	ample ID:			]		
Water Level Be		10.4	lB	ft						-		
	oth of Well:	<u> </u>	~	ft			Bottl	e List:		1		
W	ell Volume:			liters		1 Liter Raw		4-1L Nitric				
Depth to To	op of Pump:			ft		500mL Nitric						
Water Level Af	ter Sample:		0.49	ft		500mL Nitric						
Measureme	nt Method:	Electric	Nater Level	Indicator	j	250mL Sulfu	ric			1		
					FIE	LD READIN	IGS					
Stabilization Paran	neters	Temp.	Spec.	. · ·	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Co	
(3 Consecutive		(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)		Rate	Removed	Clarity, Color, Odd	
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min	<u> </u>	clear, slightly turbic	l, turbid
- 6 42.020	0745	Start of Well	Purge								1 27	
22 Sept 2020	0750	12.44	1841	7.42	1.56	342.1	104.23	10.48	100.0	560.0	Clear	
		13,39	1374	7.29	0.15	149.7	12.84	10,48	100.0	3000,0	Clea	
	0870	13.08	1352	7,30	0,14	892	8.60	10.48	100,0	2000,0	Clan	
	0900	13,30	1346	7.30	0.16	71.9	4.48	10.48	100.0	2000,0	den	
	0905	(3,29	1347	7,30	0.16	72.6	4.17	10,49	100,3	500,0	dea	
	OGID	13,35	1347	7,30	0.15	75.3	4.29	10.49	100.0	500.0	· Clen	
								,			· · · · · · · · · · · · · · · · · · ·	
		<u> </u>							<b></b>			
							<u> </u>		<u></u>	_ <b>_</b>		
		1	L		<u> </u>	1	<u> </u>	1	Ļ		<u>. </u>	
	Well St	abilized?	YES	NO				Total Vo	iume Purgeo	:_ <u>8500.0</u>		
Sample Date	Time	Temp.	Spec.	рН			Turbidity				Appearance or Co	
Sample Date		(°C)	Cond.		L		(NTU)	1	ļ	<u> </u>	Clarity, Color, Od	or, Ect.
22 Sept 2020	0910	13,38	1347	7.30			4,29	<u> </u>			Clen	
Comments:		1 001	1+2000 @	() <sup>0</sup> (2)								
Johnnents.	I field B	lon h all	y www									



Groundwater Assessment

Company	:	MDU Lev	vis & Cla	rk		
Event:		Septemb	er 2020			
Sample I	):		10			
Sampling	Personal:	ال	em M	<u></u>		
				$\rightarrow$		
-10	Precip:	Sunny / I	Partly Cl	oudy / Clo	udy	
SA	MPLING I	NFORMAT	ION			
Bladder				Control S	ettings:	
			1_	~	<u> </u>	

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9 Weather Conditions:		Temp:	70	°۲	Wind:	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	@ 5-10	>	Precip:	Sunny / Pá	rtly Cloudy / Cloudy
		DRMATION		•						FORMATIC	
Well Locked?	YES	NO			1	Purging Met	hod.	Bladder			Control Settings:
Well Labeled?	VES	NO		·		Sampling M		Bladder			Purge: <u>3</u> Sec.
	YES	NO				Dedicated E		YES	(NO)		Recover: 7- Sec.
Casing Strait? Grout Seal Intact?	YES,	NO	Not V	/isible		Dedicated =	94.12				PSI: 20
Repairs Necessary?		NO				Duplicate Sa	mple?	YES	NØ		
	g Diameter:	2	11			Duplicate Sa			-		
Water Level Be		and the second		ft							
	oth of Well:			ft			Bottl	e List:		]	
	ell Volume:		,2	liters	1	1 Liter Raw		4-1L Nitric		1. 1.	
Depth to To				ft	1	500mL Nitric					
Water Level Af			26	ft	1	500mL Nitric	(filtered)			-	
Measureme			Vater Level	Indicator	1	250mL Sulfur	ic				
			,		- FIE	LD READIN	GS				
Stabilization Paran	neters	Temp.	Spec.		DO	ORP	Turbidity	Water Level	Pumping	mL.	Appearance or Comment
(3 Consecutive		(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)	water Level	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
	1143	Start of Well	Purge	<b>L</b>							
21 Sep + 2020	1148	16,49	1129	7.36	2.27	141.3	52.46	9.01	100,0	500.0	Clear
	1218	16.35	1124	7.35	1.85	179.7	11.30	9,05	1000	3000.0	Cleare
	1248	16.72	1123	7.35	1.68	182.9	4.97	9,05	100.0	3000,0	Clea
	1253	16.80	1123	7.35	1.88	189.3	4.82	9.06	100.00	500,0	Clear
	1253	16.37	1124	7,36	1,60	185.0	4.91	9.06	100,0	500,0	clas
										<u></u>	
										L	·
							l	<u> </u>	<u> </u>		
	Well Sta	abilized?	YES	NO			·	Total Vo	lume Purged:	7500,0	mL
Convelle Dette	Time	Temp.	Spec.	pН	1		Turbidity				Appearance or Comment
Sample Date	Time	(°C)	Cond.				(NTU)		L		Clarity, Color, Odor, Ect.
21 Sept 202	1258	16.87	1124	7.36			4,91				Clear
Comments:										<u></u>	



Comments:

# **Field Datasheet**

**Groundwater Assessment** 

Company:	MDU Lewis & Clark
Event:	September 2020
Sample ID:	119
Sampling Personal:	Jan Hay

~

2616 E. Broadway Ave, Bi	ismarck, ND						-	Sampling P	ersonal:	7-	- May
Phone: (701) 258-				~=			0 0		Precip:	Suppy / Da	artly Cloudy / Cloudy
Weather Conditions	:	Temp:	75	۳ <del>۲</del>	Wind:	7	@ 5-10				
	WELL INFO	RMATIO	N						PLING IN	FORMATIO	
Well Locked?	YES	010				Purging Met		Bladder			Control Settings:
Well Labeled?	VES	NO				Sampling M		Bladder			Purge: Sec. Recover: CS Sec.
Casing Strait?	YES	NO			]	Dedicated E	quipment?	YES	NO)	1	
Grout Seal Intact?	YES	NO	Not V	isible	4.			1000	(i)	1	PSI: 20
Repairs Necessary?						Duplicate Sa		YES	(NO)		
	ng Diameter:	2		~	4	Duplicate Sa	imple ID:			J	
Water Level B		8, 6	56	ft ft	4 .		Bottle	o List:		1	
	epth of Well:			liters	4	1 Liter Raw	DULI	4- 1L Nitric		1	
	Vell Volume:			ft	4	1 Liter Raw 500mL Nitric		4" IL MUIL			
	op of Pump:	8.9		ft	4	500mL Nitric					
Water Level A			Vater Level		-	250mL Sulfur	•				
Measurem	ent Method:	Electric	Water Lever	maicator	_1					1	
						D READIN				1	Appearance or Comment
Stabilization Para		Temp.	Spec.	pН	DO	ORP	Turbidity	Water Level	Pumping	mL Removed	Clarity, Color, Odor, Ect.
(3 Consecutiv	-	(°C)	Cond.		(mg/L)	(mV)	(NTU)	(ft)	Rate mL/Min	Removed	clear, slightly turbid, turbid
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10	L			I	clear, slightly turbid, turbid
21 Sept 2020		Start of Well		120		183,3	28,59	8.87	100.0	500,0	Clear
	1405	18.18	1189	7.29	1.61	181.1	37.66	0,03	100.0	3020,0	Clear
	1435	19.4B	1186	7.29	0.00	105.1	11.98	6,00	1000	8000.0	Clear
	1455	21,77	1197	7.29	0.92	191.2	4.87	6,69	1,00,0	200.0	Clea
	1520	21.96	1202	7.29	0.94	192,5	3.05	8.89	100,0	500.0	Clear_
	1 1520	41.10				186.2	2.93	8,88	120.0	500.0	Chin
		2,95	1165	1 / 2 4	1001						
	1525	21.95	119.5	7.29	0.97	10010	<u> </u>	0,00	1000	300.0	
		21.95	119.5	4.29	0.97	10010					
		21.95	195	4,29	0.97	<u> </u>					
		21.95	195	<u> </u>	0.97	<u>, , , , , , , , , , , , , , , , , , , </u>					
	1525	2(.95	119.5 (TES)	4.29 NO	0.97					: <u>85</u> 0,0	
	Vell Sta	abilized?	TED	NO	0.97		Turbidity				mL Appearance or Comment
Sample Date	1525				0.97						



1325

17.16

3846

# **Field Datasheet**

Groundwater Assessment

	Company:		MDU Lewis & Clark								
	Event:		September 20	20							
	Sample ID:		[[	(							
	Sampling Perso	nal:	Jan	8hz							
	- <u></u>										
5-10	) Prec	ip:	Sunny / Partly	Cloudy & Clou	ıdy						
	SAMPLI	NG IN	FORMATION								
d:	Bladder			Control Set	ttings:						
iod:	Bladder	<u></u>	Pur	rge: S	Sec.						
ipment?	YES ()	NO2	Red	cover: 55	Sec.						
			PSI	: 20							

Cles

			0.	ounanace	, ,					f	
2616 E. Broadway Ave, B	lismarck, ND							Sampling P	ersonal:	<u></u>	784
Phone: (701) 258	-9720										
Veather Conditions		Temp:	ЪS	°F	Wind:		@5-10	)	Precip:	Sunny / Pa	artly Cloudy & Cloudy
reacher oblighten		· · · · · · · · · · · · · · · · · · ·						CAN/		FORMATIC	
	WELL INFO		N		r	Purging Me	thed:	Bladder			Control Settings:
Vell Locked?	YES	<u>(NÖ)</u>			4	Sampling M		Bladder			Purge: S S
Vell Labeled?	YES	NO			-	Dedicated E		YES	( NO>		Recover: 55 S
asing Strait?	(YES)	NO	(Not V	licible	-	[Dedicated E	quipments	1 125	<u> </u>	1	PSI: 20
irout Seal Intact?	YES	NO		ISTALE	4	Duralizata S		(YES)	-NO-	1	
epairs Necessary?		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			4	Duplicate Sa			40		
	ng Diameter:	2		<i>I</i> .	4	Duplicate Sa	ampie iD.	1 fre	[	1	
Water Level E		7.8	25	ft ft	-	Г	Pottl	e List:	<u></u>	1	
	epth of Well:				4	1.134 a a Davis	BUILI	4- 1L Nitric			
	Well Volume:			liters	-	1 Liter Raw		4- 11 Munc			
	Top of Pump:			ft ft	4	500mL Nitric					
Water Level A		Į.	6 1		4	500mL Nitric	-				
Measurem	ent Method:	Electric V	Water Level	Indicator	1	250mL Sulfu				ł	
					FIE	LD READIN	IGS			<u></u>	
Stabilization Para	meters	Temp.	Spec.		DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comment
(3 Consecuti	ve)	(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)		Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min	<u> </u>	clear, slightly turbid, turbid
	1210	Start of Well	Purge								
ZzSeptzozo	1215	16.93	4416	7.00	0.68	221.9	19.10	7.88	102.0	500.0	Clear
	1245	16.87	4153	7.04	0.49	186.1	17.90	7.83	100.0	3090,0	des
	1305	17.06	3917	7.10	1.57	122.0	8.64	7.80	100.0	2000.0	Clear
	1315	16.80	3874	1.12	1.87	76.1	4.98	7.88	100.0	1000.0	Ckm
	1320	17.00	3861	7.12	1.98	72.3	3,53	7.69	122.0	50.0	Clear
	1325	17,16	3846	7.12	2.04	70,1	2.65	7,89	100.0	500.0	Clu
		1	T							ļ	
			0						<u> </u>		
	Well St	abilized?	(YES)	NO				Total Vo	lume Purged	7500.0	
Causala Dali	<b>T</b>	Temp.	Spec.	nH	T		Turbidity				Appearance or Commen
Sample Date	Time	(°C)	Cond.	рН			(NTU)		ļ		Clarity, Color, Odor, Ect.
		1	6.1	1 -7 -	1	1	500	1	1	1	

22 Sept 2020 Comments:

2.65

7.12



Groundwater Assessment

Company:	MDU Lewis & Clark
Event:	September 2020
Sample ID:	. /17,
Sampling Personal:	- May-

2616 E. Broadway Ave, Bismarck, ND

<b>Weather Conditions</b>		Temp:	60	°F	Wind:	<u> </u>	@ 5-1	3	Precip:	Sunny / Pa	irtly Cloudy / Cloudy
	WELL INFO	ORMATION	Į					SAM	PLING IN	FORMATIC	
Well Locked?	YES	(NO)				Purging Met	hod:	Bladder			Control Settings:
Well Labeled?	YES?	NO		i		Sampling M	ethod:	Bladder			Purge: <u>5</u> Se
Casing Strait?	YES	NO				Dedicated E	quipment?	YES	(NO)		Recover: 55 Se
Grout Seal Intact?	YES	NO	Not V	isible						- Lip	PSI: 20
Repairs Necessary?						Duplicate Sa	imple?	YES	(ND		
	ng Diameter:	2	19			Duplicate Sa	imple ID:	•			
Water Level B		5.6		ft						-	
	epth of Well:		5 (	ft			Bottl	e List:		]	
V	Vell Volume:	3,		liters		1 Liter Raw		4-1L Nitric			
Depth to T	op of Pump:			ft		500mL Nitric					
Water Level A	fter Sample:	Below	Pump	ft		500mL Nitric	•				
Measurem	ent Method:	Electric V	Vater Level	Indicator		250mL Sulfur	ic			]	
					FJFI	LD READIN	GS				
Stabilization Para	meters	Temp.	Spec.		DO	ORP	Turbidity		Pumping	mL	Appearance or Comment
(3 Consecutiv		(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)	Water Level	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
21 Sup + 2020	1640	Start of Well			l	<u>L</u>		· ····································			
21 24 1 200	1645	16.15	7384	7,05	7.69	267.2	18.77	6.65	150,0	750,0	Clean
	1700	16.14	7432	7.05	8.01	232.6		9,00	150.0	2250,0	Clear
	1715	16.38	7458	7.13	7.19	267.B	5.30	BelowPing	150.0	2250,0	Cla
		Purged	Dry		h						
22 Sept 2020	1127	Pirged	well for	- 5 min	to de	on live		6.08			
22-91-22	1127	16.68	7066	6.99	6.47	237.4	2.79	6.30	100,0	500.0	Clis
		1010-		¥							
					1						
				0							l
	. Well St	abilized?	YES	(NO)				Total Vol	ume Purged	: 5750.0	_mL
		Temp.	Spec.	<u> </u>	1	T	Turbidity				Appearance or Comment
Sample Date	Time	(°C)	Cond.	pН			(NTU)				Clarity, Color, Odor, Ect.
22 Sept 2020	1132	16.68	7066	6.99			2.79				Clie
Comments:			and the second								





Groundwater Assessment

Company:	MDU Lewis & Clark	
Event:	September 2020	
Sample ID:	118	
Sampling Personal:	Jest by	_

2616 E. Broadway Ave, Bismarck, ND

<b>Neather Conditions</b>		Temp:	SC	プF	Wind:	<u> </u>	@ 5-10	3	Precip:	Sunny / Pa	rtly Cloudy / Cloudy
<u> </u>		ORMATIO	N					SAM	PLING IN	FORMATIC	DN
Well Locked?	YES	(NO)			]	Purging Met	hod:	Bladder			Control Settings:
Well Labeled?	YES	NO			1	Sampling Method: Bladder					Purge: <u>5</u> Se
Casing Strait?	(YES)	NO			1	Dedicated E	quipment?	YES	(NO)		Recover: 55 Se
Grout Seal Intact?	(YES)	NO	Not \	/isible	1	<b>A</b>					PSI: 20
Repairs Necessary?					1	Duplicate Sa	mple?	YES	(NO)		
	g Diameter:	2	17			Duplicate Sa	mple ID:				
Water Level B		Bí.	38	ft							
	pth of Well:			ft	1		Bottl	e List:			
	Vell Volume:		-	liters	]	1 Liter Raw		4-1L Nitric			
Depth to T	op of Pump:	- 1		ft	]	500mL Nitric					
Water Level A		B	50	ft		500mL Nitric					
Measurem	ent Method:	Electric	Water Level	Indicator	]	250mL Sulfur	ic			J	
					FIE	LD READIN	GS				
Stabilization Para	meters	Temp.	Spec.	T .	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Comment
(3 Consecutiv		(°C)	Cond.	рН	(mg/L)	(mV)	(NTU)	water Lever	Rate	Removed	Clarity, Color, Odor, Ect.
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min		clear, slightly turbid, turbid
	1540	Start of Wel	Purge			-					
22 septrozo	1545	21.92	1795	7.27	3.81	201,7	181.35	8,44	[80.5	5020	Clean
ι	1615	17.25	1569	7.09	4.03	201.0	2.66	8,46	100.0	30000	Clear
	1620	17.15	1613	7.09	3,91	199.0	1.51	8,46	100,0	50000	Clas
	6625	12.15	1630	7.10	3,87	195,8	1.64	8,47	00.0	500,0	Cher
	1630	17,19	1638	7.11	3,65	191.4	1.32	B, 47	100.0	500,0	Clear
										<u> </u>	
								<u> </u>			
								L		<u> </u>	
				<u> </u>						<b> </b>	
· · · · · · · · · · · · · · · · · · ·			<u> </u>	<u> </u>		<u> </u>					L
	Well St	abilized?	(YES)	NO				i otal Vol	lume Purged:	<u>50000</u>	_mL
	Time	Temp.	Spec.	рН			Turbidity				Appearance or Comment
Comple Date	1 ume	(°C)	Cond.			1	, (NTU)				Clarity, Color, Odor, Ect.
Sample Date	1630	17.19		7.4			524				Clear

.



Groundwater Assessment

MDU Lewis & Clark
September 2020
120,
Janj Khy-

2616 E. Broadway Ave, Bismarck, ND

Weather Conditions	:	Temp:	65	Ϋ́Ε	Wind:		@∑∽,⊘		Precip:	Sunny / Pe	rtly Cloudy/ Cloudy	
	WELL INFO	RMATION	1					SAM	PLING IN	FORMATIC		
Well Locked?	YES	(NO)				Purging Met	thod:	Bladder			Control Settings	
Well Labeled?	YES?	NO				Sampling M		Bladder			Purge: 5	Sec.
Casing Strait?	YES	NO	<u> </u>	>		Dedicated E	quipment?	YES	(NO)		Recover: SS	Sec.
Grout Seal Intact?	YES	NO	(Not V	sible						1	PSI: 20	
Repairs Necessary?						Duplicate Sa		YES	NO			
	g Diameter:	2				Duplicate Sa	ample ID:					
Water Level B		14.		ft					<u></u>	1		
Total De	pth of Well:	<u> </u>		ft			Bottl	the second s				
	Vell Volume:			liters	]	1 Liter Raw		4- 1L Nitric				
	op of Pump:			ft	1	500mL Nitric						
Water Level A	and the second se			ft	4	500mL Nitric						
Measureme	ent Method:	Electric V	Vater Level I	ndicator	J	250mL Sulfu	TIC			ł		
					FIE	LD READIN	IGS					
Stabilization Para	meters	Temp.	Spec.	PH	DO	ORP	Turbidity	Water Level	Pumping	mL	Appearance or Com	and the second se
(3 Consecutiv	/e)	(°C)	Cond.	рн	(mg/L)	(mV)	(NTU)		Rate	Removed	Clarity, Color, Odor,	the second s
Purge Date	Time	±0.5°	±5%	±0.1	±10%	±10		(ft)	mL/Min	<u> </u>	clear, slightly turbid,	turbia
22 Sept 2020	1000	Start of Well	Purge					<u>et 1</u>	1.00			
20 .9.0	1005	11.75	6099	6,70	0.44	212.1	0.84	14,56	100.5	500,0	Clear Clear	
	1015	12.13	5562	6.70	0,64	156.8	1,13	14.65	100.0	1000.0	Cha Clear	
1	1020	12.22	5535	b.70	0.73	93.4	0.75	14.68	100,0	500.0		
l	1025	12.34	5620	6.70	0.65	66.0	0.24	14,70	100.0	500.0	Claar Oler	
	1030	12,48	5686	6.70	0.62	59.4	0,19	14.71	(00,0)	5000	(led	
	1035	12.49	5828	6.70	0.62	57.3	0.2(	14.73	100,0	500.0	( 1000	
						<u> </u>	<u></u>			+		
					<u> </u>	<u> </u>						
	Wall St	abilized?	(YES)	NO		<u> </u>	<u>I</u>	Total Vo	lume Purged	3500.0	յ mL	
	wen st					1	Turbidity	1	-		Appearance or Com	ment
Sample Date	Time	Temp. (°C)	Spec. Cond.	pН			(NTU)				Clarity, Color, Odor	
22 Sept 2020	10355	12.49	5823	6.70	1	1	0,21				Clez	
Comments:										<u> </u>		



Surface water Assessment

Company:	MDU Lewis & Clark					
Event:	September 2020					
Sample ID:						
Sampling Personal:	Jenth					

2616 E. Broadway Ave, Bismarck, ND 25.5

Phone: (701) 258-9720

Weather Conditions:	Temp:	60	°F	Wind:	3	@ 5-10	Precip:	Sunny / Partly Cloudy / Cloudy
Well ID	Date	Time	Casing Diameter	Water Level (ft)			Cor	nments
MW101	22 Sept 2020	0952	2"	9.06				
MW105	22 Sept 2020	1730	2"	B. 75				
MW106	22 Sept 2020	1536	2"	9,44				
MW107	22 Sept 2020	0954	2"	५,3७				
MW108	22 Sept 2020	1203	2"	16.03				
MW116	2z Sept 2020	1201	2"	11.82				
	~							



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

### **Chain of Custody Record**

Project Name:		Sec. 1		Event:		233.3				ALC: NO RECEIV	er Number:	1
	MDU Lev	wis & Clark			S	epter	nbe	er 2020			3-26	1 20
Report To: Attn: Address: Phone: Email:	MDU Todd Peterson 400 N. 4th St Bismarck, ND 58501 701-425-2427 Todd.Peterson@mdu.cc	om		CC:						Collected I	By: 7 My-	
Lab Number	Sample ID	Oate	Time		Illier Proc	Soom wind	211 Succelle	Temo (°C)		in Ha		Analysis Required
W3630	Dup 1	22 Sept 2020	NA	GW					NA	NA	NA	
WBLEBI	Field Blank (FB)	22 Sept 2020	NA	GW			4	NA	NA	NA	NA	4
W3e32	MW103	22 Sept 2020	0910	GW			4	13.3B	1347	7.30	4.29	-
W3633	MW110	21 Sept 2020	1258	GW			4	16.87	1124	7.36	4.91	-
W3634	MW119	21 Sept 2020	1525	GW			4	21.95	1195	7.29	2.93	-
W3635	MW111	22 Sept 2020	1325	GW			4	17.16	3846	7.12	2.65	Rad 226 & 228
WB636	MW117	22 Sept 2020		GW			4	16.68	7066	6.99	2.79	4
W3637	MW118	22 Sept 2020	1630	GW			4	(7.19	1638	7.11	1.32	4
WELEZS	MW120	22 Sept 2020	1035	GW			4	12.49	5828	6.70	0,21	-
												-

Comments:

Relinguished By		Sample	Condition	Receiv	ved By
Name	Date/Time	Location	Temp (°C)	Name	Date/Time
1 1 - 4	245072020	Log In Walk In #2	TM562 / TM805	Eily Delan -	24 Sept 2020 0740
2					

### Appendix B

Montana-Dakota Utilities Co., Lewis & Clark Station, Alternative Source Demonstration – Temporary Storage Pad





#### **Technical Memorandum**

To:Todd Peterson, Montana-Dakota Utilities Co.From:Paul Swenson and John GreerSubject:Alternative Source Demonstration (ASD), Temporary Storage Pad, Lewis & Clark StationDate:November 13, 2020Project:26411007

Montana-Dakota Utilities Co. (MDU) owns and operates Lewis & Clark Station (Site), a coal-fired electricity generation unit near Sidney, Montana. Operation of the Lewis & Clark Station results in coal combustion residuals (CCR) as a by-product. Two storage ponds and a CCR pile that has been physically closed are situated at the property to manage CCR. The storage ponds—which comprise a single, multi-unit CCR surface impoundment under the US Environmental Protection Agency (EPA) CCR Rule (40 CFR Parts 257 and 261 Disposal of Coal Combustion Residuals from Electric Utilities) (CCR Rule)—are named the East and West Scrubber Ponds, or collectively the Scrubber Ponds.

The Scrubber Ponds store sluiced flue-gas desulfurization (FGD) solids. The closed CCR pile was referred to as the Temporary Storage Pad (TSP). The TSP was used to store FGD solids (excavated from the Scrubber Ponds) where they drained to prior to loading and hauling for disposal. The TSP has been reconstructed as a paved area that is no longer subject to the CCR Rule.

#### 1.0 Introduction

Closure by removal of CCR began at the TSP in 2018 with the removal of CCR and CCR-contaminated sediments. Although physical removal actions have been completed, demonstration that groundwater meets the quality requirements of CCR Rule §257.102(c) has been ongoing. The locations of the Scrubber Ponds and former TSP are shown on Large Figure 1. The groundwater monitoring system is a multi-unit groundwater monitoring system, as allowed in §257.91(d), meaning that both the Scrubber Ponds and the TSP are monitored by the groundwater monitoring system.

The CCR units 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, 2019). A statistically significant increase (SSI) over background levels was determined for one or more of the constituents listed in appendix III to the CCR Rule (§257.95(a)) in 2018, which resulted in initiation of the assessment monitoring program on April 15, 2018, and which continues through 2020.

It was determined on January 2, 2019, that the initial assessment monitoring and resample events 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). The Scrubber Ponds and former TSP are currently in selection of remedy, as described in §257.97, subject to the ongoing evaluation of a potential alternative source.

#### 1.1 Purpose

This memorandum provides written documentation of an Alternative Source Demonstration (ASD) supporting closure by removal in accordance with §257.102(f)(3). The ASD evaluation presented is consistent with requirements of §257.95(g)(3)(ii) of the CCR Rule.

#### 1.2 Description of the Monitoring Well System

The monitoring well system around the CCR units 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). The downgradient monitoring wells are located hydraulically downgradient of the CCR units along the waste boundary and are spaced approximately 500 feet (or less) apart. The downgradient wells are positioned to detect contaminants from a hypothetical release from the CCR units. The number, spacing, and hydraulic positions of the monitoring wells comply with requirements outlined in §257.91 (a)-(c) of the CCR Rule. The monitoring system is designed as a multi-unit groundwater monitoring system as allowed by §257.91 (d). It was not feasible to install a separate groundwater monitoring system for each CCR unit.

#### 1.3 Groundwater Standards for Closure by Removal

Once assessment monitoring is triggered for a CCR unit, CCR Rule § 257.95(d)(2) requires that GWPS be established for appendix IV constituents detected in groundwater. GWPS are defined as the higher of the 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 all appendix IV constituents.

The criteria for "closure by removal of CCR" (§257.102(c)) states:

CCR removal and decontamination of the CCR unit are complete when constituent concentrations throughout the CCR unit and any areas affected by releases from the CCR unit have been removed and groundwater monitoring concentrations do not exceed the groundwater protection standard established pursuant to § 257.95(h) for constituents listed in appendix IV to this part.

While nearly all monitoring results satisfied this requirement, the post-closure groundwater samples exceeded the lithium GWPS during assessment monitoring for all four downgradient monitoring wells

(MW-111, MW-117, MW-118, and MW-120). The post-closure samples exceeded the selenium GWPS during assessment monitoring for monitoring wells MW-111 and MW-118 only.

# 1.4 Description of TSP Operation and Relevant Historical Changes to Site Configuration

The first Scrubber Ponds were excavated in 1975 to support newly installed plant air quality equipment. FGD solids were brought directly from the 1975 Scrubber Ponds to historical bottom ash ponds, which ceased receipt of ash in 2015. The first TSP was constructed in 1993 with the construction of the 1993 lined Scrubber Ponds. The general operation of the TSP was as follows:

- 1. After one of the Scrubber Ponds is drained, FGD material was allowed to dewater within the drained Scrubber Pond until the material was dry enough move to the TSP.
- 2. Material was then piled on the TSP.
- 3. The material remained on the TSP until it was dry enough for transportation to an offsite disposal location.

The following is a short summary of changes in configuration of the Scrubber Ponds and TSP that are relevant to this ASD. All dates are approximate.

- 1975: Unlined, incised Scrubber Ponds were constructed in the area east of Lewis & Clark generating station. Based on available historical data, it appears that the ponds were excavated to bedrock (Barr, 2016)(Barr, 2019b), meaning that the Scrubber Ponds were in direct contact with the aquifer.
- 1993: Lined Scrubber Ponds were constructed in the footprint of the original unlined ponds with base elevations that were higher than the 1975 ponds, and placement of materials on the TSP area began.
- 1998: The TSP was retrofitted with a geomembrane liner.
- 2018: Scrubber ponds were retrofitted with a composite liner in the footprint of the former 1993 Scrubber Ponds, with base elevations that were higher than the 1993 ponds and some expansion of footprint to the northeast.
- 2018: TSP closure by removal construction was completed.

#### 2.0 Hypothesis No. 1

If the TSP is a source of lithium and selenium to downgradient monitoring wells, material testing data should show a high potential for significant infiltration from the material stored on the TSP and modeling should show a significant impact on downgradient water quality from the infiltration.

The hypothesis was tested to determine if data and modeling support the hypothesis. Data and modeling results reviewed to evaluate the hypotheses included:

- Water content of the material on the TSP
- Groundwater flow and contaminant transport modeling

The results of the test show that there are multiple lines of evidence supporting the ASD and establish that interpretation of the GWPS exceedance for lithium and selenium meets the alternative source requirements of the CCR Rule (§257.95(g)(3)(ii)) for the TSP.

#### 2.1 Water Content of Material on TSP

To understand the percentage of water potentially released from the FGD material while stockpiled on the TSP, 16 samples of the material were collected in August 2020. Two piles were identified on the TSP that were typical of FGD operations, one that had recently been placed on the TSP (representative of initial moisture content), and the second that had sat for a period of time and was about to be removed for off-site disposal (representative of final moisture content). Capturing the moisture content of both conditions allowed characterization of the variability in water content of the material placed on the TSP.

Each pile was divided into eight grid cells of approximately the same size. Shelby tube samples were attempted to be obtained from each grid cell. The ends of the Shelby tube were capped immediately upon retrieval of the sample. A total of 16 samples were collected and analyzed for average initial water content, total porosity, field capacity, and grain size distribution. During lab testing, five of the samples from the pile sitting on the TSP the longest were too dry to collect intact material from the Shelby tube. Testing proceeded on the eight samples from the newly placed pile and the three samples from the pile sitting the longest.

The results of laboratory testing were used to estimate the average water content within the TSP materials that would be available for drainage into groundwater. The water content available for drainage was calculated by subtracting field capacity from the initial water content for each sample (Table 1 TSP Material Water Content and Field Capacity Sampling ResultsTable 1).

Sample ID	Initial Water Content [% vol.]	Water Content @ 1/3 Bar (Field Capacity) [% vol.]	Estimated Water Content Available for Drainage [% vol.]
TSP-Ash-01	59.5	44.9	14.6
TSP-Ash-02	58.3	57.3	1.1
TSP-Ash-03	57.0	56.6	0.4
TSP-Ash-04	54.0	52.3	1.7
TSP-Ash-05	50.9	46.4	4.5
TSP-Ash-06	55.1	54.0	1.1
TSP-Ash-07	56.2	53.1	3.1
TSP-Ash-08	58.6	58.3	0.4
TSP-Ash-13	48.4	35.0	13.4
TSP-Ash-14	53.8	53.0	0.8
TSP-Ash-09	TD	TD	0.0
TSP-Ash-10	TD	TD	0.0
TSP-Ash-11	TD	TD	0.0
TSP-Ash-12	TD	TD	0.0
TSP-Ash-15	TD	TD	0.0
		median	0.8

#### Table 1 TSP Material Water Content and Field Capacity Sampling Results

TD: Sample too dry for analysis, assumed to have water content available for drainage equal to zero.

Based on the values presented in Table 1, material placed on the TSP had a typical (median) water content available for drainage of 0.8%. The annual material volume was estimated to range between 22,000 and 29,000 cubic yards per year, with an average of approximately 28,000 cubic yards per year. This average was based on annual tonnage and bulk density estimates used for design calculations of the 2018 pond retrofit and represents analysis of material storage over time (not a simple average of the minimum and maximum storage values). Multiplying the median free water content by the range in TSP material volume produced a seepage of between 100 and 130 gallons per day (gpd), with an average of 120 gpd.

#### 2.2 Estimated Discharge to Groundwater from Material Placed on the TSP

The discharges from the TSP materials to groundwater were estimated for both the unlined TSP (which operated from 1993-1998) and the lined TSP (which operated from 1998-2018).

To estimate the discharge to groundwater from materials placed on the unlined 1993-1998 TSP, it was assumed that the estimated average TSP material seepage of 120 gpd discharged completely to groundwater. This was a conservative assumption, as some of the water would evaporate. To estimate a recharge from the TSP materials, the average TSP material seepage rate of 120 gpd was applied over the TSP area (1.7 acres). This resulted in a calculated average seepage rate of 7.8E-08 centimeters per second

(cm/s) from the TSP materials. For comparison, the estimated recharge rate from infiltration of precipitation is 1.9E-08 cm/s (Attachment C, Barr, 2020).

The effect of the liner in the 1998-2018 TSP was estimated using a MODFLOW simulation in which a low permeability material was simulated under the TSP area to represent the liner (Barr, 2020). The properties and extent of the simulated liner material are based on historical site information that indicates a 20-mil poly liner was installed under the TSP pile area. Modeling results indicate seepage from the TSP pile to groundwater was approximately 10% to 20% less than from the unlined TSP with an average reduction of approximately 15% (Barr, 2020). Applying these reductions to the average TSP material seepage rate of 120 gpd, it was estimated that seepage from the lined TSP ranged between approximately 80 and 120 gpd, with an average of approximately 100 gpd. Based on available information, the seepage rate from the TSP materials is low and the addition of the low permeability liner resulted in a reduction in the already low seepage rate.

Similar to the unlined TSP, the discharge to groundwater from materials placed on the 1998-2018 lined TSP was estimated assuming all of the estimated average TSP material seepage of 120 gpd discharges completely to groundwater.

The selenium and lithium concentration of water draining from materials placed on the TSP was estimated to be a dilution of the Scrubber Pond water due to mixing of pond water and precipitation which infiltrates the material pile. When the material was initially removed from the pond, it was assumed that the pore water within the material was at a concentration equal to that of the pond water. Over time, the concentration of the pore water was assumed to be reduced as mixing of infiltrated precipitation occurs. For the purposes of this study, it was assumed that the concentration of seepage from materials placed on the TSP was a recharge weighted average of the concentrations in the pond and site-specific background concentrations (Table 2). These background concentrations were developed for modeling purposes and were intended to approximate the average concentrations of groundwater entering the Site groundwater monitoring system from upgradient flow or precipitation recharge. These concentrations were estimated by taking the geometric mean of lithium and selenium concentrations for samples collected at upgradient wells within the CCR monitoring system for data available prior to August 2019.

#### Table 2 Estimated TSP Material Seepage Concentrations

	Estimated annual average recharge rate [cm/s]	Lithium concentration [mg/L]	Selenium concentration [mg/L]
TSP material (initial conc. From Scrubber Ponds)	7.8E-08	0.560	0.226
Precipitation infiltration	1.8E-08	0.043	0.043
Estimated mixture concentration		0.464	0.192

By inclusion of infiltrated precipitation at the background concentration rather than a concentration of 0, it was assumed that some desorption of constituents from the TSP materials to the infiltrated precipitation was occurring. The actual impact of desorption from the TSP materials on the infiltrated precipitation was the result of a complex transient geochemical reaction. Due to the short contact time of the TSP materials and infiltrated precipitation, the assumption that desorption from the TSP materials resulted in a concentration comparable to the long-term average background concentration at the Site was deemed to be reasonable. Note that the precipitation infiltration rate was approximately 25% of the TSP material infiltration rate, so the estimated concentration of the precipitation infiltration rate.

The equation for the recharge weighted concentration calculation is provided in Equation 1.

#### Equation 1 Calculation of Recharge Weighted Concentration of Infiltration from the TSP

$$\bar{C}_{tsp} = \frac{\left(r_{inf} * c_{inf}\right) + \left(r_{tsp} * c_{pond}\right)}{\left(r_{inf} + r_{tsp}\right)}$$

Where:

 $\bar{C}_{tsp}$  = the average recharge weighted concentration of infiltration from the TSP

 $r_{inf}$  = the infiltration recharge rate

 $r_{tsp}$  = the TSP infiltration rate

 $c_{inf}$  = the infiltration recharge concentration (background)

 $c_{pond}$  = the Scrubber Pond concentration

For comparison, it is estimated based on groundwater flow and transport modeling that the original, unlined 1975 Scrubber Ponds contributed an average of 1,300 gpd to groundwater with undiluted concentrations of lithium and selenium (Barr, 2020). Table 3 below compares the estimated groundwater seepage, lithium mass loading rates, and selenium mass loading rates of the TSP to the original unlined Scrubber Ponds.

Table 3	Comparison of Estimated TSP to the 1975 Scrubber Ponds

Source	Median Estimated Seepage (gpd)	Lithium concentration (mg/L)	Median Estimated Lithium Mass Loading Rate (mg/d)	Selenium concentration (mg/L)	Median Estimated Selenium Mass Loading Rate (mg/d)
1975 Scrubber Ponds (unlined)	1300	0.56	2800	0.23	1100
Unlined TSP	120	0.46	210	0.19	87
Lined TSP	100	0.46	180	0.19	74

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#### 3.0 Hypothesis No. 2

The impacts at downgradient wells within the CCR monitoring network are primarily attributable to the 1975 Scrubber Ponds and/or other sources, not the TSP. Groundwater flow and contaminant transport modeling was reviewed and tested to determine if site data supported the hypothesis.

#### 3.1 Groundwater Transport Modeling

The current distribution of lithium and selenium in Site groundwater is the result of contributions from multiple historical sources. To estimate the proportion of the current lithium and selenium distribution attributable to the unlined and lined TSP, a groundwater flow and transport computer model was used to simulate the impacts of both TSP configurations (Barr, 2020). The unlined and lined TSPs were simulated as recharge areas, with recharge rates and concentrations based on the analysis discussed in Section 2.2. The groundwater flow and transport models were originally developed as part of the Assessment of Corrective Measures (ACM), and were substantially updated and recalibrated with relevant additional Site data collected or discovered since the original model development for the TSP evaluation (Barr, 2020).

Historical sources simulated with the groundwater flow and transport model include the 1975 Scrubber Ponds, the 1993 Scrubber Ponds, the 2018 Scrubber Ponds, the unlined TSP, the lined TSP, and the sewage lagoon as sources. Other sources, such as metals that are naturally occurring in finer grained soils and carbonaceous zones that have been identified on the site, may have affected groundwater quality in downgradient wells, but they have not been included in the model. The groundwater flow and transport model with all known historical sources simulated reasonably matches the lithium and selenium concentrations at the wells in the CCR monitoring system, indicating that application of the model to estimate the proportional impact of various historical sources to evaluate impacts of the TSP is appropriate.

Comparisons of lithium and selenium concentrations measured September 21 and 22, 2020 to modelsimulated concentrations are presented on Figure 2 and Figure 3, respectively. Note that the modeling includes a background concentration of 0.0427 mg/L for lithium and 0.0434 mg/L for selenium. Since the model cannot predict concentrations below the background concentrations, measured concentrations less than background are plotted at the background concentrations.



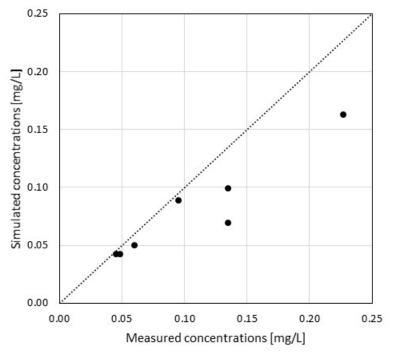


Figure 2 Fall 2020 Measured vs. Simulated Lithium Concentrations at Wells in the CCR System

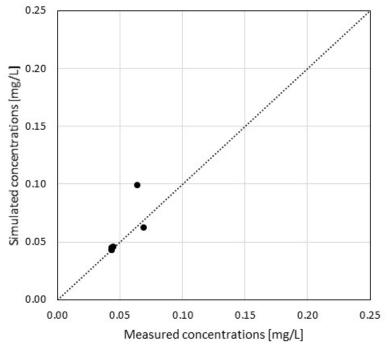


Figure 3 Fall 2020 Measured vs. Simulated Selenium Concentrations at Wells in the CCR Monitoring System

To estimate the relative impact of the unlined and lined TSP as well as other historical sources of lithium and selenium, the sources were simulated individually and the impacts on wells within the CCR monitoring system were evaluated. To evaluate the individual effect of lithium and selenium from sources other than

P:\Bismarck\26 MT\41\26411007 L&C Scrubber Ash Ponds CCR Compliance\WorkFiles\26411007.15 Supplemental ASD\ASD Documentation\TSP\Technical Memo\_2020 TSP ASD\_Final.docx the TSP, the other sources were removed from the model and it was run for the full period of Site activity (1975-2020). The simulated lithium concentrations as of fall 2020 at downgradient wells within the CCR monitoring system resulting from each source when simulated individually are presented in Table 4. The simulated proportional contribution of the historical sources to fall 2020 concentrations above the background concentration are presented in Table 5. The same results for selenium are presented in Table 6 and Table 7. Note that concentrations measured less than background are targeted for simulation at the background concentrations presented above.

### Table 4Estimated Relative Impact of the TSP on Fall 2020 Lithium Concentrations at the<br/>Downgradient CCR Monitoring System Wells

	Measured	Simulated Concentrations [mg/L]						
CCR Monitoring System Well	Concentration Fall 2020 [mg/L]	All sources	Unlined TSP only	Lined TSP only	1975 Pond only			
MW-111	0.227	0.163	0.0446	0.0545	0.125			
MW-117	0.135	0.0994	0.0427	0.0427	0.0429			
MW-118	0.0950	0.0888	0.0427	0.0427	0.0757			
MW-120	0.135	0.0694	0.0502	0.0466	0.0580			

Lithium background concentration in the simulations was 0.0427 mg/L

# Table 5Simulated Proportional Contribution of the Historical Sources to Fall 2020 Lithium<br/>Concentrations Above the Background Concentration at Downgradient CCR<br/>Monitoring Wells

CCR Monitoring	Simulated Attributable Contribution Percent Above Background						
System Well	Unlined TSP only	Lined TSP only	1975 Pond only				
MW-111	2%	10%	68%				
MW-117	0%	0%	0%				
MW-118	0%	0%	72%				
MW-120	28%	15%	57%				

### Table 6Estimated Relative Impact of the TSP on Fall 2020 Selenium Concentrations at the<br/>Downgradient CCR Monitoring System Wells

Measured		Simulated Concentrations [mg/L]						
CRR Monitoring System Well	Concentration Fall 2020 [mg/L]	All sources	Unlined TSP only	Lined TSP only	1975 Pond only			
MW-111	0.0634	0.100	0.0453	0.0454	0.0901			
MW-117	0.0322	0.0434	0.0434	0.0434	0.0434			
MW-118	0.0689	0.0627	0.0434	0.0434	0.0582			
MW-120	< 0.0050	0.0450	0.0435	0.0434	0.0449			

Selenium background concentration in the simulations was 0.0434 mg/L

Table 7Simulated Proportional Contribution of the Historical Sources to Fall 2020 Selenium<br/>Concentrations Above the Background Concentration at Downgradient CCR<br/>Monitoring Wells

<b>CRR Monitoring</b>	Simulated Attributab	nt Above Background	
System Well	Unlined TSP only	Lined TSP only	1975 Pond only
MW-111	3%	4%	81%
MW-117	0%	0%	0%
MW-118	0%	0%	74%
MW-120	4%	0%	63%

The results of the analysis indicate that only a small portion of the lithium and selenium concentrations measured at wells within the CCR monitoring system in the fall of 2020 are attributable to either the unlined or the lined TSP and that the impacts from these units are insufficient to result in concentrations above the GWPS.

The conclusion that the majority of the impacts at downgradient wells within the CCR monitoring system are attributable to sources other than the TSP is consistent with the conceptual understanding of groundwater flow at the Site. Some key points in this understanding are outlined below:

- The 1975 ponds were unlined and appear to have been excavated down to bedrock, meaning that the ponds were directly connected to the groundwater system. In comparison, the 1993 and 2018 ponds were constructed above the water table and lined.
- Due to a generally low hydraulic gradient and the presence of low permeability materials at the Site, it can take groundwater years to decades to move off site. Therefore, lingering impacts from the 1975 ponds (which ended operation in 1993) or other sources should be expected.
- The 1975 ponds were directly connected to the groundwater system and would have caused mounding of the water table. This mounding would have resulted in a higher horizontal hydraulic gradient in the water table aquifer than under conditions post-1993. The mounding would also

have made it possible for groundwater and contaminants to more easily move into areas of the Site where, under lower gradient conditions, lower permeability materials would otherwise retard movement. When operation of the 1975 ponds ceased, the driving head was removed and the hydraulic gradient in the water table aquifer decreased. This caused impacted groundwater to flow more slowly across the site.

#### 4.0 Conclusion

The analysis summarized in this memorandum supports a demonstration, consistent with requirements of \$257.95(g)(3)(ii) of the CCR Rule, that the presence of statistically significant concentrations of lithium and selenium above the GWPS are not attributed to releases at the TSP. This conclusion is based on the low potential for infiltration from the TSP as compared to other historical site sources and groundwater flow and transport modeling which indicates that impacts from the TSP would be insufficient to result in concentrations of lithium and selenium that are statistically significantly above the GWPS. Taken as a whole, the lines of evidence presented above provide adequate documentation that a source other than the TSP is responsible for the presence of lithium and selenium at statistically significant concentrations above the GWPS.

#### 5.0 Certification

I certify that the written demonstration provided herein for lithium and selenium concentrations at monitoring wells MW-111, MW-117, MW-118, MW-120, supported by the data in the referenced documents, is accurate and consistent with our review of the groundwater data collected to date and as required under the CCR Rule (§257.95(g)(3)(ii)).

Paul Swenson, P.E. Vice President

/ John Greer Hydrogeologist

#### 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.

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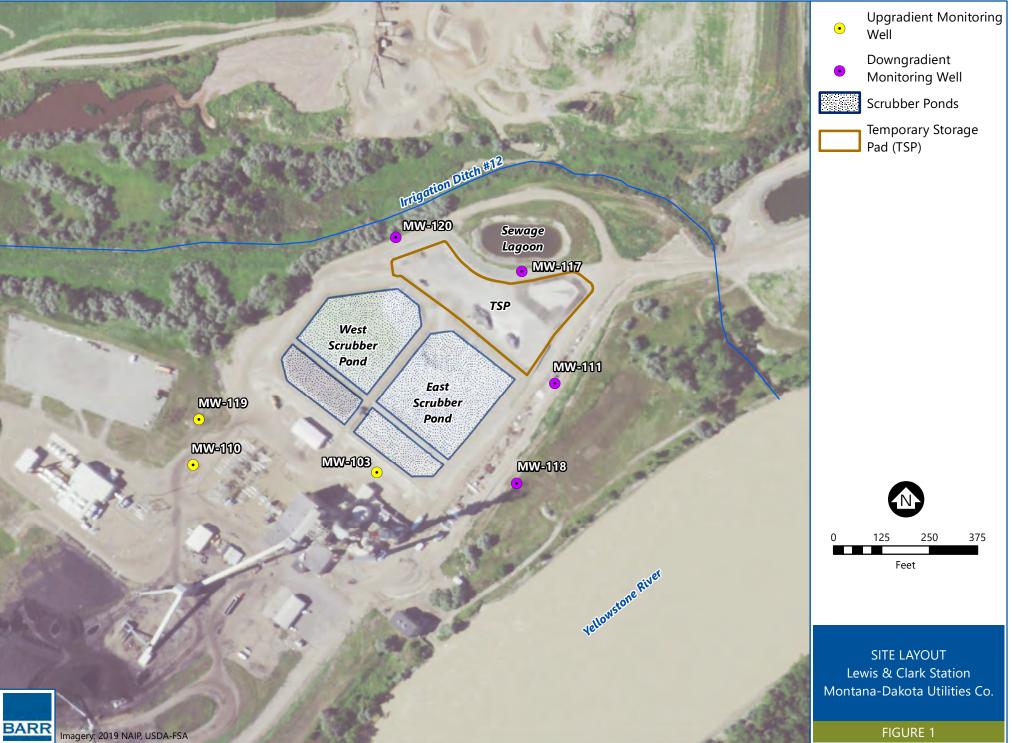
Barr Engineering Co., 2020. Update of the Preliminary Groundwater Flow and Transport Modeling, Lewis & Clark Station, Sidney, MT. Prepared for Montana-Dakota Utilities, November 2020.

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Figure 1 Site Layout

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Large Figures



### Appendix C

Montana-Dakota Utilities Co., Lewis & Clark Station,

Alternative Source Demonstration – Scrubber Ponds



# Alternative Source Demonstration (ASD) for Lithium and Selenium

Lewis & Clark Station

Prepared for Montana-Dakota Utilities Co.

January 2021

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#### Alternative Source Demonstration (ASD) for Lithium and Selenium Lewis & Clark Station

#### January 2021

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- Appendix B Analytical Results for Hypothesis No. 1

#### 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 units regulated under the CCR Rule at the Site caused the statistically significant increases over the applicable groundwater protection standards (GWPS) for lithium and selenium in wells that are downgradient from those units.



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

02/01/2021

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 units at the Site that are regulated under the CCR Rule are the TSP and the Scrubber Ponds. An ASD for the TSP determined that the TSP did not cause the SSIs in the downgradient wells. This ASD pertains to the Scrubber Ponds. As explained below, it was concluded that the Scrubber Ponds did not cause the SSIs in the downgradient wells. Rather, such SSIs are related to natural variations in groundwater quality at the Site and certain statistical methods that were utilized.

#### 1.1 Purpose

In accordance with the CCR Rule, assessment monitoring was undertaken at the Site and identified concentrations of lithium and selenium in downgradient wells that potentially result in statistically significant increases (SSIs) over background levels. 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 discontinuation of the selection of remedy in accordance with § 257.95(g)(3)(iii) of the CCR Rule.

#### 1.2 Scope of Work

As part of the ASD, site data were evaluated to determine whether the regulated CCR units caused the SSIs over background levels for lithium and selenium in downgradient monitoring wells. As part of this evaluation, four 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 and certain statistical methods that were used rather than the Scrubber Ponds. As a result, it was determined an alternative source exists for the SSIs and resulting exceedances of the Ground Water Protection Standard (GWPS) for lithium and selenium 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 2020.

On January 2, 2019, it was determined that the initial assessment monitoring and resample events resulted in detections of lithium and selenium 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). The Scrubber Ponds are currently in selection of remedy, as described in § 257.97, subject to the outcome of the ASD.

#### 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 units 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 units 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.

### 2 ASD Hypotheses

The hypotheses and corresponding determinations supporting the ASD are summarized below. Hypotheses 1 and 2 support an ASD for lithium only and Hypotheses 3 and 4 support an ASD for selenium only.

#### 2.1 Hypothesis No. 1: Natural Variation (Lithium)

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 the hypothesis No. 1, a total of eight Site sediment samples (see Table 1) 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 1. The lithium concentrations for finegrained sediments (clay and silt) ranged from 11.5 milligrams per kilogram (mg/kg) to 22.7 mg/kg, with an average concentration of 16.1 mg/kg. In the coarse-grained sediments (sand and gravel), the concentrations ranged from 4.0 mg/kg to 6.9 mg/kg, with an average concentration of 5.4 mg/kg. The results indicate that the average lithium concentration in the fine-grained sediments is more than three times the average lithium solids concentration in the coarse-grained sediments. The laboratory report for the analysis of the sediment samples is presented in Appendix B.

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	

 Table 1
 Lithium Solids Concentration by Sample Material Type

#### 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 units 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 units 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 2. 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 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.

Sediment	Boring	g Sample Depth within Boring (ft)	Sediment Type	Lithium Result (mg/L)	
Туре	ID		(field-estimated composition in boring logs)		
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				
Coarse	T-15	5-10	Poorly graded sand with silt and gravel (20% gravel, 70% sand, 10% fines)	0.03	
Coarse	Coarse     T-16     3-11     Poorly graded sand with silt and gravel (20% gravel, 70% sand, 10% fines)		0.02		
Coarse			, , , , , , , , , , , , , , , , , , , ,	0.03	
Coarse			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					
			Coarse Range	0.02 to 0.06	

#### Table 2 Summary Saturated Paste Extracts for Lithium

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 coarsegrained 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 (0.0627 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 coarsegrained 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 2 was used to calculate an interwell prediction limit of 0.16 mg/L (Figure 3), which is more than 2.5 times the established GWPS. This upper limit of natural variability more accurately represents potential downgradient background concentrations.

#### 2.1.4 Conclusions

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

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

Finally, statistical evaluation of lithium concentrations obtained from the analyses of SPE leachate resulted in an interwell prediction limit that more than 2.5 times the GWPS. Therefore, based on these geologic

relationships, elevated concentrations of lithium in downgradient wells MW-117 and MW-118 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 (Lithium)

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

### 2.2.1 Lithium Concentrations within Carbonaceous Material

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

SPE leachate analyses of carbonaceous samples for lithium shown in Table 3 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.

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		

#### Table 3 Summary of SPEs for Lithium in Carbonaceous Materials

### 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 4 provides maximum lithium concentrations 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 4	Carbonaceous Zone Correlation to Downgradient Groundwater Concentrations
---------	--------------------------------------------------------------------------

Downgradient CCR Well	Maximum Lithium Concentration in Groundwater Measured during Assessment Monitoring (μg/L)	Distance to Closest Boring with Documented Carbonaceous Material (ft)
MW-111	227	within boring
MW-120	175	125
MW-117	155	160
MW-118	106	280

By inference from the information presented above, elevated concentrations of lithium in MW-111 is attributable to the presence of carbonaceous materials within the well boring. The site investigation boring logs document that carbonaceous material is present within 125 feet from MW-120 based on the boring conducted closest to the well. Carbonaceous material may be closer to MW-120 than documented by the borings.

Since the average lithium concentration SPE leachate analyses is about 1.5 times the average for finegrained 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 has a significant impact on lithium concentrations in these wells and the regulated CCR units are not the cause of elevated concentrations at MW-111 and MW-120.

### 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 appears to correlate with the elevated lithium concentrations in CCR monitoring network wells, with monitoring well MW-111 having the highest lithium concentrations as well as being the only downgradient well with carbonaceous material encountered in the wellbore. These data show that the presence of carbonaceous material in the aquifer matrix causes elevated lithium in downgradient groundwater and has a stronger influence on MW-111 and MW-120, and is therefore responsible for exceedances of the GWPS in these two wells.

### 2.3 Hypothesis No. 3: Contaminant Transport Modeling (Selenium)

Selenium concentrations attributed to the regulated CCR units may not be sufficient to exceed the GWPS at downgradient wells within the CCR monitoring system.

### 2.3.1 Groundwater Transport Modeling Methodology

The current distribution of selenium in Site groundwater is the result of contributions from multiple historical sources. To estimate the proportion of the current selenium distribution attributable to the regulated CCR units, a groundwater flow and transport computer model was used to simulate the impacts of the regulated CCR units (Barr, 2020b). Historical sources simulated with the groundwater flow and transport model include the 1975 scrubber ponds, the Scrubber Ponds at different stages of design, the unlined TSP, the lined TSP, and the sewage lagoon. The groundwater flow and transport model, with all known historical sources simulated, was calibrated to Site data and closely matches the selenium concentrations at the wells in the CCR monitoring system (Barr, 2020b), indicating that application of the model to estimate the proportional impacts of various historical sources is appropriate.

To estimate the impacts of the Scrubber Ponds over time, the sources were simulated individually and the impacts on downgradient wells within the CCR monitoring system were evaluated. The simulated selenium concentrations as of fall 2020 at downgradient wells within the CCR monitoring system resulting from the Scrubber Ponds are presented in Table 5. It should be noted that the transport modeling includes a background concentration of 0.043 mg/L for selenium (Barr, 2020b).

		Simulated Selenium Concentrations (mg/L)				
Location	CCR Monitoring System Well	Pond Design as of Effective Date of Rule	Pond Design after Retrofit			
	MW-111	0.049	0.043			
Devenerations	MW-117	0.043	0.043			
Downgradient	MW-118	0.048	0.044			
	MW-120	0.043	0.043			

#### Table 5 Proportional Contribution to Fall 2020 Selenium Concentrations

As shown in Table 5, the maximum selenium concentration attributed to the CCR units in the downgradient wells (0.049 mg/L) is less than the established GWPS for selenium of 0.0705 mg/L.

### 2.3.2 Conclusion

Based on the results above, releases from the Scrubber Ponds would not be sufficient to produce observed selenium concentrations above the GWPS at downgradient wells within the CCR monitoring system. Therefore, it is apparent that sources other than the Scrubber Ponds caused the observed exceedances of the GWPS at these wells.

### 2.4 Hypothesis No. 4: Statistical Methods (Selenium)

An evaluation of statistical methods could indicate that, based on the selenium data collected through 2020, selenium is not present at levels that are statistically significantly above the GWPS. Instead, it is possible that the previous SSIs were the result of the utilization of an inappropriate statistical methodology rather than a release from the CCR units.

### 2.4.1 Initial Method Used to Make SSI Determination

The determination that there was an SSI for selenium in MW-111 and MW-118 was based on nonparametric interwell prediction limits calculated from data collected between March 2016 and June 2017. This approach was based on the Statistical Method Selection Certification (Barr, 2017). Further review of this certification and guidance documents suggest that the specifics of the methods outlined in the Statistical Method Selection Certification are designed for detection monitoring, and additional refinements may be more appropriate for assessment monitoring. Upon further evaluation, it has been determined that the original statistical method used to identify SSIs for selenium was not appropriate for the assessment monitoring phase and data distribution. In this ASD, the appropriate statistical method was applied, and the analysis was updated accordingly. As explained below, the appropriate statistical method and the corresponding corrected statistical analysis indicate that the monitoring results did not, in fact, represent SSIs for selenium.

### 2.4.2 Alternate Methods

The U.S. EPA's Unified Guidance (U.S. EPA, 2009) provides recommendations for statistical methods to be used in assessment monitoring (Chapter 7). The methods described below are acceptable practices under the Unified Guidance for defining a GWPS. These general methods are also included in the Statistical Method Selection Certification (Barr, 2017).

Although the Unified Guidance (U.S. EPA, 2009) considers prediction limits to be an acceptable method for GWPS evaluations, it also recommends confidence interval testing against a fixed GWPS for assessment monitoring and suggests an upper tolerance limit for identifying the GWPS.

To compare data from a compliance well to the background tolerance limit GWPS, the guidance recommends evaluating whether the lower confidence limit of the mean of the compliance data exceeds the GWPS. The use of a lower confidence limit of the mean of the compliance data assumes that the compliance data are stationary over time. In cases where the compliance data are trending, lower

confidence limit of the mean method is not appropriate, and an alternative method should be used. Two types of trends were identified in the selenium data from MW-111 and MW-118. Statistical analysis accounting for these trends shows that the increase in selenium concentrations in these wells relative to background is not statistically significant.

### 2.4.2.1 Linear Trend Method

A linear trend refers to a series of consecutive measurements that evidence successively increasing or decreasing concentration levels. Guidance suggests the use of a confidence band around the trend line if the data follow a linear trend. The lower confidence limit of the trend can then be evaluated relative to the GWPS.

#### 2.4.2.2 Shift Method

Alternatively, if the non-stationary behavior exhibits a shift, in which the data shift from one stationary level to a significantly different level, guidance suggests limiting the confidence limit calculation to the recent level. Although this approach will reduce sample size, the reduction will be offset by the gain in statistical power from lower variability. Welch's *t*-test can be used as a means to determine whether the shift represents a statistically significant difference.

### 2.4.3 Selenium Results

Using the upgradient baseline data to calculate a background tolerance limit yields a fixed background GWPS of 70.5  $\mu$ g/L (Figure 4). Selenium in downgradient wells MW-111 and MW-118 has shown exceedances of the GWPS in individual measurements but appears to have decreased since the monitoring program began. Both the trend and shift confidence interval methods were evaluated for the downgradient selenium data.

### 2.4.3.1 Linear Trend Method Results

The full data sets for selenium in downgradient monitoring wells MW-111 and MW-118 exhibit significantly decreasing linear trends (Figure 5 and Figure 6). When a 95% confidence envelope (dotted lines on figures) is applied to these trend lines (solid line on figures), the trend line and lower confidence limits for selenium in both wells are below the GWPS (dashed line on figures) for all of 2020 (March and September sampling events).

### 2.4.3.2 Shift Method Results

Visual examination of the selenium time-series data for downgradient wells MW-111 and MW-118 suggests a shift between data collected during baseline (pre-2018) and assessment monitoring (2018 and later). The *t*-test of data from these two periods indicates that the mean selenium concentrations during baseline in the two wells were statistically significantly higher than the mean concentrations during assessment monitoring (Figure 7 and Figure 8). Therefore, the mean confidence intervals for selenium in downgradient monitoring wells MW-111 and MW-118 were reevaluated based on the data collected during the assessment monitoring period (n=6 per well in September 2020 and 5 per well in March 2020). The results of this evaluation showed the lower confidence limits as below the GWPS for these two consecutive sampling events (Figure 9 and Figure 10).

### 2.4.4 Conclusion

Correcting the method of evaluating SSIs above background concentrations in assessment monitoring demonstrates that the two 2020 selenium samples collected from the downgradient monitoring wells did not represent SSIs. The alternate methods are consistent with the CCR Rule and U.S. EPA guidance. Therefore, the previous SSI determinations for selenium at wells MW-111 and MW-118 were due to the statistical method used and were not due to a release from the CCR units.

# 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 statistically significant concentrations of lithium and selenium above the GWPS are not attributed to releases from the Scrubber Ponds. 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.
- **Hypothesis No. 3**: Solute transport modeling results indicate that the selenium concentrations attributed to the Scrubber Ponds are not sufficient to exceed the GWPS at downgradient wells within the CCR monitoring system.
- **Hypothesis No. 4**: Correcting the method of evaluating SSIs above background concentrations demonstrates the previous SSIs were the result of statistical methodology rather than a release from the Scrubber Ponds.

Taken individually or as a whole, the lines of evidence presented above provide adequate documentation and support that an alternative source is responsible for the presence of lithium and selenium 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., 2017. Statistical Method Selection Certification, Lewis & Clark Station. Prepared for Montana-Dakota Utilities, October 2017.
- 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. Construction and Calibration of a Groundwater Flow and Transport Model, Lewis & Clark Station, Sidney, MT. Prepared for Montana-Dakota Utilities, November 2020.
- U.S. Environmental Protection Agency, 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance. EPA-530-R-09-007.

# Figures

Figure 1 Site Layout

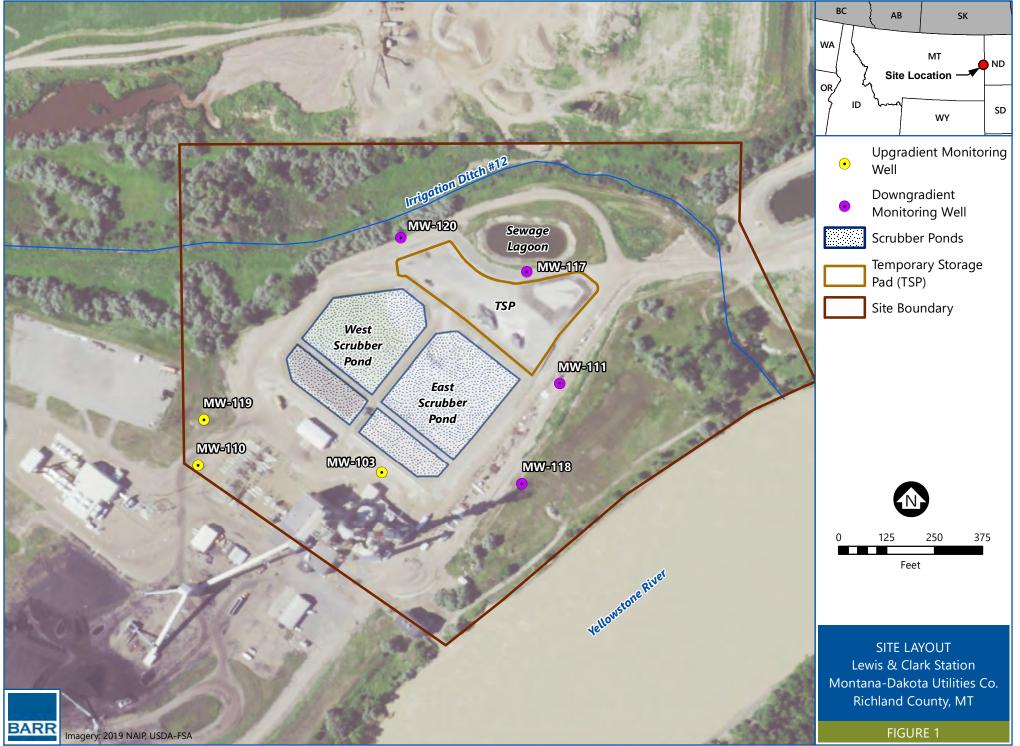


Figure 2 Well Material Types and Lithium Concentrations

#### Barr Footer: ArcGIS 10.7.1, 2021-01-25 15:47 File: I:\Projects\26\41\1007\Maps\Reports\Additional\_Soil\_Investigation\_2020\Report\_August2020\Figure02bLithium Concentrations and Geology.mxd User: MRQ

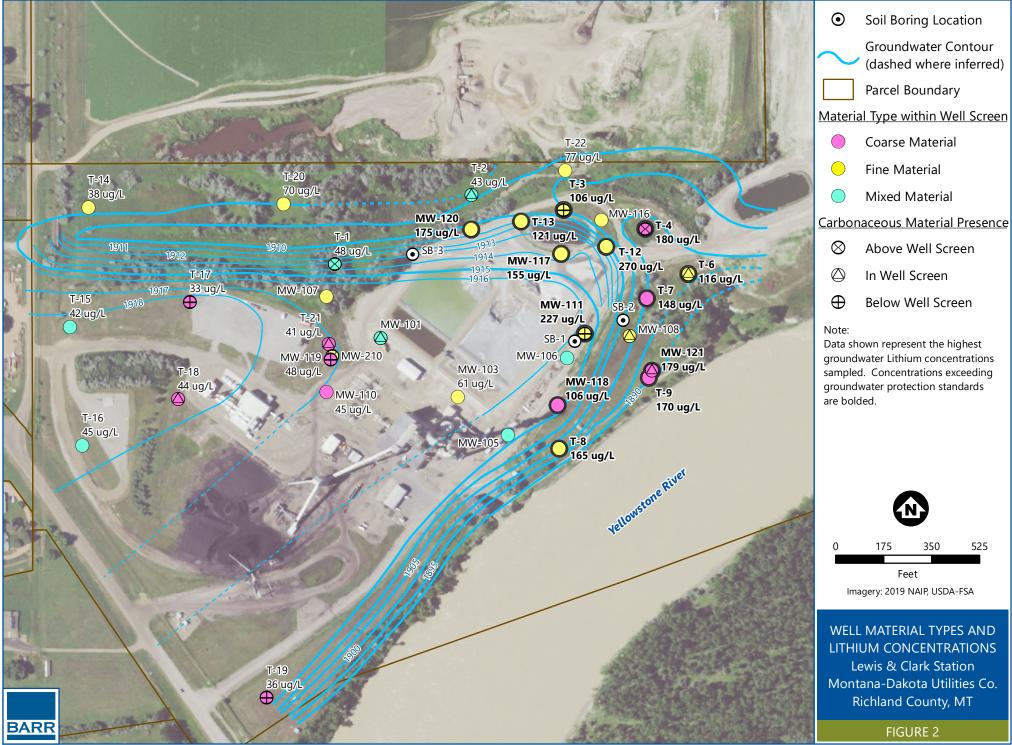
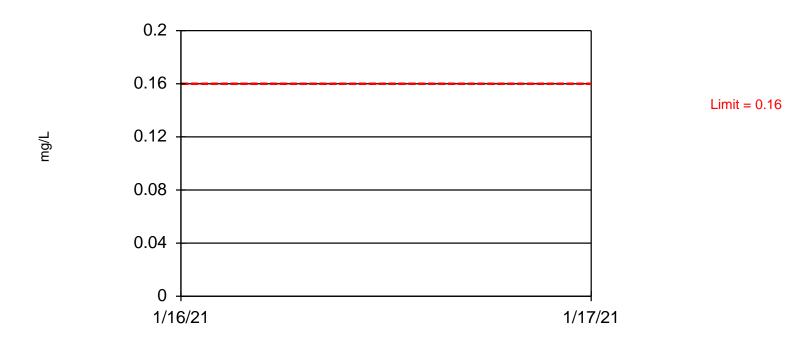


Figure 3 Lithium Upper Limit of Natural Variability

### Lithium - Fine



**Interwell Parametric** 

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.

Prediction Limit Analysis Run 1/6/2021 1:11 PM Lewis & Clark Station Client: Barr Engineering Company Data: LCLileaching

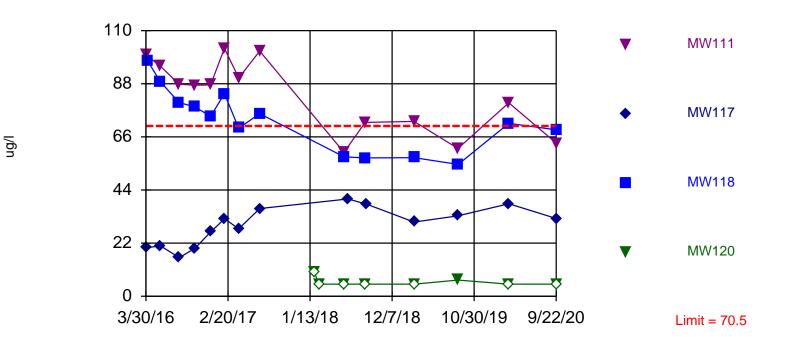
> Figure 3 Lithium Upper Limit of Natural Variability

Figure 4 Selenium Tolerance Limit

Sanitas<sup>™</sup> v.9.6.27 For the statistical analyses of ground water by Barr Engineering Company only. UG Hollow symbols indicate censored values.

Within Limit

### Selenium, total

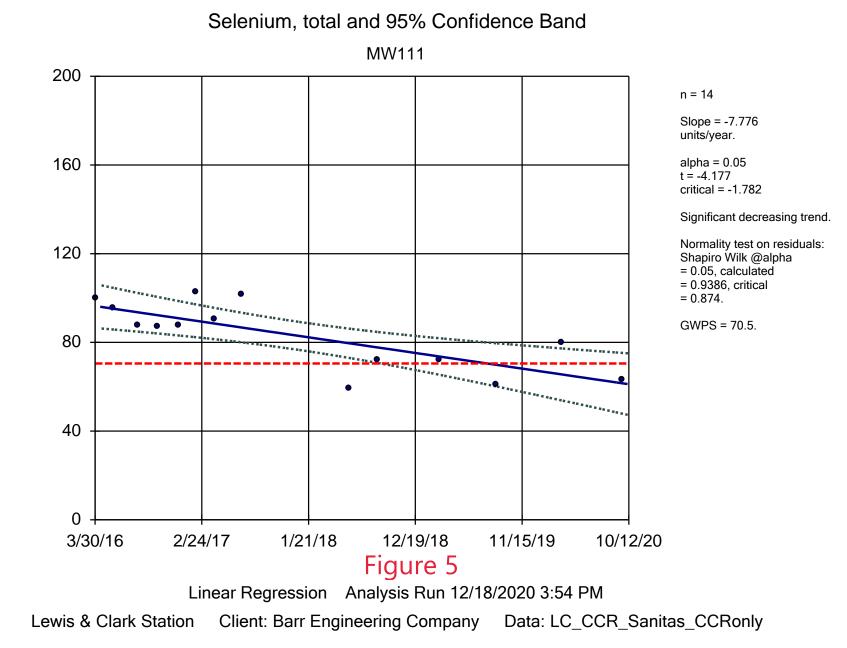


Interwell Non-parametric

Non-parametric test used in lieu of parametric tolerance limit because censored data exceeded 50%. Most recent observation is compared with limit. Limit is highest of 24 background values. 62.5% NDs. 82.62% coverage at alpha=0.01; 88.09% coverage at alpha=0.05; 97.07% coverage at alpha=0.5. Report alpha = 0.292.

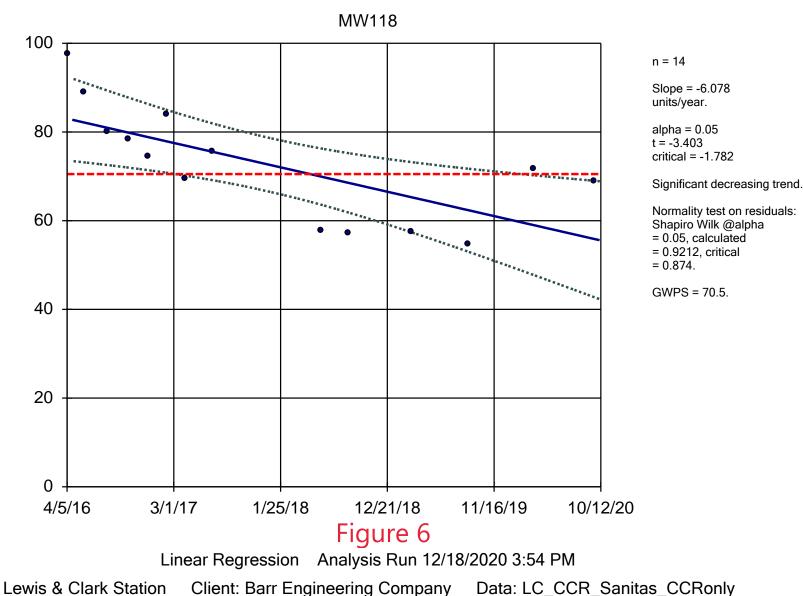
## Figure 4

Tolerance Limit Analysis Run 12/21/2020 12:23 PM Lewis & Clark Station Client: Barr Engineering Company Data: LC\_CCR\_Sanitas\_CCRonly Figure 5 Selenium Linear Regression – MW111



l/bn

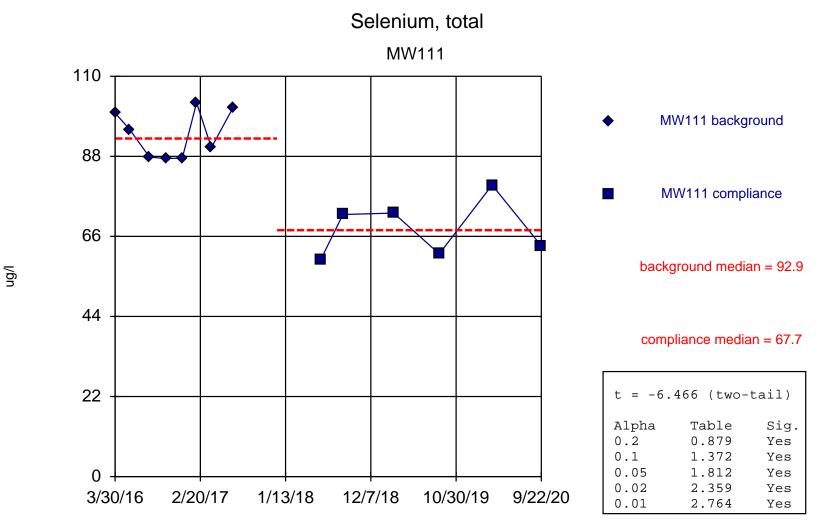
Figure 6 Selenium Linear Regression – MW118



# Selenium, total and 95% Confidence Band

l/gu

Figure 7 Selenium Welch's t-Test – MW111



Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.8452, critical = 0.818.

# Figure 7

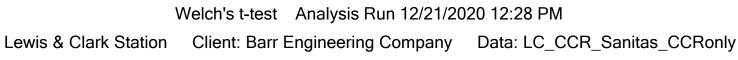
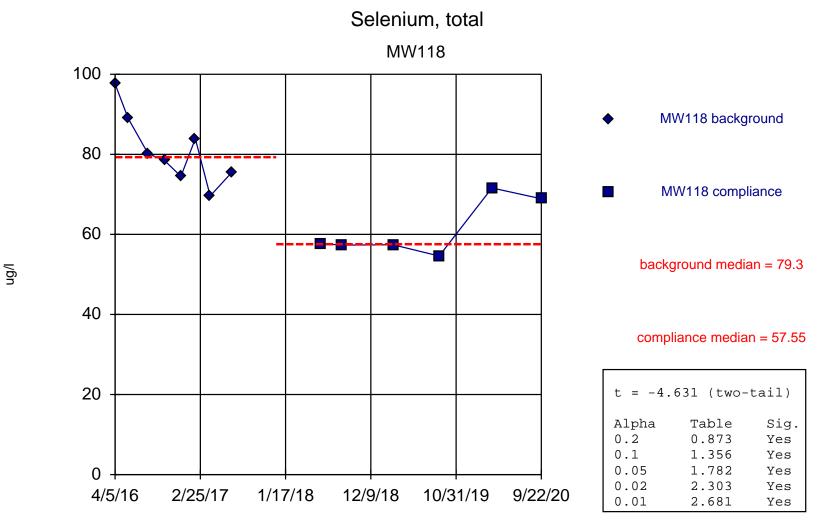


Figure 8 Selenium Welch's t-Test – MW118



Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.957, critical = 0.818.

# Figure 8

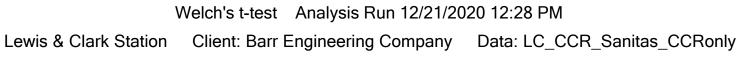
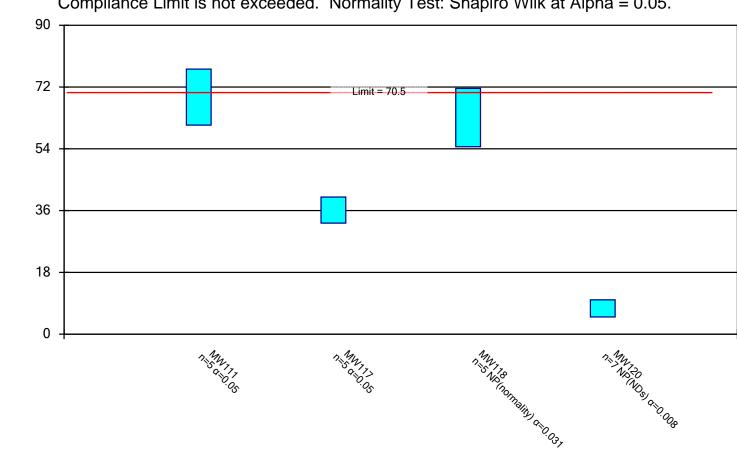


 Figure 9
 Selenium Parametric Confidence Interval

### Parametric and Non-Parametric (NP) Confidence Interval



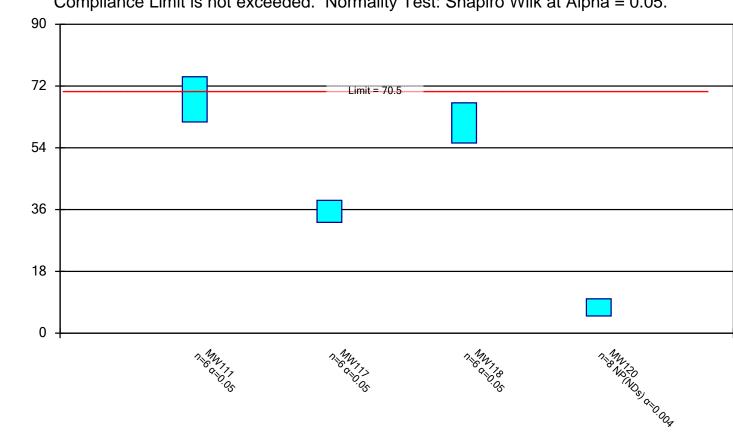
Compliance Limit is not exceeded. Normality Test: Shapiro Wilk at Alpha = 0.05.

# Figure 9

Constituent: Selenium, total Analysis Run 12/21/2020 12:12 PM Lewis & Clark Station Client: Barr Engineering Company Data: LC\_CCR\_Sanitas\_CCRonly Figure 10 Selenium Non-Parametric Confidence Interval

l/gu

### Parametric and Non-Parametric (NP) Confidence Interval



Compliance Limit is not exceeded. Normality Test: Shapiro Wilk at Alpha = 0.05.

# Figure 10

Constituent: Selenium, total Analysis Run 12/21/2020 12:12 PM Lewis & Clark Station Client: Barr Engineering Company Data: LC\_CCR\_Sanitas\_CCRonly

Appendices

# Appendix A

Site Boring Logs

Appendix A Site Boring Logs

PROJECT: W86-007 SOIL BORINGS BORING: ST-10									
	.CT: W	1	Fly Ash Sludge Lagoons MDU Lewis & Clark Station Sidney, MT		BORING: ST-103W LOCATION: Middle of SW of lagoons, see N.C.C.				√ side • drav
		4.3			DATE: 1/2		1/86	SCALE: 1"=4	
Elev. 23.2	Depth	ASTM D2487 Symbol	Description of Materials (ASTM D2488)	A	BPF		Tests	or	Note
22.7	<u>3<sup>1</sup>2</u>	CL	<u>GRAVEL surfacing</u> SILTY CLAY, low to medium plas ticity, dark brown to grayish brown, moist, very stiff (fine alluvium)	s-	21		<u>qp</u> 4+		
16.7	61_2	CL	SANDY CLAY, low plasticity, brown, moist, rather stiff (fine alluvium)		10		2		
<u>19.7</u> <u>16.7</u>	a Ia	CW-CM	SANDY CRAVEL, fine to medium grained, a little silt, wet to waterbearing, loose to dense (coarse alluvium)	 ,	17	2	×		6 8 8
	8				5				
14 14 14					57				
08.2	15	ML	SANDY SILT, nonplastic, light						
06.2	<u> </u>		gray, moist, very dense (siltstone)		52		1 3/4		
		СН	FAT CLAY, high plasticity, ligh gray, moist, hard (claystone)	ht	~				
02.7	20 <sup>1</sup> 2				38		4+		
			Water level down 10.1' with 19' of hollow-stem auger in the ground				<u> </u>		
			Water level down 9.3' immed- iately after withdrawal of auger						
			2" PVC monitoring well in- stalled to a depth of 19', see sketch						

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Section 2

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#### Form No. 503 (R 2-89)

#### WELL LOG REPORT

File No.\_

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

1. WELLOWNER MDU Lewis & Clark Sta	f) Duration of test: Pumping time hrs. g) Recovery time hrs. h) Recovery water level ft. at hrs. after					
2 CURRENT MAILING ADDRESS	pumping stopped.					
400 North 414 Bismarck, NID 58501	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 in-					
3. WELL LOCATION <u>SE</u> 1/4 <u>NW</u> 1/4 <u>SW</u> 1/4 Section <u>2</u> Township <u>22</u> <u>NW</u> Range <u>59</u> <u>EW</u> County <u>Kick land</u> Govn't Lot <u>, or Lot</u> <u>, Block</u>	tended appropriation. In addition to the above information, water level data shall be collected and recorded on the Department's "Aquifer Test Data" form. NOTE: All wells shall be equipped with an access port ½ inch minimum or a pressure gauge that will indicate the shut-in pressure of a flowing well. Re- movable caps are acceptable as access ports.					
Subdivision Name Tract Number	11. WAS WELL PLUGGED OR ABANDONED?Yes KNo					
4. PROPOSED USE: Domestic Stock Irrigation Other Specify Mouitoring	12. WELLLOG # 3. 110.					
5. TYPE OF WORK: Hollowstem Auger X	12. WELLLOG #3, 110 Depth (ft.) From To Formation					
New well K Method: Dug Deepened Cable Driven	0 0.3 Silt, sandy w/gravel, dark browy					
Reconditioned  Recond	0,3 1 Silt, Sindy W/gravel, reduch					
6. DIMENSIONS: Diameter of Hole Dia. 8 in. from 6 ft. to 18 ft.	1 4 Silt, sandy w/gravel & Copples,					
Dia in. from ft. to ft. to ft. to ft. to ft.	4 14 Gravel, to Coavse, w/Cobbles,					
7. CONSTRUCTION DETAILS:	14 18 Silt, Light blue, Bedrock					
Casing; Steel         Diafromft. toft.           Threaded         Welded         Diafromft. toft.						
TypeWall Thickness Casing; PlasticDia2_from_+1.8_ft. to_8_ft.						
Weight SDR-21 Dia fromft. toft.						
PERFORATIONS: Yes I No 🕰						
Size of perforationsin. byinininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininininin						
perforations fromft. toft.						
perforations fromft. toft.         SCREENS:       Yes X       No D         Manufacturer's NameTimeo       PVC						
Type Model No Dia Slot size #10 from ft. to _15 ft.						
DiaSlot sizefromft. toft. GRAVEL PACKED: Yes No K Size of gravel						
Gravel placed from ft. to ft.						
GROUTED: To what depth? 7 Material used in grouting 263 <sup>th</sup> bentonite chips						
8. WELL HEAD COMPLETION:						
Pitless Adapter  Yes  No 9. PUMP (if installed)						
Manufacturer's name	ATTACH ADDITIONAL SHEETS IF NECESSARY					
Type Model No HP	13. DATE COMPLETED 8/28/9/					
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 pro- vide the following information:	14. DRILLER/CONTRACTOR'S CERTIFICATION This well was drilled under my jurisdiction and this report is true to the best of my knowledge.					
a) Air Pump Bailer b) Static water level immediately before testing ft. If flow- ing; closed-in pressure psi gpm. Flow controlled by: valve, reducers, other, (specify) c) Depth at which pump is set for test	HATER Supply Inc Firm Name 2501 Twin City Dr					
<ul> <li>c) Depth at which pump is set for testgpm.</li> <li>d) The pumping rate:gpm.</li> <li>e) Pumping water levelft. athrs. after pumping began.</li> </ul>	Address Mandan, ND 58504					
ייייייט איז	Signature Signature 296/004					
MONTANA DEPARTMENT OF NATURAL RESOUR	ces & conservation DNRC					

MONTANA WELL LOG REPORT	Other Options				
This well log reports the activities of a licensed Montana well serves as the official record of work done within the borehole casing, and describes the amount of water encountered. This complied electronically from the contents of the Ground-Wate Information Center (GWIC) database for this site. Acquiring w is the well owner's responsibility and is NOT accomplished b of this report.	and <u>View scanned well log (7/28/2010 8:48:11 AM)</u> s report is er vater rights				
Site Name: MDU GWIC Id: 190701 DNRC Water Right:	Section 7: Well Test Data Total Depth: 18				
Section 1: Well Owner	Static Water Level: Water Temperature:				
Owner Name					
MDU	Unknown Test Method *				
Mailing Address	Yield _ gpm.				
	Pumping water level _ feet.				
CityStateZip CodeSIDNEYMT59270	Time of recovery _ hours. Recovery water level _ feet.				
SIDNET INT 53270					
Section 2: Location Township Range Section Quarter Sections 22N 59E 9 SW¼ NE¼ SW¼ County Geocode RICHLAND	* During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.				
LatitudeLongitudeGeomethodDatum47.679047104.157232TRS-SECNAD83	Section 8: Remarks				
Altitude Method Datum Date	Section 9: Well Log				
Addition Block Lot	Geologic Source Unassigned				
Section 3: Proposed Use of Water	From To Description				
MONITORING (1)	0 5 BLACK SILTY CLAY				
	5 21 TAN/ YELLOW SILT CLAY				
	21 22 COAL				
Drilling Method: Section 5: Well Completion Date	21 22 COAL				
Section 4: Type of Work Drilling Method: Section 5: Well Completion Date Date well completed: Thursday, May 03, 2001	21 22 COAL				
Drilling Method: Section 5: Well Completion Date Date well completed: Thursday, May 03, 2001	21 22 COAL				
Drilling Method: Section 5: Well Completion Date	21 22 COAL				
Drilling Method: Section 5: Well Completion Date Date well completed: Thursday, May 03, 2001 Section 6: Well Construction Details	21 22 COAL				
Drilling Method: Section 5: Well Completion Date Date well completed: Thursday, May 03, 2001 Section 6: Well Construction Details Borehole dimensions From To Diameter 0 18 8	21 22 COAL				
Drilling Method: Section 5: Well Completion Date Date well completed: Thursday, May 03, 2001 Section 6: Well Construction Details Borehole dimensions From To Diameter 0 18 8 Casing	21 22 COAL				
Drilling Method: Section 5: Well Completion Date Date well completed: Thursday, May 03, 2001 Section 6: Well Construction Details Borehole dimensions From To Diameter 0 18 8	21 22 COAL				
Drilling Method: Section 5: Well Completion Date Date well completed: Thursday, May 03, 2001 Section 6: Well Construction Details Borehole dimensions From To Diameter 0 18 8 Casing Wall Pressure	21       22       COAL         22       25       SILTY CLAY SAND STRINGERS				
Drilling Method: Section 5: Well Completion Date Date well completed: Thursday, May 03, 2001 Section 6: Well Construction Details Borehole dimensions From To Diameter 0 18 8 Casing From To Diameter Thickness Rating Joint Type 0 8 2 PVC-SCHED40 Completion (Perf/Screen)	21 22 COAL   22 25 SILTY CLAY SAND STRINGERS				
Drilling Method:         Section 5: Well Completion Date         Date well completed: Thursday, May 03, 2001         Section 6: Well Construction Details         Borehole dimensions         From To Diameter         0       18         0       18         7         Pressure         0       8         2       Pressure         0       8         2       PVC-SCHED40         Completion (Perf/Screen)         From To Diameter       Size of         Openings       Description	21       22       COAL         22       25       SILTY CLAY SAND STRINGERS				
Drilling Method: Section 5: Well Completion Date Date well completed: Thursday, May 03, 2001 Section 6: Well Construction Details Borehole dimensions From To Diameter 0 18 8 Casing From To Diameter Thickness Rating Joint Type 0 8 2 PVC-SCHED40 Completion (Perf/Screen) From To Diameter Øpenings Openings Description	21       22       COAL         22       25       SILTY CLAY SAND STRINGERS         2       25       SILT				
Drilling Method: Section 5: Well Completion Date Date well completed: Thursday, May 03, 2001 Section 6: Well Construction Details Borehole dimensions From To Diameter 0 18 8 Casing From To Diameter Thickness Rating Joint Type 0 8 2 PVC-SCHED40 Completion (Perf/Screen) From To Diameter Øpenings Øpenings Description 8 18 2	21       22       COAL         22       25       SILTY CLAY SAND STRINGERS         2       25       SILT				
Drilling Method: Section 5: Well Completion Date Date well completed: Thursday, May 03, 2001 Section 6: Well Construction Details Borehole dimensions From To Diameter 0 18 8 Casing From To Diameter Thickness Rating Joint Type 0 8 2 PVC-SCHED40 Completion (Perf/Screen) From To Diameter Openings Description 8 18 2	21       22       COAL         22       25       SILTY CLAY SAND STRINGERS         2       2       SILTY SAND STRINGERS         2       2       SILTY SAND STRI				
Drilling Method: Section 5: Well Completion Date Date well completed: Thursday, May 03, 2001 Section 6: Well Construction Details Borehole dimensions From To Diameter 0 18 8 Casing From To Diameter Thickness Rating Joint Type 0 8 2 PVC-SCHED40 Completion (Perf/Screen) From To Diameter Openings Description 8 18 2	21       22       COAL         22       25       SILTY CLAY SAND STRINGERS         2       25       SILT				

							LOG OF WELL MW-117
BAF	RR <sup>,</sup>						SHEET 1 OF 1
Project:L Project N Location Coordina Datum:N	lo.:2641 :Sidney ites:UTN	1007. , Mont	00 Pl ana		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.	U S C S	Graphic Log	LITHOLC	DGIC DESCRIPTION	MAJOR UNIT	WELL OR PIEZOMETER CONSTRUCTION DETAIL
-0.0-	/	CL		TOPSOIL - SANDY CLAY (CL): fine grain	ed; brown; frozen.		1917.
		CL/ML		FILL - SILTY CLAY (CL/ML): yellow; mois gravel, 5% sand, 95% fines, orange staini	t; medium to high plasticity; strong HCl reaction; 0% ng.	Ē	PRO. CASING Diameter: 6" Type: Steel
2.5 		CL/ML			ow brown - to olive yellow; moist to wet; low to 00% fines, hard to very hard, black oxidation spots, fracture boundaries, very fine grain sand.	Alluvium	Interval:       Surface + 3'       1915.0         RISER CASING       -         Diameter:       2"         Type:       Sch 40 PVC         Interval:       1912.0         GROUT       -         Type:       Concrete         Interval:       0-1' bgs         SEAL       1910.0         Type:       Bentonite chips         Interval:       1-4.5' bgs         SANDPACK       -
10.0- 12.5- 15.0- 15.0- 17.5- 20.0 Date Bori Logged E Drilling C Drill Rig:		CL		CLAY (CL): gray; dry to moist; high plastic fines, very hard, Fort Union Formation, bla boundaries, occurance of silty clay, low to 13': Dry, no oxidation, non-plastic.	city; strong HCl reaction; 0% gravel, 0% sand, 100% ack oxidation spots, rusty oxidation on fracture high plasticity.	Fort Union	Type:         20/40         1907.5           Interval:         4.5-10' bgs         -           SCREEN         -         -           Diameter:         2"         -           Type:         No. 10 Sch 40         1905.0           Interval:         PVC         1905.0           5-10' bgs         -           1902.5         -           1902.6         -           1900.6         -
				End of well 19.0 feet			
20.0 Date Bori Date Bori Logged E Drilling C	ing Star ing Com 3y: contracto	l ted: npleted pr:		2/20/16 2/21/16 DJZ Terracon	Remarks: Additional data may have been collected in the field which is not inclu	ded on thi	is log
Drill Rig:				CME-55	Weather: 25°F, overcast		-

						LOG OF WELL MW-118
BARR						SHEET 1 OF 1
Project:Lewis a Project No.:26 Location:Sidne Coordinates:U Datum:NAVD8	411007. ey, Mont ГМ 13N	00 Pł ana		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 Samole No.	U S C S	Graphic Log	LITHOLO	OGIC DESCRIPTION	MAJOR UNIT	WELL OR PIEZOMETER CONSTRUCTION DETAIL
	CL		TOPSOIL - SANDY CLAY (CL): dark olive SAND WITH GRAVEL (SW): very dark gr fines, fine-to-medium-grained subangular graded.	e gray; frozen. rayish brown; dry to wet; 25% gravel, 75% sand, 0% sand; subangular gravel with some cobbles, well	Alluvium	PRO. CASING 1920.0 Diameter: 6" Type: Steel Interval: Surface + 3' RISER CASING 1917.5 Diameter: 2" Type: Sch 40 PVC Interval:
7.52	ML		Rusty brown water at contact. SILT (ML): very pale brown; moist; low pla	and with small to large subangular cobbles and asticity; some brown layers within. genous, Fort Union Formation, non-plastic.	Fort	GROUT 1915.( Type: Concrete Interval: 0-1' bgs SEAL Type: Bentonite chips Interval: 1-5' bgs SANDPACK Type: 20/40 Interval: 5-12' bgs SCREEN Diameter: 2"
12.5- - - 15.0- - - -			End of well 12.0 feet	genous, roit onion romation, norplasta.		Type: No. 10 Sch 40 Interval: PVC 6-11' bgs
- 17.5- - - - - - - - - - - - - - -						
12.5- 	mpleted	1:	2/21/16 2/22/16 DJZ Terracon CME-55	Remarks: Additional data may have been collected in the field which is not includ Weather: 20°F, fog	led on thi	is log.

								LOG OF WELL MW-119
BA	٩R	<b>२</b> ,						SHEET 1 OF 1
Proje Loca Coord	tion:Si	:2641 dney, s:UTM	1007. Mont	00 Pl ana	tion 11-014 248125.79m, E:3584035.03m	Surface Elevation:1923.3 ft Drilling Method:Hollow Stem Auger Sampling Method:Split Spoon Completion Depth:16.0 ft		Top of Casing Elev.:1926.3 ft Unique Well No.:
Depth, feet	Sample Type & Recovery	Sample No.	U S C S	Graphic Log	LITHOLOGIC I	DESCRIPTION	MAJOR UNIT	WELL OR PIEZOMETER CONSTRUCTION DETAIL
-0.0-	$\setminus$ /				TOPSOIL - SANDY CLAY MIX: black; dry; less			
- - 2.5-			GW		FILL - GRAVEL WITH SAND (GW): pinkish grav well graded, large to small subrounded gravel ar sand, no HCL reaction.	y; dry to wet; 50% gravel, 50% sand, 0% fines, nd cobbles, fine to coarse grained subangular	Fill	192. PRO. CASING Diameter: 6" Type: Steel Interval: Surface + 3' 192
- - 5.0- -				5	SAND WITH GRAVEL (SW): pinkish gray; mois graded fine to coarse grained sand, large to small	at to wet; 40% gravel, 55% sand, 5% fines, well all subrounded gravel and cobbles.		RISER CASING Diameter: 2" Type: Sch 40 PCV Interval: GROUT
- - 7.5- _ _ -			SW		7': Some orange/black oxidation in sand.		Alluvium	Type: Neat Cement Interval: 3-5' bgs SEAL Type: Bentonite chips 191 Interval: 5-7' bgs SANDPACK
10.0- - - 12.5-					10': Some heaving sand.			Type: 20/40 Interval: 7-16' bgs 191: SCREEN Diameter: 2" Type: No. 10 Sch 40 Interval: PVC
-								9-14' bgs 191
- - 15.0-			ML		SILT (ML): gray; moist; 0% gravel, 0% sand, 10 reaction.	0% fines, very hard, non-plastic, low HCL	Fort Union	
- - - 17.5-					15.75: Lignite lense. End of well 16.0 feet	/		<u>190</u>
Date	Boring	Com		d:	2/18/16	marks:		
Logge Drillin	ed By: 1g Con		r:		DJZ Terracon			
Drill F	Rig:		••		CME-55	litional data may have been collected in the field which is not includ eather: 35°F, overcast	led on thi	is log.

								LOG OF WELL MW-120
BA	R	R,						SHEET 1 OF 1
Projec Projec Locati Coorc Datun	ct No. ion: linate	: s:	26411007. Sidney, Mo	Clark Station .00 PH1-014 ontana N:m, E:m		1	Surface Elevation: 1919.0 ft Drilling Method: Hollow Stem Auger Sampling Method: Split Spoon Completion Depth: 16.0 ft	Top of Casing Elev.: 1922.0 ft
Depth, feet	Sample Type & Recovery	Sample No.	Blows/6in.	ENVIRONMENTAL DATA	U S C S	Graphic Log	LITHOLOGIC DESCRIPTION	WELL OR PIEZOMETER CONSTRUCTION DETAIL
-0.0-					CL- CH		CLAY FILL (CL-CH): yellowish brown (10YR 5/4); frozen; hard; roots.	
- - 2.5-	$\left( \begin{array}{c} \\ \\ \\ \end{array} \right)$		7-9-14-18.	G/S/F:0%/ 0%/ 100% G/S/F:15%/ 60%/ 25%	SP- SC		SAND W/ GRAVEL (SP-SC): brown (10YR 4/3); moist; very fine grained sand, subround gravels, large to small.	PRO. CASING Diameter: 6" Type: Steel Interval: Surface + 3'
-	Å		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.	
- 5.0- -	Å		5-6-7-11.	<b>G/S/F:</b> 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.	Type: Sch 40 PCV Interval: GROUT
-	$\mathbf{X}$		2-4-3-0.	<b>G/S/F:</b> 5%/ 20%/ 75%			At 6-7.5': Mix of fat clay and claystone w/ sand/gravel within w/ little silt pockets.	Type: Cement 191: Interval: 0-1.5' bgs
7.5	X		1-2-3-0.	<b>G/S/F</b> :10%/ 20%/ 70%	CL- CH		At 7.5': Transitions to SANDY CLAY (CL/CH), high plasticity with very fine to coarse grained sand within, subround to subangular. Trace gravels, small to large. Rusty red oxidation spots and fractures. Few black manganese oxidation spots.	Type: Bentonite chips Interval: 1.5-9' bgs 1910
- 10.0 _	$\mathbb{N}$		1-3-4-4.	<b>G/S/F:</b> 5%/ 20%/ 75%			Few white precipitate veins/spots.	SANDPACK Type: 10/20 Interval: 9-16' bgs
_ ⊻ 12.5-	X		1-2-2-0.	<b>G/S/F:</b> 10%/ 20%/ 70%			At 11': Color change to dark grayish brown (10YR 4/2), softer. At 12': Sample, wet.	SCREEN 190 Diameter: 2" Type: No. 12 Sch 40 PVC Interval: 11-16' bgs
-	$\mathbb{X}$		1-3-3-0.	<b>G/S/F:</b> 10%/ 20%/ 70%				190
_ 15.0- _			1-2-3-4.	<b>G/S/F:</b> 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.	
-							End of well 16.0 feet	
17.5- _ _								
Date E Date E Logge Drilling Drill R	Boring ed By: g Cor	g Con	npleted:	1/29/18 1/29/18 DJZ SK Geotechnical			Remarks: After 15 min., water level was at 12.9 ft bgs. A PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methan Additional data may have been collected in the field which is not included on	- ne Corrected; G/S/F = Gravel/Sand/Fines

LOG	OF	BORING	6 MW-121
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Proje Proje Locat Coore Datur	ct No tion: dinate		26411007. Sidney, Mo	Clark Station 14 Boundary Well ontana N:17326179m, E:1848	3702m	1	Surface Elevation: 1902.4 ft Drilling Method: Hollow Stem Auger Sampling Method: Completion Depth: 14.0 ft	Top o	of Casi	ing Elev.: 1904.6 ft	
	Sample Type & Recovery	Sample No.	Blows/6in.	ENVIRONMENTAL DATA	U S C S	Graphic Log	LITHOLOGIC DESCRIPTION	W		OR PIEZOMETER NSTRUCTION DETAIL	Elevation, feet
-0.0- - - -		1	W-2-3-3.	<b>G/S/F:</b> 0%/ 5%/ 95%	CL		CLAY (CL): dark grayish brown (10YR 4/2); moist to wet; roots; thin fine grained sand laminations. SILTY SAND (SM): olive brown (2.5Y 4/3); moist to wet; roots; fine grained sand within; few sandy lenses.			6" steel protop: +3 to 2 ft bgs concrete: 0 to 2 ft bgs	
2.5- - -	-	2	1-1-4-6.	<b>G/S/F:</b> 0%/ 60%/ 40%			SAND (SP): fine grained sand; trace fines, loose; light olive brown (2.5Y 5/3); moist.			bentonite seal: 2 to 6 ft bgs	1900
- 5.0- -		3	2-2-3-3.	<b>G/S/F</b> :0%/ 90%/ 10%			At 5.75 ft, 2 in lens silty clay, mottled w/ rusty orange oxidation spots.			-3-	1897
- - 7.5-		4	1-3-3 1-5-4	<b>G/S/F:</b> 0%/ 90%/ 10% <b>G/S/F:</b> 0%/ 95%/ 5%	SP		At 5.95 ft and 6.25 ft, 2 in silt lens w/ fine grained sand and mottled w/ rusty orange oxidation spots. At 8 ft, trace fine grained orange terracotta fragments.			2" PVC schedule 40 riser: +2.5 to 8 ft bgs	189
- עַ - 10.0		6	W-3-5-3.	G/S/F:0%/ 90%/ 10%			At 9 ft, saturated.			10/20 silica sand filter pack: 6 to 13 ft bgs 2" #10 schedule 40 PVC	¥   189 
- - - 12.5		7	2-2-3	<b>G/S/F:</b> 0%/ 90%/ 10% <b>G/S/F:</b> 90%/ 10%/ 0%	GP	° 0 0 0 0	At 11 ft, trace fragments of lignite coal. GRAVEL (GP): fine to coarse grained; subrounded; trace fine to coarse grained sand.			screen: 8 to 13 ft bgs	189
-		8	1-1-1	<b>G/S/F:</b> 0%/ 0%/ 100%	CL- CH		CLAY [FORT UNION FORMATION] (CL-CH): very dark gray; wet; soft; high plasticity. End of boring 14.0 feet		<u>=:.:</u>		
-15.0 - -											
- -17.5 - -											
Date	Borin		rted: npleted:	9/26/19 2:45 pm 9/26/19 4:00 pm			Remarks: Dashed line indicates an inferred contact dep Water level measured at time of drilling.	th.			
Logge Drillin Drill F	g Co	r: ntract	tor:	DJZ S&K Geotechnical			PID = Headspace; D/O/S = Discoloration/Odor/Sheen; FID/MC = FID/Methan Additional data may have been collected in the field which is not included on		d; G/S/F =	Gravel/Sand/Fines	

BA		23	34 We	st Ce	ring Company ntury Avenue ) 58503 701-255-5460	LOG OF BORING SE DRA SHEET T OF T			
Proje Proje Locat	ct: ct No. tion: dinates	5: 	GeoPi 26411 Lewis	robe I 007.1 & Cla 18,18	nvestigation	Surface Elevation: 1914.4 ft Drilling Method: GeoProbe Direct-Push Sampling Method: GeoProbe Completion Depth: 25.0 ft			
Depth, feet	Sample Type & Recovery & Sample Type & Caphi, root of Craphic Log					LITHOLOGIC DESCRIPTION	i		
-0			CL		CLAY (CL): dark brown; frozen; with roots	s; 0% gravel, 0% sand, 100% fines.			
- 5 — - -			CL		SILTY CLAY (CL): dark yellowish brown; r 99% fines.	moist; with roots, trace fine grained sand lenses within; weak HCl reaction; 0% gravel, 1% sand,	1		
- 10- - - 15- - - -			SP		SAND (SP): fine grained; light gray/tan; m	noist to wet; subrounded; few areas with silty sand mix within; 0% gravel, 90% sand, 10% fines.	1		
- 20—			CL- \CH/		veins/fractures.	ay; moist; lean to fat; high plasticity; 0% gravel, 5% sand, 95% fines, red oxidation staining on $$	18		
- - - -			CL- CH		LIGNITE COAL: black; dry. CLAY (CL-CH): gray & tan; moist; hard; le mottles, with black organics within.	ean to fat; 0% gravel, 5% sand, 95% fines, red oxidation staining on veins/fractures, with few	¥1;		
25—					End of boring 25.0 feet				
ate l	Boring Boring ed By:	Con	ted: nplete		1/31/19 9:55 am 1/31/19 10:15 am DJZ	Remarks: Log is duplicate of MW-108 Cave: 24.45' bgs before abandoning borehole Weather: 15°F, overcast, windy	<u> </u>		
Drillin	g Con Rig:		or:		AET 6620 DT	Additional data may have been collected in the field which is not included on this log.			

					ring Company ntury Avenue	LOG OF BORING SB-	-	
BA	٩R	_			D 58503 701-255-5460	DRAF SHEET 1 OF 1	T	
Proje Proje .ocat	ect: ect No. tion: dinate:	: s:	GeoP 26411 Lewis	robe I 1007.1 & Cla 48,493	nvestigation	Surface Elevation:1925.2 ftDrilling Method:GeoProbe Direct-PushSampling Method:GeoProbeCompletion Depth:20.0 ft		
Depth, feet	Sample Type & Recovery	Sample No.				LITHOLOGIC DESCRIPTION	Elevation, feet	
-0	-				FILL: push through road, no recovery.	1	19	
-			CL		FILL - CLAY (CL): dark grayish brown; m fines.	noist; with trace fine-medium grained sand mix within; high plasticity; 0% gravel, 5% sand, 95%		
-					CLAYEY SAND (SC): mostly fine grained 55% sand, 35% fines.	d with trace medium and coarse grained; subrounded; with few subrounded gravels; 10% gravel,		
5 -						1	19	
-			SC					
- 10 <u>₹</u>	- 7		SP		9.5': SAND (SP): 3-inch lens of fine grain	red; tan; moist to wet. $ array 1$	19	
-			CL		SANDY CLAY (CL): dark gray; moist to v	vet; with fine to coarse sand and few gravels within, trace roots.		
15-			SM		within; 10% gravel, 60% sand, 30% fines		19	
-	-		ML		SANDY SILT (ML): very fine to fine grain	ed; light olive brown; wet to saturated; mottled.		
- 20-			CL- CH		LEAN TO FAT CLAY (CL-CH): olive yello End of boring 20.0 feet	ow; moist; with golden brown mottles, trace manganese oxidation stains; medium plasticity.		
)ate	Boring	I Stai	rted <sup>.</sup>		1/31/19 2:05 pm	Remarks: WL: 10.20' bgs, not allowed to equilibrate		
)ate .ogge	Boring ed By:	l Con	nplete		1/31/19 2:25 pm DJZ	Weather: 25°F, clear/sunny, windy		
Drillin Drill F	ng Con Rig:	tract	or:		AET 6620 DT	Additional data may have been collected in the field which is not included on this log.		

BA		2	34 We	st Ce	ring Company ntury Avenue D 58503 701-255-5460	LOG OF BORING DRA SHEET 1 OF	١FT			
Locat	ct No. ion: dinates	: 6:	26411 Lewis	007.1 & Cla 18,474	e Investigation Surface Elevation: 1914.6 ft 7.10 Drilling Method: GeoProbe Direct-Push Clark Station, Sidney, MT 174.2 ft E 3,584,051.4 ft Completion Depth: 25.0 ft					
Depth, feet	Sample Type & Recovery	Sample No.	U S C S	Graphic Log		LITHOLOGIC DESCRIPTION	i			
-0 ⊻ -			SC		CLAYEY SAND (SC): fine grained few m subrounded gravels; 10% gravel, 50% sa	nedium and coarse grained; subrounded; very dark grayish brown; frozen; with few small and, 40% fines.	¥			
_					SILTY CLAY (CL): dark grayish brown; n	noist; 0% gravel, 0% sand, 100% fines.	1			
5	5		CL- CH		CLAY (CL-CH): dark grayish brown; mois	st; mottled with orange/red and gray; high plasticity; 0% gravel, 0% sand, 100% fines.				
- 10- -					8.5': color change to gray and dark gray. 9.0': wet, fragments of black organics and	d lignite coal within.	1			
-					13': color change to grayish brown with n	nottles.				
15— - -			CL		CLAY WITH SAND (CL): fine to medium	grained; grayish brown; subrounded to subangular; wet to moist; 0% gravel, 25% sand, 75% fines.	-1			
- 20— - -	- 20 - -		sw			subrounded to subangular; well graded with gravels at contact.	1			
_			CL- CH		CLAY (CL-CH): Fort Union Formation; gr	ray; moist; silt laminations as fractures within.	1			
25-					End of boring 25.0 feet	1				
ate l ogge	ed By:	Con	npleteo	d:	1/31/19 3:10 pm 1/31/19 4:20 pm DJZ AET	Remarks: WL: 0.99' bgs Weather: 25°F, partly cloudy, windy				
Drill F	g Con Rig:	uact	UI.		6620 DT	Additional data may have been collected in the field which is not included on this log.				

BA		2	34 We	st Ce	ring Company ntury Avenue D 58503 701-255-5460	LOG OF BORING T- DRAF SHEET 1 OF 1			
Proje Proje ∟ocat	ct: ct No. ion: dinate	: s:	GeoPi 26411 Lewis	robe   007.1 & Cla 18,72	bbe Investigation     Surface Elevation: 1911.9 ft       107.10     Drilling Method:     GeoProbe Direct-Push       & Clark Station, Sidney, MT     Sampling Method:     GeoProbe       3,725.2 ft E 3,584,548.7 ft     Completion Depth: 30.0 ft				
Depth, feet Sample Type & Recovery Sample No. $\omega \cap \omega \subset$ Graphic Log				Graphic Log		LITHOLOGIC DESCRIPTION	Louton foot		
-0					CLAY WITH ORGANICS (OL): dark grayis	sh brown; frozen; roots; medium plasticity; 0% gravel, 0% sand, 100% fines.	19		
- 5 — -			CL		LEAN CLAY (CL): gray; moist to wet; soft;	; rusty/oxidized mottles; high plasticity; 0% gravel, 1% sand, 99% fines.	19		
-					8': Darker gray with black organics, soft.				
10—					CLAY (CL-CH): gray; moist to wet; soft; m	nottled with rusty golden spots; high plasticity; 0% gravel, 0% sand, 100% fines.	4		
- - 15-			CL- CH	1 1 1 1			19		
-			SM		SILTY SAND (SM): very fine to fine graine	ed; grayish brown; trace medium to coarse grained sand; 0% gravel, 60% sand, 40% fines.	1		
_			CL- CH			ret; trace medium grained sand, mottled with gray spots; high plasticity. ed; grayish brown; trace medium to coarse grained sand; 0% gravel, 60% sand, 40% fines.			
- 20— -			SM SW			rse grained; subrounded to subangular; small to large gravels, subrounded to subangular.			
-			CL- CH_		CLAY (CL-CH): olive brown; wet; soft; frag		18		
- 25—			CH		LIGNITE: black; wet; horizontal layering. CLAY (CH): Fort Union Formation; gray to CLAY (CL-CH): gray; moist; hard; 0% gra	o dark gray; moist; hard. vel, 5% sand, 95% fines, breaks on fine grained sand veins, horizontal and paper thin, possible silt			
-			CL- CH		laminations with fine sand.		18		
30-					End of boring 30.0 feet				
ate l ogge	ed By:	l Con	nplete	d:	2/1/19 8:40 am 2/1/19 12:30 pm DJZ	Remarks: Artesian conditions once rods removed, no temp well installed, borehole sealed with bentonite chips, pipes were used to verify that no bridging occured. Weather: 25°F, partly cloudy			
	g Cor Rig:	tract	or:		AET 6620 DT	Additional data may have been collected in the field which is not included on this log.			

					ring Company	LOG OF BORING T	-3	
BA	R				ntury Avenue ) 58503 701-255-5460	DRAI SHEET 1 OF 1	<u>-T</u>	
Projeo Projeo ∟ocati	ct: ct No. ion: dinate:	: s:	GeoP 26411 Lewis N 2,24	GeoProbe InvestigationSurface Elevation:1915.0 ft26411007.10Drilling Method:GeoProbe Direct-PushLewis & Clark Station, Sidney, MTSampling Method:GeoProbeV 2,248,671.5 ft E 3,584,884.7 ftCompletion Depth:32.5 ft				
Depth, feet	Depth, feet Sample Type & Recovery Sample No. Ø ∩ Ø ∩ Graphic Log					LITHOLOGIC DESCRIPTION	Flowetion foot	
		CL		LEAN CLAY (CL): brown; frozen to moist fines.	; lenses of silt, roots, few mottles; high plasticity; weak HCl reaction; 0% gravel, 0% sand, 100%	19		
- - 10			CL		gravel, 1% sand, 99% fines.	gravel, 0% sand, 100% fines. ew gray mottles and thin gray silt laminations, trace orange medium to coarse grained sand; 0% uent gray mottles; high plasticity; 0% gravel, 0% sand, 100% fines.	19	
 15			СН		SANDY SILT (ML): very fine grained; ligh	ر t olive brown; wet; soft; no HCl reaction; 0% gravel, 35% sand, 65% fines.	1	
- - 20-			ML			red; light olive brown; wet to saturated; very soft; trace gravels; 2% gravel, 60% sand, 38% fines.	18	
-			SM		SAND (SP): fine grained with trace media	um to coarse grained; brown; wet; subrounded; trace small subrounded gravels.		
25			SP CL			rown; moist; hard; gray mottles, black organic lenses with fragments of lignite and roots; medium	18	
- 30 -			СН			gray; moist; hard; black organics and fragments of lignite; lignite at bottom of sample, 32.5'.	18	
Date E Logge	ed By:	l Con	nplete		End of boring 32.5 feet 1/1/19 10:40 am 2/1/19 3:00 pm DJZ	Remarks: WL: 11.93' bgs, temp well removed prior to advancing past 20'. Weather: -5°F, clear/sunny, windy		
Drilling Drill R	g Con Rig:	tract	or:		AET 6620 DT	Additional data may have been collected in the field which is not included on this log.		

234 W	Engineering Company /est Century Avenue arck, ND 58503 hone: 701-255-5460	LOG OF BORING T DRAI SHEET 1 OF 1	FΤ
Project: GeoF Project No.: 2641 Location: Lewis	Probe Investigation 11007.10 is & Clark Station, Sidney, MT 248,649.6 ft E 3,585,434.0 ft	Surface Elevation:1912.8 ftDrilling Method:GeoProbe Direct-PushSampling Method:GeoProbeCompletion Depth:20.0 ft	
Depth, feet Sample Type & Recovery Sample No. ∞ ∩ ∞ ⊂	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation foot
-0	reaction; 15% gravel, 15% sand, 70% fine:	o moist; varying amounts of sand and gravels, fine to coarse grained, subrounded; weak HCl s.	19
5 ML	sand, 90% fines.	grained silty sand lenses, areas of gray and rusty mottles; weak HCl reaction; 0% gravel, 10%	19
10 SP		own; wet; areas of gray and rusty mottles; weak HCl reaction.	-
			19
15 ML	SILT (ML): dark grayish brown; wet; soft; C	0% gravel, 0% sand, 100% fines.	18
- Сн 20-		ay; wet; soft; high plasticity; 0% gravel, 0% sand, 100% fines.	
Date Boring Started:	ted: 1/30/19 1:35 pm	Remarks: WL: 14.36' bgs Weather: 5°F, clear/sunny, windy	
.ogged By: Drilling Contractor: Drill Rig:	DJZ AET 6620 DT	Additional data may have been collected in the field which is not included on this log.	

	234 W	est Ce	ering Company entury Avenue D 58503	LOG OF BORING T DRAI			
BARF	Bisma Telepł	rck, N none:	D 58503 701-255-5460	SHEET 1 OF 1			
Project: Project No.: .ocation: Coordinates: Datum:	2641 Lewi	1007. s & Cl 248,43	Investigation 10 ark Station, Sidney, MT 7.8 ft E 3,585,340.5 ft	Surface Elevation: 1916.8 ft Drilling Method: GeoProbe Direct-Push Sampling Method: GeoProbe Completion Depth: 20.0 ft			
Depth, feet Sample Type & Recovery	Sample Type & Recovery Sample No. Ø ∩ Ø ⊂ Graphic Log			LITHOLOGIC DESCRIPTION			
	CL	-	LEAN CLAY (CL): brown; frozen to mois fines.	t; few subrounded gravels and few subrounded to subangular sands; 10% gravel, 5% sand, 85%	19 <sup>-</sup>		
5	CL		SILTY CLAY (CL): brown; moist; trace su	ubrounded gravels, few fine grained clayey sand lenses, loose; 5% gravel, 20% sand, 75% fines.	19		
-	ML	-	SILT (ML): brown; wet; areas of clay/clay	yey silt within; 0% gravel, 0% sand, 100% fines.	19		
- 15	SP	• • • • • • • • • • • • • • • • • • •	SAND (SP): fine grained; tan; wet; loose	; 0% gravel, 90% sand, 10% fines.			
	SM	1	CLAYEY SAND (SM): fine grained; brow	n; wet; loose to soft; 0% gravel, 65% sand, 35% fines.	10		
_ ⊻ _	C⊢		FAT CLAY (CH): Fort Union Formation; I at 18'.	light olive brown to dark yellow; wet; hard; 2% gravel, 0% sand, 98% fines, trace gravel or mudstone $\Xi$	190 7		
20-	CH	1	CARBONACEOUS CLAY (CH): black; m End of boring 20.0 feet	noist; hard; lignite within.	-		
Date Boring S Date Boring C Logged By: Drilling Contr	Complet	ed:	1/30/19 2:20 pm 1/30/19 2:40 pm DJZ AET	Remarks: WL: 17.52' bgs Weather: 5°F, cloudy, windy	1		
			DJZ	Additional data may have been collected in the field which is not included on this log.			

Barr Enginee 234 West Ce Bismarck, N Telephone:	ering Company entury Avenue D 58503 701-255-5460	LOG OF BORING TA DRA SHEET TOF	١FT
Project No.: 26411007. Location: Lewis & Cla	Investigation 10 ark Station, Sidney, MT 9.2 ft E 3,584,730.4 ft	Surface Elevation: 1916.9 ft Drilling Method: GeoProbe Direct-Push Sampling Method: GeoProbe Completion Depth: 22.5 ft	
Depth, feet Sample Type & Recovery Sample No. ∽ ∩ ∽ ⊂ Graphic Log		LITHOLOGIC DESCRIPTION	Elovation foot
- CL- CH		o coarse sand and gravel, subrounded; 10% gravel, 10% sand, 80% fines.	19
	GRAVELLY LENS (GP). SILT WITH CLAY (ML-CL): light yellowish	h brown; wet; interbedded silt and clay lenses with rusty mottles.	15
ML- CL		wn to light gray; moist to wet; hard; mottles, trace coal; 0% gravel, 0% sand, 100% fines.	1
	17.5'-22.5': water bearing silt lenses throu		19
	End of boring 22.5 feet		18
Date Boring Started: Date Boring Completed: Logged By: Drilling Contractor: Drill Rig:	1/30/19 9:15 am 1/30/19 10:15 am DJZ AET 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.	

		В	arr En	ginee	rring Company LOG OF BORING T	<b>-14</b>
BA	BARR TO				D 58503 701-255-5460	
Proje Proje Locat	ct: ct No. ion: dinate	.: s:	Supple 26411 Lewis	emen 007. and ( 18,67	tal ASD Surface Elevation: 1917.1 ft	
Depth, feet	Sample Type & Recovery	Sample No.	U S C S	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation feet
-0.0 <del>-</del>			OL		TOPSOIL (OL): black; frozen; roots, clayey mix; 0% gravel, 0% sand, 100% fines.	
-					LEAN TO FAT CLAY (CL-CH): very dark gray; frozen to moist; soft; roots, organics; 0% gravel, 0% sand, 100% fines.	
- 2.5 -		1	CL- CH			 191 
-						 191
5.0-					FAT CLAY (CH): dark grayish brown to gray; moist to wet; dense to hard; 0% gravel, 2% sand, 98% fines.	
-			СН			
- -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.	 19 <sup>,</sup>
- - 10.0- -	· · ·		CL- CH			190
- - 12.5		3				190
-			CL		LEAN CLAY (CL): Fort Union Formation; gray; wet to saturated; brown mottles, trace subrounded sand and gravel within; 3% gravel, 3% sand, 94% fines, refusal at 13' bgs on claystone rock or cemented clay.	
-					End of boring 13.5 feet	
15.0- _ _						190
-						190
-17.5 - -						
-						 189
	Boring		rted: nplete	d:	4/7/20 8:35 am     Remarks: Refusal at 13.5' bgs - dense.       Driller commented that 2-5' bgs was very soft (no push) - no recovery       4/7/20 9:05 am     Temp well screen 3.5-13.5' bgs.	I
Logge	ed By: g Cor	:			DJZ     Water at surface visible in bore hole/well.       AET     Additional data providers have called to be fold which is not included on this land.	
Drill F		mau	<u>.</u>		ACI Additional data may have been collected in the field which is not included on this log.	

					ering Company	LOG OF BORING T	-15
					entury Avenue D 58503 701-255-5460	DRA SHEET 1 OF	
Proje Proje ∟ocat	ect: ect No tion: dinate	.:	Supp 2641 Lewis	olemental ASD 11007.15 is and Clark Station, Sidney, MT 248,244.4 ft E 3,583,085.3 ft		Surface Elevation:1923.6 ftDrilling Method:Geoprobe Direct-PushSampling Method:GeoprobeCompletion Depth:17.5 ft	
Depth, feet	Sample Type & Recovery	Sample No.	U S C S	Graphic Log		LITHOLOGIC DESCRIPTION	T Lotter Lotter
-0.0-			OL		TOPSOIL (OL): dark brown; moist; root		_
- - 2.5- - -		1	CL- CH		trace subrounded gravels; 1% gravel, 6	moist; few fine to coarse sand, subrounded to subangular, few areas of rusty oxidiation spots/veins, 3% sand, 93% fines.	       192
- 5.0≝ - - - 7.5−		2	SP		POORLY GRADED SAND WITH SILT	AND GRAVEL (SP-SM): wet; cobble fragments, fine to medium sand. AND GRAVEL (SP-SM): wet to saturated; loose; subrounded to subangular; few well-graded areas of few coarse sand, little subrounded to subangular gravels; 20% gravel, 70% sand, 10% fines, fines	19 <sup>-</sup>
- - - 10.0- -			SP- SM				19 <sup>-</sup>
- - 12.5- - -		3					19     19
- 15.0- - -		4	СН		FAT CLAY (CH): Fort Union Formation; recovery due to swelling.	; gray; moist; hard; thin silt laminations; 0% gravel, 0% sand, 100% fines, 2.5' push with 4' of	19
7.5- - - -					End of boring 17.5 feet		19
ate	Borin Borin ed By	g Co	irted: mplete	ed:	4/6/20 9:50 am 4/6/20 10:30 am DJZ	Remarks: Temp well screen 1.5-11.5' bgs. Sand collapsed on screen.	
	ig Co		tor:		AET	Additional data may have been collected in the field which is not included on this log.	

					ring Company	LOG OF BORING T-	16	
BA	AR				ntury Avenue ጋ 58503 701-255-5460	SHEET 1 OF		
⊃roje ⊃roje _oca	ect: ect No tion: dinate	.: es:	Supple 26411 Lewis N 2,24	upplemental ASD 411007.15 wis and Clark Station, Sidney, MT 2,247,812.4 ft E 3,583,130.0 ft AVD88		Surface Elevation: 1927.2 ft Drilling Method: Geoprobe Direct-Push Sampling Method: Geoprobe Completion Depth: 13.0 ft		
Depth, feet	Sample Type & Recovery	Sample No.	U S C S	Graphic Log		LITHOLOGIC DESCRIPTION	Loution foot	
-0.0 - -	-		CL- CH		- TOPSOIL (OL): black; moist; roots, claye LEAN TO FAT CLAY (CL-CH): dark gray	rey mix. yish brown to brown; moist; soft; roots, trace fine sand within; 0% gravel, 3% sand, 97% fines.	-	
- -2.5 -		1			POORLY GRADED SAND WITH SILT A with few medium to coarse grained, little 70% sand, 10% fines, mostly fine graine	AND GRAVEL (SP-SM): moist to wet; loose; subrounded to subangular; mostly fine grained sand e subrounded to subangualr gravels, few black organic laminations/stains within sand; 20% gravel,	19:	
- -5.0 -							19:	
- - 7.5-	-	2	SP- SM				19	
<u>ب</u> - - 0.0							19	
- - 2.5 <sup>.</sup>		3	СН		FAT CLAY (CH): Fort Union Formation;	light yellowish brown to light olive brown; moist; hard; few silty areas/silt laminations.	19	
-	- <b>1</b>				End of boring 13.0 feet		19	
5.0 <sup>.</sup> - -								
- 7.5 <sup>.</sup> -	-						19   	
- - 20.0	-						190	
)ate .ogg	ed By	g Con :	nplete	d:	4/6/20 11:20 am 4/6/20 12:10 pm DJZ	<ul> <li>Remarks: Refusal at 13' bgs, attempted second boring from offset location. Both pushes refused bgs.</li> <li>Temp well screen 8-13' bgs, expendable point used.</li> <li>Sand collapsed on screen.</li> </ul>	at	
Drillir Drill I	ng Cor Rig:	ntract	or:		AET	Additional data may have been collected in the field which is not included on this log.		

					ring Company	LOG OF BORING T-	17		
				4 West Century Avenue marck, ND 58503 ephone: 701-255-5460					
Project: Project No.: Location: Coordinates:		Suppl 2641 Lewis	emen 1007.1 and ( 48,33)	tal ASD	Surface Elevation: 1922.5 ft Drilling Method: Geoprobe Direct-Push Sampling Method: Geoprobe Completion Depth: 15.0 ft				
Depth, feet	Sample Type & Recovery	Sample No.	U S C S	Graphic Log		LITHOLOGIC DESCRIPTION			
-0.0 - -			_OL		_TOPSOIL (OL): black; moist; roots, claye POORLY GRADED SILTY SAND (SM): coarse grained sand, trace gravels; 4% g	ey mix, trace gravel. brown; moist to wet; subrounded to subangular; mostly fine grained sand with few medium to	19:		
- -2.5 -		1	SM				19		
⊻ 					WELL GRADED SAND WITH SILT (SW at bottom of contact; 4% gravel, 86% sa	(-Sivi): The to coarse grained; wet; loose; subrounded to subangular; trace gravels with more gravels	19		
- 7.5- - - -		2	SW- SM				19		
0.0- - - -					FAT CLAY (CH): Fort Union Formation; 0% gravel, 0% sand, 100% fines.	gray; moist; silt laminations, few 1" lignite coal lenses/fragments and carbonaceous zones within;	19		
2.5- - -		5	СН				19		
- -5.0 - -					End of boring 15.0 feet		 19 		
	-						19		
ate l ogge	Boring ed By	g Cor :	nplete		4/6/20 2:50 pm 4/6/20 3:30 pm DJZ	Remarks: Temp well screen 5-10' bgs, expendable point used. Sand collapsed on screen.			
Drillin Drill F	ig Cor Ria:	ntract	or:		AET	Additional data may have been collected in the field which is not included on this log.			

	В	arr En	ginee	ring Company	LOG OF BORING	T-18
BAR				ntury Avenue 0 58503 701-255-5460	SHEETTO	
Project: Project No.: Location: Coordinates Datum:	: 6:	Supple 26411 Lewis	emen 007.1 and ( 17,982	tal ASD	Surface Elevation: 1923.1 ft Drilling Method: Geoprobe Direct-Push Sampling Method: Geoprobe Completion Depth: 14.5 ft	
Depth, feet Sample Type & Recovery	Sample No.	U S C S	Graphic Log		LITHOLOGIC DESCRIPTION	T lavet on fact
-0.0 - - - - 2.5-	1	CL		FILL; SANDY LEAN CLAY (CL): black to within, trace fragments of black coal withi	very dark brown; moist; subrounded to subangular; roots, fine to coarse sand and trace gravels n; 5% gravel, 30% sand, 65% fines.	192
5.0				WELL GRADED SAND WITH SILT AND gravels; 15% gravel, 75% sand, 10% fine	GRAVEL (SW-SM): fine to coarse grained; wet to saturated; loose; subrounded to subangular; lit s, some areas near top of interval are poorly graded, less fines at 11-12.5'.	192 
- 7.5- - - - 0.0	2	SW- SM				19     19
- - 2.5- - - -	3	СН		FAT CLAY (CH): Fort Union Formation; g coal lense at 14'.	gray; moist; hard to dense; thin silt laminations within; 0% gravel, 0% sand, 100% fines, 1" lignite	 19
5.0-				End of boring 14.5 feet		19
7.5- - - - 0.0-						19
ate Boring .ogged By:	te Boring Started: te Boring Completed: gged By: Iling Contractor:			4/6/20 1:10 pm 4/6/20 1:55 pm DJZ AET	Remarks: No recovery & refusal at 10-14.5' bgs, attempted second boring from offset location 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.	n which

					ring Company LOG OF BORING T-1	9			
BA	BARR Bismarck Telephon			Vest Century Avenue DRJ arck, ND 58503 hone: 701-255-5460 SHEET 10					
Proje Proje .ocat	ct: ct No. tion: dinate	: s:	Suppl 26411 Lewis	emer 007. and 46,89	tal ASD Surface Elevation: 1923.8 ft				
Depth, feet	Sample Type & Recovery	Sample No.	U S C S	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation faat			
-0.0-			OL		TOPSOIL (OL): dark brown; moist; roots, clayey mix with silt.				
- - 2.5-		1	CL		SILTY CLAY (CL): brown; moist to wet; soft; roots; 0% gravel, 0% sand, 100% fines.	92			
		2	SP- SM		1	92 91 91			
- - - 15.0- - - - 17.5- - - - -	-		СН		FAT CLAY (CH): Fort Union Formation; gray; moist; hard to dense; silt laminations, trave organics/lignite coal fragments within; 0% gravel, 0% sand, 100% fines. End of boring 12.5 feet	91 90 90			
Date	ed By	g Con	nplete	d:	4/6/20 5:20 pm       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.         DJZ				
Drillin Drill F	ng Cor Rig:	ntract	or:		AET Additional data may have been collected in the field which is not included on this log.				

					ring Company	LOG OF BORIN	G T-20	
BARR T					ntury Avenue 0 58503 701-255-5460	DR SHEET 1 C		
Project: Project No.: Location: Coordinates:		: 2   	Supplemental ASD 26411007.15 Lewis and Clark Station, Sidney, MT N 2,248,692.1 ft E 3,583,864.1 ft NAVD88		tal ASD 5 Clark Station, Sidney, MT	Surface Elevation: 1920.7 ft Drilling Method: Geoprobe Direct-Push Sampling Method: Geoprobe Completion Depth: 15.0 ft		
Depth, feet	Sample Type & Recovery	Sample No.	U S C S	Graphic Log		LITHOLOGIC DESCRIPTION	Louid foot	
-0.0 - - 2.5		1	CL		_TOPSOIL (OL): dark grayish brown; mois SANDY LEAN CLAY (CL): fine to coarse fines.	st; roots, clayey mix. grained; brown; moist; subrounded to subangular; trace gravels within; 5% gravel, 20% sanc		
_ _ 5.0 <u>₹</u>			CL- SC		POORLY GRADED SAND AND CLAY (C few gravels; 10% gravel, 45% sand, 45%	CL-SC): fine grained; brown; moist; subrounded to subangular; few medium to coarse grained fines.	191 I sand,	
- - - 7.5-		2	СН		FAT CLAY (CH): light yellowish brown; m 0% sand, 100% fines.	oist; hard to dense; occasional brown and gray mottles, few black organic lenses/stains; 0%		
- - 10.0- - - 12.5- - - -		3	ML		SANDY SILT (ML): light olive yellow; wet and silt ratio varies with depth.	to saturated; very fine grained sand within; 0% gravel, 40% sand, 60% fines, near liquid limit	191 , sand 191 191 190	
- 15.0- - - 17.5- - - -					End of boring 15.0 feet		 190 190	
End of boring 15.0 feet  End of boring 15.0 fe		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.						

		ring Company	LOG OF BORING	Г-21		
	234 West Century Avenue Bismarck, ND 58503 Telephone: 701-255-5460					
Project: Project No.: Location: Coordinates: Datum:	Supplemen 26411007.1 Lewis and (	tal ASD	Surface Elevation: 1923.8 ft Drilling Method: Geoprobe Direct-Push Sampling Method: Geoprobe Completion Depth: 15.0 ft			
Depth, feet Sample Type & Recovery Sample No.	。		LITHOLOGIC DESCRIPTION	Elevation. feet		
-0.0 		TOPSOIL (OL): black; moist; roots, cla POORLY GRADED SAND WITH SILT coarse grained sand within, few to littl 5-10' observed in second geoprobe pu	<sup>-</sup> AND GRAVELS (SP-SM): fine grained; moist to wet; subrounded to subangular; few medium to e gravels, some silty areas within; 15% gravel, 70% sand, 15% fines, wet at 5', possibly well graded a	t 1922		
2.5- 2.5- - - - - - - - - - - - - -				1920		
- ↓ ⊈ - 7.5- 2	SP- SM			191 191		
- - 10.0 -				191		
- - 12.5- - -				191:		
- - 15.0	СН	FAT CLAY (CH): Fort Union Formation 0% sand, 100% fines. End of boring 15.0 feet	n; gray; moist; hard to dense; silt laminations, trace lignite fragments/black organics within; 0% grave	191 		
17.5-				190		
-20.0				190   		
Date Boring Sta Date Boring Col Logged By: Drilling Contrac	ompleted:	4/6/20 3:55 pm 4/6/20 4:45 pm DJZ AET	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.			

		2	34 We	est Ce	ring Company LOG OF BORING T Intury Avenue D 58503	
Project: Project No.: Location: Coordinates:			eleph Supp 2641 Lewis N 2,2	narck, ND 58503 ppone: 701-255-5460 Surface Elevation: 1912.6 ft 411007.15 wis and Clark Station, Sidney, MT 2,248,814.6 ft E 3,584,890.5 ft AVD88 Completion Depth: 20.0 ft		
Depth, feet	Sample Type & Recovery	Sample No.	U S C S	Graphic Log	LITHOLOGIC DESCRIPTION	Elevention foot
0 - - _		1	CL		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.	19
5		2			<ul> <li>8-9'; olive brown; more silty and saturated.</li> <li>9-12.5'; same as 3.5-8' but harder, soft at 12.5'; high plasticity.</li> </ul>	15
- - 15-		3	СН		<ul> <li>12.5-14.5'; gray/dark gray to black; black organic/peat area with roots and shell fragments.</li> <li>14.5-15.5'; fine sand within the fat clay.</li> <li>15.5-20'; dark gray; wet, soft; high plasticity.</li> </ul>	19
- - 20-		4			End of boring 20.0 feet	18
Date _ogg	Boring Boring ed By: ng Cor	g Con	nplete	ed:	4/7/20 11:35 am     Remarks: Temp well screen 3.5-18.5' bgs.       4/6/20 10:05 am     DJZ       AET     Additional data may have been collected in the field which is not included on this log.	

				ring Company	LOG OF BORING	T-23
BAR	BARR <sup>B</sup> T			ntury Avenue 0 58503 701-255-5460	DR	AFT
Project: Project No ∟ocation: Coordinate Datum:	.: •S:	Supple 26411 Lewis	emental ASD 007.15 and Clark Station, Sidney, MT 8,816.0 ft E 3,585,392.7 ft		Surface Elevation:1917.9 ftDrilling Method:Geoprobe Direct-PushSampling Method:GeoprobeCompletion Depth:15.0 ft	
Depth, feet Sample Type & Recovery	Sample No.	U S C S	Graphic Log		LITHOLOGIC DESCRIPTION	Elevicition foot
-0.0		OL	$\frac{\sqrt{VJ_2}}{V_2}$	TOPSOIL (OL): dark brown; moist; roots	s, clay with fine sand within.	191
2.5-	1	CL		SANDY LEAN CLAY (CL): very fine to fin 4% gravel, 21% sand, 75% fines.	ne grained; brown; moist; subangular to subrounded; trace medium to coarse sand, trace gravels;	191
5.0				4.5-5.5'; dry/low moisure with areas of ru	lowish brown; moist to wet; 0% gravel, 40% sand, 60% fines. usty oxidation stains thoughout.	 19
- 7.5- - - -	2	ML		6.5-8'; wet to saturated; gray mottles.		19
0.0 <u>r</u> - - -  2.5-	3			9.5-13.5'; areas of lean clay and silt lami	nations, trace siltstone fragments, dense/hard drilling.	19
-		СН		FAT CLAY (CH): olive yellow to light yello 0% gravel, 0% sand, 100% fines.	owish brown; moist; very hard to dense; mottled, with black organics or manganese oxidation stain	s;
5.0-				End of boring 15.0 feet		 19
- 7.5- - - -						 19 
20.0 A term of the second started: 4/7/20 1:10 pm 4/7/20 1:30 pm 0000000000000000000000000000000000		4/7/20 1:30 pm DJZ	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.	[		
Drilling Cor Drill Rig:	ntract	or:		AET	Additional data may have been collected in the field which is not included on this log.	

# Appendix B

Analytical Results for Hypothesis No. 1

Appendix B Analytical Results for Hypothesis No. 1

Formerly Inter-Mountain Laboratories

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

Date: 1/30/2020

CLIENT:	Barr Engineering	CASE NARRATIVE
Project: Lab Order:	26411007 S1912224	Report ID: S1912224002
	01012224	(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

Pace Analvtical

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 - 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
S1912224-002 - Total Metals-3050/0010/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

Formerly Inter-Mountain Laboratories

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

Date: 8/7/2020

CLIENT:	Barr Engineering
Project:	Sediment Saturated Paste Extracts
Lab Order:	S2007298

**CASE NARRATIVE** 

Report ID: S2007298001

Samples T-14 (10-13), T-14 (5-7), T-14 (7-10), T-15 (10-14.25), T-15 (5-10), T-16 (11-13), T-17 (10.75-15), T-17 (5-10.75), T-18 (10-12.5), T-18 (12.5-14.5), T-18 (5-10), T-19 (10-14.5), T-19 (3.5-5), T-19 (5-10), T-20 (12.5-15), T-20 (3.5-5.5), T-20 (8.25-12.5), T-21 (13.75-15), T-21 (5-13.75), T-22 (10-15), T-22 (15-20), T-22 (3.5-10), T-23 (10-13.5), T-23 (13.5-15) and T-23 (4.5-10) were received on July 21, 2020.

Samples T-15 (14.25-17.5), T-16 (3-11), T-20 (5.5-8.25) were originally received April 14, 2020 and samples were requested to be analyzed with the current received samples.

Samples were analyzed using the methods outlined in the following references:

U.S.E.P.A. 600/2-78-054 "Field and Laboratory Methods Applicable to Overburden and Mining Soils", 1978

American Society of Agronomy, Number 9, Part 2, 1982

USDA Handbook 60 "Diagnosis and Improvement of Saline and Alkali Soils", 1969

Wyoming Department of Environmental Quality, Land Quality Division, Guideline No. 1, 1984

New Mexico Overburden and Soils Inventory and Handling Guideline, March 1987

State of Utah, Division of Oil, Gas, and Mining: Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining, April 1988

Montana Department of State Lands, Reclamation Division: Soil, Overburden, and Regraded Spoil Guidelines, December 1994

State of Nevada Modified Sobek Procedure

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition

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

Qualifiers by sample

ace Analytical

SATPASTE QC - Saturated Paste Metals by ICP/Boron - Spike Recovery outside accepted recovery limits SATPASTE QC - Saturated Paste Metals by ICP/Selenium - Spike Recovery outside accepted recovery limits

Reviewed by: Karen A Secon

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

### Sample Analysis Report

	LIENT: Barr Engineering Bismark, ND					•	8/7/2020 S2007298001	
	,				Wo		S2007298	
Project:	Sediment Saturated Paste E	xtracts			Date F	Received:	7/21/2020	
Lab ID:	S2007298-001					Sampler:		
Client Sample I	<b>D:</b> T-14 (5-7)					Matrix:	Sediment	
Depths:	5 - 7 Feet					COC:	50061	
Analyses		Result	RL	Qual	Units	Date /	Analyzed/Init	Method
Saturated Paste Me	etals							
Boron		0.2	0.1		ppm	08/04/2	020 17:22 DG	EPA 200.7
Lithium		0.03	0.01		ppm	08/04/2	020 17:22 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/2	020 17:22 DG	EPA 200.7

# Comparison 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

# Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

# Sample Analysis Report

CLIENT: Barr E Bisma			Reported: Report ID:	8/7/2020 S2007298001				
						ork Order: tion Date:	S2007298	
Project:	Sediment Saturated Past	e Extracts			Date I	Received:	7/21/2020	
Lab ID:	S2007298-002					Sampler:		
Client Sample	<b>ID:</b> T-14 (7-10)					Matrix:	Sediment	
Depths:	7 - 10 Feet					COC:	50061	
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Saturated Paste M	etals							
Boron		0.3	0.1		ppm	08/04/20	20 17:24 DG	EPA 200.7
Lithium		0.04	0.01		ppm	08/04/20	20 17:24 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/20	20 17:24 DG	EPA 200.7

# Comparison 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

# Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

### Sample Analysis Report

	ngineering rk, ND					Reported: Report ID:	8/7/2020 S2007298001	
						rk Order: tion Date:	S2007298	
Project:	Sediment Saturated Paste Ex	tracts			Date I	Received:	7/21/2020	
Lab ID:	S2007298-003					Sampler:		
Client Sample I	<b>D:</b> T-14 (10-13)					Matrix:	Sediment	
Depths:	10 - 13 Feet					COC:	50061	
Analyses		Result	RL	Qual	Units	Date A	Analyzed/Init	Method
Saturated Paste Me	etals							
Boron		0.3	0.1		ppm	08/04/2	020 17:27 DG	EPA 200.7
Lithium		0.03	0.01		ppm	08/04/2	020 17:27 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/2	020 17:27 DG	EPA 200.7

 Comparison
 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
- Reviewed by: Karen A Secon

- 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

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

# Sample Analysis Report

	ENT: Barr Engineering Bismark, ND					Reported: Report ID:	8/7/2020 S2007298001	
Project:	Sediment Saturated Pas	te Extracts			Collec	ork Order: tion Date: Received:	S2007298 7/21/2020	
Lab ID:	S2007298-004					Sampler:	.,,	
Client Sample	<b>ID:</b> T-15 (5-10)					•	Sediment	
Depths:	5 - 10 Feet					COC:	50061	
Analyses		Result	RL	Qual	Units	Date A	Analyzed/Init	Method
Saturated Paste M	etals							
Boron		0.5	0.1		ppm	08/04/20	020 17:29 DG	EPA 200.7
Lithium		0.03	0.01		ppm	08/04/20	020 17:29 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/20	020 17:29 DG	EPA 200.7

# Comparison 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

# Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

### Sample Analysis Report

	Engineering ark, ND					Reported: Report ID:	8/7/2020 S2007298001	
Project:	Sediment Saturated Paste E	tracts			Collect	ion Date:	S2007298 7/21/2020	
Lab ID:	S2007298-005					Sampler:	1/21/2020	
	<b>ID:</b> T-15 (10-14.25)					•	Sediment	
Depths:	10 - 14.25 Feet					COC:	50061	
Analyses		Result	RL	Qual	Units	Date A	Analyzed/Init	Method
Saturated Paste M	letals							
Boron		0.6	0.1		ppm	08/04/2	020 17:31 DG	EPA 200.7
Lithium		0.02	0.01		ppm	08/04/2	020 17:31 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/2	020 17:31 DG	EPA 200.7

# Comparison 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

# Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

# Sample Analysis Report

	Engineering ark, ND					-	8/7/2020 S2007298001	
					Work Collectio		S2007298	
Project:	Sediment Saturated Paste Extra	cts			Date Re	eceived:	7/21/2020	
Lab ID:	S2007298-006				S	ampler:		
Client Sample	<b>ID:</b> T-16 (11-13)					Matrix:	Sediment	
Depths:	11 - 13 Feet					COC:	50061	
Analyses	R	esult	RL	Qual	Units	Date A	Analyzed/Init	Method
Saturated Paste M	etals							
Boron		0.3	0.1		ppm	08/04/2	020 17:33 DG	EPA 200.7
Lithium	0.	.02	0.01		ppm	08/04/2	020 17:33 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/2	020 17:33 DG	EPA 200.7

# Comparison 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

# Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

### Sample Analysis Report

	CLIENT: Barr Engineering Bismark, ND					Date Reported: 8/7/2020 Report ID: \$2007298001				
					Collect	tion Date:	S2007298			
Project:	Sediment Saturated Paste	Extracts			Date I	Received:	7/21/2020			
Lab ID:	S2007298-007					Sampler:				
Client Sample	ID: T-17 (5-10.75)					Matrix:	Sediment			
Depths:	5 - 10.75 Feet					COC:	50061			
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method		
Saturated Paste N	letals									
Boron		0.4	0.1		ppm	08/04/20	020 17:36 DG	EPA 200.7		
Lithium		0.02	0.01		ppm	08/04/20	020 17:36 DG	EPA 200.7		
Selenium		ND	0.05		ppm	08/04/20	020 17:36 DG	EPA 200.7		

# Comparison 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

# Reviewed by: Karen A Secon

- 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

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

### Sample Analysis Report

	Engineering ark, ND					eported: eport ID:	8/7/2020 S2007298001	
<b>-</b> • •		·			Collecti	k Order: on Date:		
Project:	Sediment Saturated Paste Ext	racts				eceived:	7/21/2020	
Lab ID:	S2007298-008				:	Sampler:		
Client Sample	<b>ID:</b> T-17 (10.75-15)					Matrix:	Sediment	
Depths:	10.75 - 15 Feet					COC:	50061	
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Saturated Paste M	etals							
Boron		0.3	0.1		ppm	08/06/20	20 16:15 DG	EPA 200.7
Lithium		0.07	0.01		ppm	08/06/20	20 16:15 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/06/20	20 16:15 DG	EPA 200.7

# Comparison 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

# Reviewed by: Karen A Secon

- 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

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

# Sample Analysis Report

CLIENT: Barr Bism			Reported: 8	8/7/2020 S2007298001				
						ork Order: Stion Date:	S2007298	
Project:	Sediment Saturated Paste	e Extracts			Date	Received:	7/21/2020	
Lab ID:	S2007298-009					Sampler:		
Client Sample	ID: T-18 (5-10)					Matrix:	Sediment	
Depths:	5 - 10 Feet					COC:	50061	
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Saturated Paste N	letals							
Boron		0.5	0.1		ppm	08/04/202	20 17:45 DG	EPA 200.7
Lithium		0.03	0.01		ppm	08/04/202	20 17:45 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/202	20 17:45 DG	EPA 200.7

# Comparison 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

# Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

### Sample Analysis Report

CLIENT: Barr Eng Bismark	, 0					Reported: Report ID:	8/7/2020 S2007298001	
Project	Sodiment Soturated Dagter				Collect	ion Date:	S2007298	
Project:	Sediment Saturated Paste E	extracts					7/21/2020	
Lab ID:	S2007298-010					Sampler:		
Client Sample ID:	: T-18 (10-12.5)					Matrix:	Sediment	
Depths:	10 - 12.5 Feet					COC:	50061	
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Saturated Paste Meta	ls							
Boron		0.2	0.1		ppm	08/04/20	020 17:47 DG	EPA 200.7
Lithium		0.02	0.01		ppm	08/04/20	020 17:47 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/20	020 17:47 DG	EPA 200.7

# Comparison 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

# Reviewed by: Karen A Secon

- 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

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

### Sample Analysis Report

	Engineering					Reported:		
BISIT	nark, ND					Report ID:	S2007298001	
					Wo	rk Order:	S2007298	
					Collec	tion Date:		
Project:	Sediment Saturated Paste	e Extracts			Date	Received:	7/21/2020	
Lab ID:	S2007298-011					Sampler:		
Client Sample	<b>ID:</b> T-18 (12.5-14.5)					Matrix:	Sediment	
Depths:	12.5 - 14.5 Feet					COC:	50062	
Analyses		Result	RL	Qual	Units	Date A	Analyzed/Init	Method
Saturated Paste	Metals							
Boron		1.2	0.1		ppm	08/04/2	020 17:49 DG	EPA 200.7
Lithium		0.14	0.01		ppm	08/04/2	020 17:49 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/2	020 17:49 DG	EPA 200.7

# Comparison 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

# Reviewed by: Karen A Secon

- 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

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ph: (307) 672-8945

# Sample Analysis Report

CLIENT: Barr Engineering Bismark, ND				Date Reported: 8/7/2020 Report ID: S2007298001				
						rk Order: S2 tion Date:	2007298	
Project:	Sediment Saturated Paste Extracts				Date Received: 7/21/2020			
Lab ID:	S2007298-012 Sampler:							
Client Sample ID: T-19 (3.5-5)				Matrix: Sediment				
Depths:	3.5 - 5 Feet					<b>COC:</b> 50	0062	
Analyses		Result	RL	Qual	Units	Date Ana	alyzed/Init	Method
Saturated Paste N	letals							
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

# Comparison 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

# Reviewed by: Karen A Secon

- 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

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ph: (307) 672-8945

### Sample Analysis Report

	Engineering ark, ND		Date Reported: 8/7/2020 Report ID: S2007298001					
						rk Order: tion Date:	S2007298	
Project:	Sediment Saturated Paste	Extracts			Date I	Received:	7/21/2020	
Lab ID:	S2007298-013					Sampler:		
Client Sample	ID: T-19 (5-10)					Matrix:	Sediment	
Depths:	5 - 10 Feet					COC:	50062	
Analyses		Result	RL	Qual	Units	Date A	Analyzed/Init	Method
Saturated Paste N	letals							
Boron		0.2	0.1		ppm	08/04/2	020 17:54 DG	EPA 200.7
Lithium		0.02	0.01		ppm	08/04/2	020 17:54 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/2	020 17:54 DG	EPA 200.7

# Comparison 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

## Reviewed by: Karen A Secon

- 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

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ph: (307) 672-8945

### Sample Analysis Report

CLIENT: Barr Bism			Reported: Report ID:	8/7/2020 S2007298001				
					Collec	rk Order: tion Date:		
Project:	Sediment Saturated Past	e Extracts			Date	Received:	7/21/2020	
Lab ID:	S2007298-014					Sampler:		
Client Sample	ID: T-19 (10-14.5)					Matrix:	Sediment	
Depths:	10 - 14.5 Feet					COC:	50062	
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Saturated Paste N	/letals							
Boron		0.4	0.1		ppm	08/04/20	020 17:56 DG	EPA 200.7
Lithium		0.02	0.01		ppm	08/04/20	020 17:56 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/20	020 17:56 DG	EPA 200.7

These results	app	ly only to the samples tested.
Qualifiers:	В	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

# Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

- 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

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### Sample Analysis Report

CLIENT: Barr Eng Bismark			Reported: Report ID:	8/7/2020 S2007298001				
Dreiset	Sediment Saturated Paste F	ivtro.cto			Collect	tion Date:	S2007298	
Project:		xtracts					7/21/2020	
Lab ID:	S2007298-015					Sampler:		
Client Sample ID:	T-20 (3.5-5.5)					Matrix:	Sediment	
Depths:	3.5 - 5.5 Feet					COC:	50062	
Analyses		Result	RL	Qual	Units	Date A	Analyzed/Init	Method
Saturated Paste Meta	ls							
Boron		0.6	0.1		ppm	08/04/2	020 17:58 DG	EPA 200.7
Lithium		0.04	0.01		ppm	08/04/2	020 17:58 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/2	020 17:58 DG	EPA 200.7

# Comparison 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

### Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

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### Sample Analysis Report

CLIENT: Barr Engineering Bismark, ND						Reported: Report ID:	8/7/2020 S2007298001	
						rk Order: ion Date:	S2007298	
Project:	Sediment Saturated Paste E	xtracts			Date F	Received:	7/21/2020	
Lab ID:	S2007298-016					Sampler:		
Client Sample ID:	T-20 (8.25-12.5)					Matrix:	Sediment	
Depths:	8.25 - 12.5 Feet					COC:	50062	
Analyses		Result	RL	Qual	Units	Date A	Analyzed/Init	Method
Saturated Paste Meta	ls							
Boron		0.2	0.1		ppm	08/04/2	020 18:00 DG	EPA 200.7
Lithium		0.01	0.01		ppm	08/04/2	020 18:00 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/2	020 18:00 DG	EPA 200.7

# Comparison 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

# Reviewed by: Karen A Secon

- 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

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### Sample Analysis Report

CLIENT: Barr Eng Bismark			Reported: Report ID:	8/7/2020 S2007298001				
						k Order: ion Date:	S2007298	
Project:	Sediment Saturated Paste E	xtracts			Date F	Received:	7/21/2020	
Lab ID:	S2007298-017					Sampler:		
Client Sample ID:	: T-20 (12.5-15)					Matrix:	Sediment	
Depths:	12.5 - 15 Feet					COC:	50062	
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Saturated Paste Meta	ls							
Boron		0.3	0.1		ppm	08/04/20	020 18:03 DG	EPA 200.7
Lithium		0.02	0.01		ppm	08/04/20	020 18:03 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/20	020 18:03 DG	EPA 200.7

# Comparison 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

## Reviewed by: Karen A Secon

- 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

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### Sample Analysis Report

CLIENT: Barr Bism			Reported: Report ID:	8/7/2020 S2007298001				
Project:	Sediment Saturated Paste	- Extracts			Collec	rk Order: tion Date: Received:		
Lab ID:	S2007298-018				Date	Sampler:	1/21/2020	
	<b>ID:</b> T-21 (5-13.75)					•	Sediment	
Depths:	5 - 13.75 Feet					COC:	50062	
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Saturated Paste	/letals							
Boron		0.3	0.1		ppm	08/06/20	20 16:20 DG	EPA 200.7
Lithium		0.05	0.01		ppm	08/06/20	20 16:20 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/06/20	20 16:20 DG	EPA 200.7

# Comparison 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

## Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

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ph: (307) 672-8945

### Sample Analysis Report

CLIENT: Barr Eng Bismark			Reported: Report ID:	8/7/2020 S2007298001				
						k Order: ion Date:	S2007298	
Project:	Sediment Saturated Paste Ex	tracts			Date R	Received:	7/21/2020	
Lab ID:	S2007298-019				:	Sampler:		
Client Sample ID	: T-21 (13.75-15)					Matrix:	Sediment	
Depths:	13.75 - 15 Feet					COC:	50062	
Analyses		Result	RL	Qual	Units	Date A	Analyzed/Init	Method
Saturated Paste Meta	als							
Boron		0.4	0.1		ppm	08/04/2	020 18:12 DG	EPA 200.7
Lithium		0.08	0.01		ppm	08/04/2	020 18:12 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/2	020 18:12 DG	EPA 200.7

# Comparison 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

## Reviewed by: Karen A Secon

- 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

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ph: (307) 672-8945

### Sample Analysis Report

	CLIENT: Barr Engineering Bismark, ND						8/7/2020 S2007298001	
_					Collecti	on Date:	S2007298	
Project:	Sediment Saturated Paste Extrac	sts			Date R	eceived:	7/21/2020	
Lab ID:	S2007298-020				;	Sampler:		
Client Sample	ID: T-22 (3.5-10)					Matrix:	Sediment	
Depths:	3.5 - 10 Feet					COC:	50062	
Analyses	Re	sult R	LO	Qual	Units	Date A	Analyzed/Init	Method
Saturated Paste N	letals							
Boron	0	.3 0	.1		ppm	08/04/2	020 18:14 DG	EPA 200.7
Lithium	0.0	0.0	)1		ppm	08/04/2	020 18:14 DG	EPA 200.7
Selenium	0.1	4 0.0	)5		ppm	08/04/2	020 18:14 DG	EPA 200.7

# Comparison 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

## Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

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ph: (307) 672-8945

### Sample Analysis Report

CLIENT: Barr En Bismark			Reported: Report ID:	8/7/2020 S2007298001				
						rk Order: tion Date:	S2007298	
Project:	Sediment Saturated Paste I	Extracts			Date I	Received:	7/21/2020	
Lab ID:	S2007298-021					Sampler:		
Client Sample ID	: T-22 (10-15)					Matrix:	Sediment	
Depths:	10 - 15 Feet					COC:	50063	
Analyses		Result	RL	Qual	Units	Date A	Analyzed/Init	Method
Saturated Paste Meta	als							
Boron		0.6	0.1		ppm	08/04/2	020 18:16 DG	EPA 200.7
Lithium		0.10	0.01		ppm	08/04/2	020 18:16 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/2	020 18:16 DG	EPA 200.7

# Comparison 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

# Reviewed by: Karen A Secon

- 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

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ph: (307) 672-8945

### Sample Analysis Report

CLIENT: Barr I Bisma			Reported: Report ID:	8/7/2020 S2007298001				
						ork Order: tion Date:	S2007298	
Project:	Sediment Saturated Paste	Extracts			Date I	Received:	7/21/2020	
Lab ID:	S2007298-022					Sampler:		
Client Sample	ID: T-22 (15-20)					Matrix:	Sediment	
Depths:	15 - 20 Feet					COC:	50063	
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Saturated Paste M	letals							
Boron		0.5	0.1		ppm	08/04/20	20 18:18 DG	EPA 200.7
Lithium		0.10	0.01		ppm	08/04/20	20 18:18 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/20	20 18:18 DG	EPA 200.7

# Comparison 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

### Reviewed by: KarenASecor

- 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

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ph: (307) 672-8945

### Sample Analysis Report

	Engineering nark, ND		•	ted: 8/7/2020 ID: S2007298001		
				Work Ore Collection D	der: S2007298 ate:	
Project:	Sediment Saturated Paste Extrac	ts		Date Receiv	ed: 7/21/2020	
Lab ID:	S2007298-023			Samp	ler:	
Client Sample	<b>ID:</b> T-23 (4.5-10)			Mat	rix: Sediment	
Depths:	4.5 - 10 Feet			C	<b>OC:</b> 50063	
Analyses	Re	sult RL	Qual	Units Da	ate Analyzed/Init	Method
Saturated Paste I	Metals					
Boron	0.	4 0.1		ppm 08,	04/2020 18:21 DG	EPA 200.7
Lithium	0.0	0.01		ppm 08/	04/2020 18:21 DG	EPA 200.7
Selenium	Ν	D 0.05		ppm 08,	04/2020 18:21 DG	EPA 200.7

# Comparison 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

# Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

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ph: (307) 672-8945

### Sample Analysis Report

	Engineering ark, ND					Reported: Report ID:	8/7/2020 S2007298001	
Project:	Sediment Saturated Pa	ste Extracts			Collec	rk Order: tion Date: Received:		
Lab ID:	S2007298-024				Date	Sampler:	112 112020	
	<b>ID:</b> T-23 (10-13.5)					•	Sediment	
Depths:	10 - 13.5 Feet					COC:	50063	
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Saturated Paste M	/letals							
Boron		0.4	0.1		ppm	08/04/20	020 18:23 DG	EPA 200.7
Lithium		0.02	0.01		ppm	08/04/20	020 18:23 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/20	020 18:23 DG	EPA 200.7

These results	appl	y only to the samples tested.
Qualifiers:	В	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

### Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

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ph: (307) 672-8945

### Sample Analysis Report

CLIENT: Barr Eng Bismark						Reported: Report ID:	8/7/2020 S2007298001	
Draiact	Sediment Saturated Paste F	Sytracto			Collect	tion Date:	S2007298	
Project:		Extracts					7/21/2020	
Lab ID:	S2007298-025					Sampler:		
Client Sample ID:	: T-23 (13.5-15)					Matrix:	Sediment	
Depths:	13.5 - 15 Feet					COC:	50063	
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Saturated Paste Meta	ls							
Boron		0.3	0.1		ppm	08/04/2	020 18:25 DG	EPA 200.7
Lithium		0.02	0.01		ppm	08/04/2	020 18:25 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/04/2	020 18:25 DG	EPA 200.7

These results	app	ly only to the samples tested.
Qualifiers:	В	Analyte detected in the associated Method I

# B Analyte detected in the associated Method BlankD 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

# Reviewed by: Karen A Secon

- 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

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ph: (307) 672-8945

### Sample Analysis Report

	Engineering ark, ND					Reported: Report ID:	8/7/2020 S2007298001	
						rk Order: tion Date:	S2007298	
Project:	Sediment Saturated Paste	Extracts			Date I	Received:	7/21/2020	
Lab ID:	S2007298-026					Sampler:		
Client Sample	ID: T-15 (14.25-17.5)					Matrix:	Sediment	
Depths:	14.25 - 17.5 Feet					COC:	50063	
Analyses		Result	RL	Qual	Units	Date A	Analyzed/Init	Method
Saturated Paste M	letals							
Boron		0.1	0.1		ppm	08/06/2	020 16:24 DG	EPA 200.7
Lithium		0.04	0.01		ppm	08/06/2	020 16:24 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/06/2	020 16:24 DG	EPA 200.7

# Comparison 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

# Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

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ph: (307) 672-8945

### Sample Analysis Report

	Engineering ark, ND					Reported: Report ID:	8/7/2020 S2007298001	
Project:	Sediment Saturated Paste	e Extracts			Collec	rk Order: tion Date: Received:		
Lab ID:	S2007298-027					Sampler:		
Client Sample	ID: T-16 (3-11)					Matrix:	Sediment	
Depths:	3 - 11 Feet					COC:	50063	
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Saturated Paste M	etals							
Boron		0.2	0.1		ppm	08/06/20	20 16:31 DG	EPA 200.7
Lithium		0.03	0.01		ppm	08/06/20	20 16:31 DG	EPA 200.7
Selenium		ND	0.05		ppm	08/06/20	20 16:31 DG	EPA 200.7

# Comparison 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

# Reviewed by: Karen A Secon

- 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

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### Sample Analysis Report

	Engineering ark, ND					eported: eport ID:	8/7/2020 S2007298001	
					Collecti	on Date:	S2007298	
Project:	Sediment Saturated Paste Extr	acts			Date R	eceived:	7/21/2020	
Lab ID:	S2007298-028				Ś	Sampler:		
Client Sample	ID: T-20 (5.5-8.25)					Matrix:	Sediment	
Depths:	5.5 - 8.25 Feet					COC:	50063	
Analyses	I	Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Saturated Paste N	letals							
Boron		0.2	0.1		ppm	08/06/20	20 16:34 DG	EPA 200.7
Lithium		0.02	0.01		ppm	08/06/20	20 16:34 DG	EPA 200.7
Selenium		0.09	0.05		ppm	08/06/20	20 16:34 DG	EPA 200.7

# Comparison 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

## Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

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# 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 ND 0.1 Boron 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 0.2 Boron 0.1 0.31 74.7 80 - 120 S Lithium 0.07 0.01 0.07 103 80 - 120 Selenium 0.07 0.05 80 - 120 0.11 65.2 S QC-2 (08/06/20 16:40) RunNo: 181357 Result RL Ref Samp %REC Analyte Spike % Rec Limits Qual 0.2 0.1 0.31 S Boron 76.5 80 - 120 Lithium 0.07 0.01 0.07 98.2 80 - 120 0.12 0.05 Selenium 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 Ref Samp %RPD Qual % RPD Limits Analyte Result RL %REC Boron 0.3 0.1 0.3 3.28 20 0.05 20 Lithium 0.01 0.05 0.167 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 20 0.09

Qualifiers: В Analyte detected in the associated Method Blank D Report limit raised due to dilution Е Value above quantitation range G Analyzed at IML Gillette laboratory н 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 0 Outside the Range of Dilutions R RPD outside accepted recovery limits s Spike Recovery outside accepted recovery limits Х Matrix Effect

Chain of Custody for Ai		Sample Origination State:	Analysis Requested:	1	COC Number: Nº _ 50061		
	Jefferson City	☐ KS ☐ MO ☐ WI ] MI ☐ ND Other: ] MN ☐ SD	□ TO-14 □ TO-15 □ 3C □ Other	TO-15SIM	coc of		
REPORT TO			Lab Deliverable Con (check all that apply)	tents:	Matrix Code:		
Company: BARR ENGINEERING	Company:		Sample Data with QC		AA = Ambient Air (Indoor/Outdoor)		
Address: 234 W. CENTURY	Address:	-	<ul> <li>TIC Library Search</li> <li>Sample Chromatogra</li> </ul>	ms	SV = Soil Vapor/Landfill Gas/SVE Other:		
Name: SCOTT KORDIA	Name: SAME		Individual Canister Ce		SEAME ITS SA		
email: 5RBrom @barr. Com	email:		EDD:		SEDIMENT3=SD		
Copy to: datamgt@barr.com	P.O.		TIC results in EDD				
Project Name:	Barr Project No:		Other:				
Location	Canister Flow	Vacuum Collection	Collection Time Total	Matrix PID	Comple Company		
	Serial Size Controller # Serial #	Initial Final Date (mm/dd/yyyy)	Start Stop Time	Code Reading (ppm/ppb)	Sample Comments		
1 T-14 (5-7')	52007298-0	×1 4/202		JD (JZ	SEE ATTACHED		
2. T-14 (7-101)	C	2		50	LETTER FUR		
3. T-14(10-13)	00	93		50	DETAILS		
4. T-15(5-10')	0	DU		51)	<u> </u>		
5. T-15(10-14.25')	La Ca	25		SD	CONTACT SCOTT		
6. T-16(11-13')	a	56		(Z	KORON W/		
T-17(5-10,75')	30	57		50	RUESTIDUS		
*F17(10,75-15')	a	8		02	701-335-3125		
°. THB(5-10')	0	205		SN			
10. T-18(10-12.5')	1 01	0		50			
BARR USE ONLY Sampled by:	Relinquished by:	Korpan 7	Date Time Rece	Kalerfleen	Dațe Time 120 20 1 030		
Barr Proj. Manager: TEREYNY GARNIK	Relinquished by:		Date Time Rece	eived by:	Date Time		
Barr DQ Manager:		Courier X Federal Exp	oress 🗌 Sampler 🛛 Air	Bill Number:	Requested Due Date:		
Lab Name:	1	Other:			Standard Turn Around Time		
Lab Location:	Lab WO:	Custody	Seal Intact ?	□ None	Rush(mm/dd/yyyy)		

LG\STDFORMS\Chain Of Custody for Air Canisters Form 2015 RLG Rev. 06/16/15

Chain of Custody for A	ir Cani	sters	Originat	tion State:	Analysis Requested:					COC Number: Nº 50062					
	<ul> <li>Jefferson Cit</li> <li>Minneapolis</li> </ul>	ty 🗆	🗆 ND	Other:	□ TO-14 □ TO-15 □ TO-15SIM □ 3C □ Other				SIM	COC .	2	_ of <u>3</u>			
REPORT TO		INVO	ICE TO				Lab Deliverable Contents: (check all that apply)					Matrix Code:			
Company: RARR	Company:					San	nple Data	with QC			AA =	Ambien	t Air (Indoo por/Landfill (	r/Outdoor)	
Address: 234 W. CENTURY	Address:						Library Se		ns		Other:			Jas/SVE	
Name: SA, SCOTT KDCOM	Name:	SCOTT	KOR	and		🗌 Indi	ividual Car			n Data	22	)=,	XXXIII	AND	
email: SEDIOM & BAN, CON	email:		·			EDD:	uIS □EQu	IS-LITE							
Copy to: datamgt@barr.com	P.O.						results in								
Project Name:	Barr Projec	ct No:				Other	:								
Location	Canister Serial Siz	Flow Controller Serial #	Vac Initial	uum Final	Collection Date (mm/dd/yyyy)	Collection         Time         Total         Matrix         PID           Start         Stop         Time         Code         Reading           (hh:mm)         (hh:mm)         Time         Code         (ppm/ppb)								nts	
×.11 T-18 (12.5-14.5)	5200-	7298-011			04/2020				50		SE	E	ATTAC	NFD	
×12 T-19 (3.5-5')		012							50		4	ETT	52		
"B T-19(5-10')		013							50						
×14 T-19(10-14.5')		014							SD					2	
T-20(3.5-5.51		015							50						
×16-T-20(8,25-12.5'		016							50		50	on	- Kok	DA	
T-20(12.5'-15')		017							SD		Ŧ	0]-	-333	-3125	
×18 T-21 (5-13,75')		018							SN						
8.19 T-21 (13.75-15')		9						~	SA						
18:207-22(3.5-10)	V	020	,					50							
BARR USE ONLY	Relinquished	d by:	TT	Ro	Dona 2	Pater/2	Jime	Rece	ived by:	sea			7bobo	Time 1030	
Sampled by: Barr Proj. Manager: T. GACNIK	Relinquished	Relinquished by:						Rece	ived by:	itte			Date	Time	
Barr DQ Manager:	Samples Sh	ipped VIA:	er [	Federal Exp	xpress 🗌 Sampler 🛛 Air Bill Number:						Requested [	Due Date:			
Lab Name:									Standard Turn Around Time						
Lab Location:	Lab WO:				Custody	Seal Intact ? 🗆 Y 🗇 N 🗆 None				Rush					

1

Chain of Custody for A	ir Canis	sters		Originat □ MO	ion State:		sis Requ				COC N	umber:	0	50063
	] Jefferson Cit ] Minneapolis	Jefferson City 🛛 MI 🗌 ND Other:						□ TO-14 □ TO-15 □ TO-15SIM □ 3C □ Other				<u>3</u> of		_
REPORT TO		and the first of the second	ICE TO				Lab Deliverable Contents: (check all that apply)				Matrix Code:			
Company: KACK	Company:						nple Data				AA =	Ambient Air	(Indoor	Outdoor)
Address: 234 W., CENTUR	Address:	An	AF				Library Se		ns		Other:	Soil Vapor/L	and iii G	ds/SVE
Name: SUDTT KDRDM	Name:	3101	ny -			🗆 Ind	ividual Car			n Data	SD	= SEL	ME	NS
email: SEGNOM Charle CON	email:					EDD:	uIS 🗆 EQU							
Copy to: datamgt@barr.com	P.O.						results in I							
Project Name:	Barr Projec	t No:				Other	:							
	Canister	Flow	Vac	uum	Collection	Collecti	on Time	Total	Matrix	PID				
Location	Serial Siz #	controller Serial #	Initial	Final	Date (mm/dd/yyyy)	Start (hh:mm)	Stop (hh:mm)	Time	Code	Reading (ppm/ppb)		Sample C	Commen	ts
×21 T-22(10-15)	520072	2918-021			04/2021	Þ			50		SE	EAT	TAC	VED)
×22 T-22(15-20')		022			1				51)		1	ETTF	32	
123 T-23 (4.5-10')		023							5				¢ (	
*24 T-23(10-13,5')		624							SA					
\$25 F-23/13.5-151		015							SA		$\langle \rangle$	OFT	Kn	appn
6.									~		F	51-3.	25-	-3125
7.											[			0.05
8.					1									
9.														
10.														
BARR USE ONLY	Polinguiska		,			Date	Time	Deer	ived k			1 .	Data	Time
Sampled by:	Reinquished	tor by	DRD			Pate /22	<b>D</b>	Rece	Kau	e Be	2	74	Date	1030
Barr Proj. Manager: T. MCNIR	Relinquished	d by:				Date	Time	Rece	ived by:				Date	Time
Barr DQ Manager:	Samples Sh	ipped VIA:	Courie	r [	Federal Exp	ress	Sampler	Air B	ill Num	per:		Requ	ested D	ue Date:
Lab Name:			Other:											Around Time
Lab Location:	Lab WO:													

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ph: (307) 672-8945

# Sample Analysis Report

	Engineering nark, ND				F	Reported: 1/30/2020 Report ID: S1912224002 (Replaces S19 rk Order: S1912224	12224001)
						tion Date: 1/31/2019 10:0	0:00 AM
Project:	26411007				Date F	Received: 12/12/2019	
Lab ID:	S1912224-001					Sampler:	
Client Sample	e ID: SB-2					Matrix: Soil	
Depths:	2 - 5 Feet					COC: 58192	
Analyses		Result	RL	Qual	Units	Date Analyzed/Init	Method
otal Metals-3050	0/6010						
Lithium		11.5	0.2	Н	mg/Kg	01/27/2020 1835 DG	EPA 6010C
Selenium		ND	1.3	Н	mg/Kg	01/27/2020 1835 DG	EPA 6010C
PLP							
Lithium		ND	0.01	Н	mg/L	01/09/2020 1249 DG	EPA 200.7
Selenium		ND	0.2	н	mg/L	01/09/2020 1249 DG	EPA 200.7

These results a	apply	y only to the samples tested.	RL - Reporting I	Limit
Qualifiers:	В	Analyte detected in the associated Method Blank	С	Calculated Value
	Е	Value above quantitation range	G	Analyzed at IML Gillette laboratory
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	L	Analyzed by another laboratory	Μ	Value exceeds Monthly Ave or MCL or is less than LCL
I	ND	Not Detected at the Reporting Limit	0	Outside the Range of Dilutions
	S	Spike Recovery outside accepted recovery limits	U	Analysis reported under the reporting limit
	Х	Matrix Effect		
Reviewed by:	k	aren A Secon		Dage 1 of 6
	Ka	ren Secor, Soil Lab Supervisor		Page 1 of 6

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

# Sample Analysis Report

	Engineering ark, ND				F	Reported: 1/30/2020 Report ID: S1912224002 (Replaces S19 rk Order: S1912224	12224001)
						tion Date: 1/31/2019 10:0	5:00 AM
Project:	26411007				Date F	Received: 12/12/2019	
Lab ID:	S1912224-002					Sampler:	
Client Sample	ID: SB-2					Matrix: Soil	
Depths:	10 - 20 Feet					COC: 58192	
Analyses		Result	RL	Qual	Units	Date Analyzed/Init	Method
Total Metals-3050	/6010						
Lithium		4.9	0.2	Н	mg/Kg	01/27/2020 1837 DG	EPA 6010C
Selenium		ND	1.3	Н	mg/Kg	01/27/2020 1837 DG	EPA 6010C
SPLP							
Lithium		ND	0.01	Н	mg/L	01/09/2020 1252 DG	EPA 200.7
Selenium		ND	0.2	н	mg/L	01/09/2020 1252 DG	EPA 200.7

These results	s appl	ly only to the samples tested.	RL - Reporting	Limit
Qualifiers:	В	Analyte detected in the associated Method Blank	С	Calculated Value
	Е	Value above quantitation range	G	Analyzed at IML Gillette laboratory
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	L	Analyzed by another laboratory	Μ	Value exceeds Monthly Ave or MCL or is less than LCL
	ND	Not Detected at the Reporting Limit	0	Outside the Range of Dilutions
	S	Spike Recovery outside accepted recovery limits	U	Analysis reported under the reporting limit
	Х	Matrix Effect		
Reviewed b	y: 4	Laren A Secor		Page 2

Karen Secor, Soil Lab Supervisor

Page 2 of 6

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# Sample Analysis Report

	Engineering nark, ND				F	Reported: 1/30/2020 Report ID: S1912224002 (Replaces S19 rk Order: S1912224	12224001)
						tion Date: 1/31/2019 3:20	:00 PM
Project:	26411007				Date F	Received: 12/12/2019	
Lab ID:	S1912224-003					Sampler:	
Client Sample	e ID: T-1	Matrix: Soil					
Depths:	19 - 23 Feet					COC: 58192	
Analyses		Result	RL	Qual	Units	Date Analyzed/Init	Method
Total Metals-3050	0/6010						
Lithium		4.0	0.2	Н	mg/Kg	01/27/2020 1839 DG	EPA 6010C
Selenium		ND	1.3	Н	mg/Kg	01/27/2020 1839 DG	EPA 6010C
SPLP							
Lithium		ND	0.01	Н	mg/L	01/09/2020 1254 DG	EPA 200.7
Selenium		ND	0.2	Н	mg/L	01/09/2020 1254 DG	EPA 200.7

These results	s appl	ly only to the samples tested.	RL - Reporting	Limit
Qualifiers:	В	Analyte detected in the associated Method Blank	С	Calculated Value
	Е	Value above quantitation range	G	Analyzed at IML Gillette laboratory
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	L	Analyzed by another laboratory	Μ	Value exceeds Monthly Ave or MCL or is less than LCL
	ND	Not Detected at the Reporting Limit	0	Outside the Range of Dilutions
	S	Spike Recovery outside accepted recovery limits	U	Analysis reported under the reporting limit
	Х	Matrix Effect		
Reviewed b	y: 4	Laren A Secor		Page 3

Karen Secor, Soil Lab Supervisor

Page 3 of 6

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ph: (307) 672-8945

# Sample Analysis Report

	Engineering hark, ND				F	Reported: 1/30/2020 Report ID: S1912224002 (Replaces S19 rk Order: S1912224	12224001)
						ion Date: 2/1/2019 12:15	:00 PM
Project:	26411007				Date F	Received: 12/12/2019	
Lab ID:	S1912224-004					Sampler:	
Client Sample	<b>ID:</b> T-2					Matrix: Soil	
Depths:	23.5 - 30 Feet					COC: 58192	
Analyses		Result	RL	Qual	Units	Date Analyzed/Init	Method
Total Metals-3050	0/6010						
Lithium		18.1	0.2	Н	mg/Kg	01/27/2020 1844 DG	EPA 6010C
Selenium		ND	1.3	Н	mg/Kg	01/27/2020 1844 DG	EPA 6010C
SPLP							
Lithium		0.02	0.01	Н	mg/L	01/09/2020 1256 DG	EPA 200.7
Selenium		ND	0.2	Н	mg/L	01/09/2020 1256 DG	EPA 200.7

These results	appl	ly only to the samples tested.	RL - Reporting	Limit
Qualifiers:	В	Analyte detected in the associated Method Blank	С	Calculated Value
	Е	Value above quantitation range	G	Analyzed at IML Gillette laboratory
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	L	Analyzed by another laboratory	Μ	Value exceeds Monthly Ave or MCL or is less than LCL
	ND	Not Detected at the Reporting Limit	0	Outside the Range of Dilutions
	S	Spike Recovery outside accepted recovery limits	U	Analysis reported under the reporting limit
	Х	Matrix Effect		
	4	1 1		
Reviewed by	/: <u>*</u>	Laren A Secor		Page 4 c

Karen Secor, Soil Lab Supervisor

Page 4 of 6

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

# Sample Analysis Report

	Engineering nark, ND				F	Reported: 1/30/2020 Report ID: S1912224002 (Replaces S19	12224001)
						r <b>k Order:</b> S1912224 tion Date: 1/30/2019 9:20	.00 AM
Project:	26411007					Received: 12/12/2019	
Lab ID:	S1912224-005					Sampler:	
Client Sample	e ID: T-13					Matrix: Soil	
Depths:	3.5 - 10 Feet					COC: 58192	
Analyses		Result	RL	Qual	Units	Date Analyzed/Init	Method
Total Metals-3050	0/6010						
Lithium		16.2	0.2	Н	mg/Kg	01/27/2020 1856 DG	EPA 6010C
Selenium		ND	1.3	Н	mg/Kg	01/27/2020 1856 DG	EPA 6010C
SPLP							
Lithium		ND	0.01	Н	mg/L	01/09/2020 1305 DG	EPA 200.7
Selenium		ND	0.2	Н	mg/L	01/09/2020 1305 DG	EPA 200.7

These results	appl	ly only to the samples tested.	RL - Reporting	Limit
Qualifiers:	В	Analyte detected in the associated Method Blank	С	Calculated Value
	Е	Value above quantitation range	G	Analyzed at IML Gillette laboratory
	Н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	L	Analyzed by another laboratory	Μ	Value exceeds Monthly Ave or MCL or is less than LCL
	ND	Not Detected at the Reporting Limit	0	Outside the Range of Dilutions
	S	Spike Recovery outside accepted recovery limits	U	Analysis reported under the reporting limit
	х	Matrix Effect		
Reviewed by	y: +	Laren A Secor		Dogo 5 c
	Ka	aren Secor, Soil Lab Supervisor		Page 5 c

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

# Sample Analysis Report

	Engineering nark, ND				F	Reported:         1/30/2020           Report ID:         S1912224002           (Replaces S19	12224001)	
						rk Order: S1912224		
Project:	26411007			Collection Date: 1/30/2019 10:10:00 AM Date Received: 12/12/2019				
Lab ID:	S1912224-006					Sampler:		
Client Sample	e ID: T-13					Matrix: Soil		
Depths:	15 - 20 Feet					COC: 58192		
Analyses		Result	RL	Qual	Units	Date Analyzed/Init	Method	
Total Metals-3050	0/6010							
Lithium		22.7	0.2	Н	mg/Kg	01/27/2020 1902 DG	EPA 6010C	
Selenium		ND	1.3	Н	mg/Kg	01/27/2020 1902 DG	EPA 6010C	
SPLP								
Lithium		0.02	0.01	Н	mg/L	01/09/2020 1307 DG	EPA 200.7	
Selenium		ND	0.2	Н	mg/L	01/09/2020 1307 DG	EPA 200.7	

These results	s appl	ly only to the samples tested.	RL - Reporting	Limit
Qualifiers:	В	Analyte detected in the associated Method Blank	С	Calculated Value
	Е	Value above quantitation range	G	Analyzed at IML Gillette laboratory
	н	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	L	Analyzed by another laboratory	Μ	Value exceeds Monthly Ave or MCL or is less than LCL
	ND	Not Detected at the Reporting Limit	0	Outside the Range of Dilutions
	S	Spike Recovery outside accepted recovery limits	U	Analysis reported under the reporting limit
	Х	Matrix Effect		
Reviewed by	y:_∔	Laren A Secor		Page 6

Karen Secor, Soil Lab Supervisor

Page 6 of 6

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1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

# ANALYTICAL QC SUMMARY REPORT

ENT:	Barr Engineering			Date:	1/30/202	0	
'k Orde	er: S1912224			Report ID:	S191222	24002	
ject:	26411007					es S191222400	)1)
EPA 1	1312	Sample Type MBLK		Units: mg/L			,
	SPLP BLK (01/09/20 13:09)	RunNo: 175360					
	Analyte	Result	RL	Spike Ref San	np %REC	% Rec Limits	Qu
	Lithium	ND	0.01				
	Selenium	ND	0.2				
EPA 1	312	Sample Type <b>DUP</b>		Units: mg/L			
	S1912224-004AD (01/09/20 12:58)	RunNo: 175360					
	Analyte	Result	RL	Ref Samp %RPD	%REC	% RPD Limits	Qu
	Lithium	0.03	0.01	0.02 54.8		20	HI
	Selenium	ND	0.2	ND		20	F
Total	(3050) Metals by ICP - 6010C	Sample Type MBLK		Units: mg/Kg			
	MB-17055 (01/27/20 17:49)	RunNo: 175797	Prep	Date: 01/24/20 14:0	9 Bat	chID 17055	
	Analyte	Result	RL	Spike Ref Sar	np %REC	% Rec Limits	Qu
	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	Prep	Date: 01/24/20 14:0	9 Bat	chID 17055	
	Analyte	Result	RL	Spike Ref Sar	np %REC	% Rec Limits	Qu
	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	Prep	Date: 01/24/20 7:55	Bat	chID 17055	
	Analyte	Result	RL	Spike Ref San	np %REC	% Rec Limits	Qu
	Lithium	136	0.2	125 18.1	94.0	75 - 125	H
	Selenium	90.5	1.3	100 ND	90.5	75 - 125	Н
Total	(3050) Metals by ICP - 6010C	Sample Type MSD		Units: mg/Kg			
	S1912224-004AMSD (01/27/20 18:53)	RunNo: 175797	Prep	Date: 01/24/20 7:55	Bat	chID 17055	
	Analyte	Result	RL	Conc %RPE	%REC	% RPD Limits	Qu
	Lithium	132	0.2	136 2.55	91.3	20	F
	Selenium	88.8	1.3	90.5 1.88	88.8	20	F
Total	(3050) Metals by ICP - 6010C	Sample Type DUP		Units: mg/Kg			
	S1912224-003AD (01/27/20 18:42)	RunNo: 175797	Prep	Date: 01/24/20 7:55	Bat	chID 17055	
	Analyte	Result	RL	Ref Samp %RPD			Qu
	Lithium	4.1	0.2	4.0 0.415		20	F

Qualifiers: В Analyte detected in the associated Method Blank Е G Analyzed at IML Gillette laboratory н

- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits

Х Matrix Effect

- Value above quantitation range
- Holding times for preparation or analysis exceeded
- L Analyzed by another laboratory
- 0 Outside the Range of Dilutions
- s Spike Recovery outside accepted recovery limits

Barr Engineering Co. Chai	n of Custod	Sample Origination	State:	Analysis Requested	
Ann Arbor 🗆 Duluth 🗌 Hibbi	ng 🗌 Minneap	polis I MI I ND I		Water Soil	COC Number: <b>58192</b>
BARR Bismarck 🛛 Grand Rapids 🗆 Jeffer	son City 🗌 Salt Lake		ier: <u>MT</u>		Matrix Code: Preservative Code:
REPORT TO		INVOICE TO			GW = Groundwater A = None
Company: Bar Engineering Co	Company: Bar	N Engineening G	ners		SW = Surface Water B = HCI WW = Waste Water C = $HNO_3$
Address: Bismard AD Name: Scott Kasan	Address: BKn	narck NDJ	Y / N ontainers		$DW = Drinking Water D = H_2SO_4$ S = Soil/Solid E = NaOH
email: Skoron @barr. com	Name: Scott			Bag	$SD = Sediment \qquad F = MeOH O = Other \qquad G = NaHSO_4$
Copy to: datamgt@barr.com	P.O.	on @ barr. con			$H = Na_2S_2O_3$
Project Name: Confidential Li /Se	Barr Project No:	26411007,	m MS/M	tation	$I = Ascorbic Acid J = NH_4Cl K = Zn Acetate$
Sa	imple Depth	Collection Collection	2	E	K   =   Zn   Acetate     N   O   =   Other
Location Star	(11./10. (*	Date Time mm/dd/yyyy) (hh:mm)	Vatrix Total N Total N	A	Preservative Code
1.				N	Field Filtered Y/N
5B-2 (2-5) 2	5 4 01	1/31/2019 1000	SNI	5 912224-01 1	Analyze Lithium / Selenium
2. SB-2 (10-20) 10	20 Ff 01	1/31/2019 1005	SNI	-002 I	Analyze Lithium / Selenium per attached letter
3. T-1 (15-23)	23 A 01	1/31/2019 1520	SNI	-003	
4. T-2 (23,5-30) 23.0		1/01/2019 1215	SNI	-004 [	Send Level 2 QC
5-T-13 (3.5-10) 3.5	10	130/2019 0920	SNI	- 0.95	Send Level 2 QC Report
6. T-13 (15-20) 15	00 01	130/2019 1010	SNI	V -0010	
7.					
8.					
9.					Contact Scott Korom
10.					W/Burghing tol 221 5112
BARR USE ONLY			Ico2 Date	Time Received by:	W/Questions 701-221-5420
Sampled by: DJZ	Relinguished by:		102 12-10-19	1700 Kale ASE	Con IZIZIA Time
Barr Proj. Manager: SFK	Relinquished by:	On	Ice? Date N	Time Received by:	Date Time
Barr DQ Manager: TAO	Samples Shipped	VIA: 🗌 Courier 🛛 🖌 Fe	deral Express	Sampler Air Bill Number:	Requested Due Date:
Lab Name: Pace		Other:		7772-0595	Standard Turn Around Time
Lab Location: Sheridan WY	Lab WO:	Temperature on	Receipt (°C):	Custody Seal Intact? 🗆 Y 🗌	N □ None □ Rush

Formerly Inter-Mountain Laboratories

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

Date: 8/26/2020

CLIENT:	Barr Engineering	CASE NARRATIVE
Project: Lab Order:	26411007.15 S2008131	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

Pace Analytical

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 Secon

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

### Sample Analysis Report

	Engineering ark, ND					Reported: Report ID:	8/26/2020 S2008131001	
Project:	26411007.15				Collect	rk Order: tion Date: Received:		
Lab ID:	S2008131-001					Sampler:		
Client Sample	ID: SB-2 20.5-21					Matrix:	Solid	
Depths:	20.5 - 21 Feet					COC:	58270	
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Analyses Saturated Paste M	/letals	Result	RL	Qual	Units	Date A	nalyzed/Init	Method
	Netals	Result 9.4	<b>RL</b> 0.1	Qual	<b>Units</b>		nalyzed/Init	Method EPA 200.7
Saturated Paste	<b>N</b> etals			Qual		08/20/20	•	
Saturated Paste M Boron	<b>N</b> etals	9.4	0.1	Qual	ppm	08/20/20 08/20/20	20 16:17 DG	EPA 200.7
Saturated Paste M Boron Lithium		9.4 0.11	0.1 0.01	Qual	ppm ppm	08/20/20 08/20/20	20 16:17 DG 20 16:17 DG	EPA 200.7 EPA 200.7
Saturated Paste M Boron Lithium Selenium		9.4 0.11	0.1 0.01	Qual	ppm ppm	08/20/20 08/20/20 08/20/20	20 16:17 DG 20 16:17 DG	EPA 200.7 EPA 200.7
Saturated Paste M Boron Lithium Selenium Total Metals-3050		9.4 0.11 ND	0.1 0.01 0.05	Qual	ppm ppm ppm	08/20/20 08/20/20 08/20/20 08/25/20	20 16:17 DG 20 16:17 DG 20 16:17 DG	EPA 200.7 EPA 200.7 EPA 200.7

 Comparison
 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

### Reviewed by: Karen A Secon

- 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

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

## Sample Analysis Report

	Engineering nark, ND					Reported: 8/26/2020 Report ID: S2008131001	
Project:	26411007.15				Collect	rk Order: S2008131 tion Date: Received: 8/6/2020	
Lab ID:	S2008131-002				Date	Sampler:	
	<b>ID:</b> T-2 22.5-23.5					Matrix: Solid	
Depths:	22.5 - 23.5 Feet					<b>COC:</b> 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
Selenium Total Metals-3050	0/6010	0.13	0.05		ppm	08/20/2020 16:19 DG	EPA 200.7
	0/6010	0.13 42	0.05 5		ppm mg/Kg	08/20/2020 16:19 DG 08/25/2020 15:50 DG	EPA 200.7 EPA 6010C
Total Metals-3050	0/6010						

These results	s app	ly only to the samples tested.	RL - Reporting	Limit
Qualifiers:	В	Analyte detected in the associated Method Blank	С	Calculated Value
	D	Report limit raised due to dilution	E	Value above quantitation range
	G	Analyzed at IML Gillette laboratory	н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by another laboratory
	Μ	Value exceeds Monthly Ave or MCL or is less than LC	L ND	Not Detected at the Reporting Limit
	0	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	U	Analyte below method detection limit	Х	Matrix Effect
Reviewed b	y: 4	Laren A Secon		Page 2 of 0
	K	aren Secor, Soil Lab Supervisor		Page 2 of 9

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

### Sample Analysis Report

	Engineering nark, ND					Reported: 8/26/2020 Report ID: S2008131001	
Project: Lab ID: Client Sample Depths:	26411007.15 S2008131-003 e ID: T-3 30-32.5 30 - 32.5 Feet				Collec	rk Order: S2008131 tion Date: Received: 8/6/2020 Sampler: Matrix: Solid COC: 58270	
-							
Analyses		Result	RL	Qual	Units	Date Analyzed/Init	Method
Analyses Saturated Paste I	Metals	Result	RL	Qual	Units	Date Analyzed/Init	Method
	Metals	Result	<b>RL</b> 0.1	Qual	<b>Units</b>	Date Analyzed/Init	Method EPA 200.7
Saturated Paste I	Metals			Qual		•	
Saturated Paste I Boron	Metals	1.5	0.1	Qual	ppm	08/20/2020 16:21 DG	EPA 200.7
Saturated Paste I Boron Lithium		1.5 0.13	0.1 0.01	Qual	ppm ppm	08/20/2020 16:21 DG 08/20/2020 16:21 DG	EPA 200.7 EPA 200.7
Saturated Paste I Boron Lithium Selenium		1.5 0.13	0.1 0.01	Qual	ppm ppm	08/20/2020 16:21 DG 08/20/2020 16:21 DG	EPA 200.7 EPA 200.7
Saturated Paste I Boron Lithium Selenium Total Metals-3050		1.5 0.13 0.07	0.1 0.01 0.05	Qual	ppm ppm ppm	08/20/2020 16:21 DG 08/20/2020 16:21 DG 08/20/2020 16:21 DG	EPA 200.7 EPA 200.7 EPA 200.7

 Comparison
 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

### Reviewed by: Karen A Secon

- 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

1673 Terra Avenue Sheridan, WY 82801

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### Sample Analysis Report

	Engineering nark, ND					Reported: 8/26/3 Report ID: S200		
Project: Lab ID: Client Sample Depths:	26411007.15 S2008131-004 e ID: T-5 10-15 10 - 15 Feet				Collec	rk Order: S200 tion Date: Received: 8/6/20 Sampler: Matrix: Solid COC: 58270	)20	
Analyses		Result	RL	Qual	Units	Date Analyz	ed/Init	Method
Analyses Saturated Paste I	Metals	Result	RL	Qual	Units	Date Analyz	ed/Init	Method
	Metals	Result	<b>RL</b> 0.1	Qual	<b>Units</b> ppm	Date Analyz		Method EPA 200.7
Saturated Paste	Metals			Qual			24 DG	
Saturated Paste I Boron	Metals	0.8	0.1	Qual	ppm	08/20/2020 16	24 DG 24 DG	EPA 200.7
Saturated Paste I Boron Lithium		0.8 0.09	0.1 0.01	Qual	ppm ppm	08/20/2020 16 08/20/2020 16	24 DG 24 DG	EPA 200.7 EPA 200.7
Saturated Paste I Boron Lithium Selenium		0.8 0.09	0.1 0.01	Qual	ppm ppm	08/20/2020 16 08/20/2020 16	24 DG 24 DG 24 DG	EPA 200.7 EPA 200.7
Saturated Paste I Boron Lithium Selenium Total Metals-3050		0.8 0.09 0.06	0.1 0.01 0.05	Qual	ppm ppm ppm	08/20/2020 16 08/20/2020 16 08/20/2020 16	24 DG 24 DG 24 DG 02 DG	EPA 200.7 EPA 200.7 EPA 200.7

These results	appl	y only to the samples tested.
Qualifiers:	В	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

## Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

### Sample Analysis Report

	Engineering hark, ND					Reported: Report ID:	8/26/2020 S2008131001	
Project: Lab ID: Client Sample Depths:	26411007.15 S2008131-005 ID: T-6 19.5-20 19.5 - 20 Feet				Collec	rk Order: tion Date: Received: Sampler: Matrix: COC:	8/6/2020 Solid	
-								
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Analyses Saturated Paste M	Netals	Result	RL	Qual	Units	Date A	nalyzed/Init	Method
-	Metals	<b>Result</b> 0.6	<b>RL</b> 0.1	Qual	<b>Units</b>		nalyzed/Init	Method EPA 200.7
Saturated Paste	Netals			Qual		08/20/20	•	
Saturated Paste M Boron	<b>Metals</b>	0.6	0.1	Qual	ppm	08/20/20 08/20/20	20 16:26 DG	EPA 200.7
Saturated Paste M Boron Lithium		0.6 0.08	0.1 0.01	Qual	ppm ppm	08/20/20 08/20/20	20 16:26 DG 20 16:26 DG	EPA 200.7 EPA 200.7
Saturated Paste M Boron Lithium Selenium		0.6 0.08	0.1 0.01	Qual	ppm ppm	08/20/20 08/20/20 08/20/20	20 16:26 DG 20 16:26 DG	EPA 200.7 EPA 200.7
Saturated Paste M Boron Lithium Selenium Total Metals-3050		0.6 0.08 0.09	0.1 0.01 0.05	Qual	ppm ppm ppm	08/20/20 08/20/20 08/20/20 08/25/20	120 16:26 DG 120 16:26 DG 120 16:26 DG	EPA 200.7 EPA 200.7 EPA 200.7

These results	apply	y only to the samples tested.
Qualifiers:	В	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

## Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

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## Sample Analysis Report

	Engineering ark, ND					Reported: 8/26/2020 Report ID: S2008131001	
<b>-</b>	0044400745				Collec	rk Order: S2008131 tion Date:	
Project:	26411007.15				Date	Received: 8/6/2020	
Lab ID:	S2008131-006					Sampler:	
=	<b>ID:</b> T-17 10.75-15					Matrix: Solid	
Depths:	10.75 - 15 Feet					<b>COC:</b> 58270	
Analyses		Result	RL	Qual	Units	Date Analyzed/Init	Method
Saturated Paste M	letals						
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						
Total Metals-3050/ Boron	/6010	44	5		mg/Kg	08/25/2020 16:06 DG	EPA 6010C
	/6010	44 13.3	5 0.2		mg/Kg mg/Kg	08/25/2020 16:06 DG 08/25/2020 16:06 DG	EPA 6010C EPA 6010C

These results	s app	ly only to the samples tested.	RL - Reporting	Limit
Qualifiers:	В	Analyte detected in the associated Method Blank	С	Calculated Value
	D	Report limit raised due to dilution	E	Value above quantitation range
	G	Analyzed at IML Gillette laboratory	н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by another laboratory
	Μ	Value exceeds Monthly Ave or MCL or is less than LC	L ND	Not Detected at the Reporting Limit
	0	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	U	Analyte below method detection limit	Х	Matrix Effect
Reviewed b	y: 4	Laren A Secon		Page 6 of 0
	K	aren Secor, Soil Lab Supervisor		Page 6 of 9

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

## Sample Analysis Report

	Engineering hark, ND					Reported: 8/26/2020 Report ID: S2008131001	
Project:	26411007.15	rk Order: S2008131 tion Date: Received: 8/6/2020					
Lab ID:	S2008131-007					Sampler:	
Client Sample	<b>ID:</b> T-18 12.5-14.5					Matrix: Solid	
Depths:	12.5 - 14.5 Feet					<b>COC:</b> 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	0/6010						
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

These results apply only to the samples tested.			RL - Reporting	Limit
Qualifiers:	В	Analyte detected in the associated Method Blank	С	Calculated Value
	D	Report limit raised due to dilution	E	Value above quantitation range
	G	Analyzed at IML Gillette laboratory	н	Holding times for preparation or analysis exceeded
	J	Analyte detected below quantitation limits	L	Analyzed by another laboratory
	Μ	Value exceeds Monthly Ave or MCL or is less than LC	L ND	Not Detected at the Reporting Limit
	0	Outside the Range of Dilutions	S	Spike Recovery outside accepted recovery limits
	U	Analyte below method detection limit	Х	Matrix Effect
Reviewed b	y: 4	KarenAsecor		Dage 7 of 0
	K	aren Secor, Soil Lab Supervisor		Page 7 of 9

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

### Sample Analysis Report

						Reported: 8/26/20 Report ID: S20081		
Project: Lab ID: Client Sample Depths:	26411007.15 S2008131-008 PID: T-22 10-15 10 - 15 Feet	Work Order: S2 Collection Date: Date Received: 8/ Sampler: Matrix: So COC: 58					-	
Analyses		Result	RL	Qual	Units	Date Analyzed	l/Init	Method
Analyses Saturated Paste M	Metals	Result	RL	Qual	Units	Date Analyzed	l/Init	Method
	Metals	Result	<b>RL</b> 0.1	Qual	<b>Units</b> ppm	Date Analyzed		Method EPA 200.7
Saturated Paste	Metals			Qual			DG	
Saturated Paste M Boron	Metals	0.9	0.1	Qual	ppm	08/20/2020 16:35	DG DG	EPA 200.7
Saturated Paste N Boron Lithium		0.9 0.06	0.1 0.01	Qual	ppm ppm	08/20/2020 16:35 08/20/2020 16:35	DG DG	EPA 200.7 EPA 200.7
Saturated Paste N Boron Lithium Selenium		0.9 0.06	0.1 0.01	Qual	ppm ppm	08/20/2020 16:35 08/20/2020 16:35	DG DG DG	EPA 200.7 EPA 200.7
Saturated Paste M Boron Lithium Selenium Total Metals-3050		0.9 0.06 ND	0.1 0.01 0.05	Qual	ppm ppm ppm	08/20/2020 16:35 08/20/2020 16:35 08/20/2020 16:35	DG DG DG DG	EPA 200.7 EPA 200.7 EPA 200.7

These results	appl	y only to the samples tested.
Qualifiers:	В	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

## Reviewed by: Karen A Secon

- 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

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

### Sample Analysis Report

CLIENT:Barr EngineeringDate Reported:Bismark, NDReport ID:						8/26/2020 S2008131001		
	26411007.15 S2008131-009 ID: COAL PILE COAL 2		Work Order: S2008131 Collection Date: Date Received: 8/6/2020 Sampler: Matrix: Solid					
Depths:	0 - 0 Feet					COC:	58270	
Analyses		Result	RL	Qual	Units	Date A	nalyzed/Init	Method
Analyses Saturated Paste M	etals	Result	RL	Qual	Units	Date A	nalyzed/Init	Method
	letals	Result	<b>RL</b> 0.1	Qual	<b>Units</b> ppm		020 16:37 DG	Method EPA 200.7
Saturated Paste M	letals			Qual		08/20/20	-	
Saturated Paste M Boron	letals	2.6	0.1	Qual	ppm	08/20/20 08/20/20	020 16:37 DG	EPA 200.7
Saturated Paste M Boron Lithium		2.6 0.03	0.1 0.01	Qual	ppm ppm	08/20/20 08/20/20	020 16:37 DG 020 16:37 DG	EPA 200.7 EPA 200.7
Saturated Paste M Boron Lithium Selenium		2.6 0.03	0.1 0.01	Qual	ppm ppm	08/20/20 08/20/20 08/20/20	020 16:37 DG 020 16:37 DG	EPA 200.7 EPA 200.7
Saturated Paste M Boron Lithium Selenium Total Metals-3050/		2.6 0.03 ND	0.1 0.01 0.05	Qual	ppm ppm ppm	08/20/20 08/20/20 08/20/20 08/25/20	020 16:37 DG 020 16:37 DG 020 16:37 DG	EPA 200.7 EPA 200.7 EPA 200.7

These results	appl	y only to the samples tested.
Qualifiers:	В	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

# Reviewed by: Karen A Secon

Karen Secor, Soil Lab Supervisor

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

Formerly Inter-Mountain Laboratories

Lithium

Selenium

Pace Analytical

1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

# ANALYTICAL QC SUMMARY REPORT

CLIENT: **Barr Engineering** Date: 8/26/2020 Work Order: S2008131 Report ID: S2008131001 Project: Saturated Paste Metals by ICP Sample Type MBLK Units: ppm SATPASTE BLK (08/20/20 16:46) RunNo: 181804 Analyte Result RL Spike Ref Samp %REC % Rec Limits Qual ND 0.1 Boron 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 Qual Analyte Result RL Spike Ref Samp %REC % Rec Limits 0.4 0.1 Boron 0.31 80 - 120 S 124 Lithium 0.08 0.01 0.07 116 80 - 120 Selenium 0.10 0.05 80 - 120 0.11 86.7 Saturated Paste Metals by ICP Sample Type DUP Units: ppm S2008131-005AD (08/20/20 16:28) RunNo: 181804 Analyte Result Ref Samp %RPD % RPD Limits Qual RL %REC Boron 0.6 0.1 0.6 7.17 20

0.08

0.07

0.01

0.05

0.08

0.09

5.44

24.9

Qualifiers: В Analyte detected in the associated Method Blank D Report limit raised due to dilution Е Value above quantitation range G Analyzed at IML Gillette laboratory н 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 0 Outside the Range of Dilutions R RPD outside accepted recovery limits s Spike Recovery outside accepted recovery limits

Х Matrix Effect 20

20

R

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1673 Terra Avenue Sheridan, WY 82801

ph: (307) 672-8945

## ANALYTICAL QC SUMMARY REPORT

CLIENT: Barr Engineering Date: 8/26/2020 Work Order: S2008131 Report ID: S2008131001 Project: Total (3050) Metals by ICP - 6010C Sample Type MBLK Units: mg/Kg MB-17637 (08/25/20 14:57) RunNo: 181916 PrepDate: 08/20/20 17:23 BatchID 17637 RL Spike Ref Samp %REC % Rec Limits Analyte Result Qual ND 5 Boron Lithium ND 0.2 Selenium ND 1.3 Total (3050) Metals by ICP - 6010C Sample Type LCS Units: mg/Kg RunNo: 181916 PrepDate: 08/20/20 17:23 BatchID 17637 LCS-17637 (08/25/20 14:59) 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 Units: mg/Kg Sample Type MS S2008131-009AS (08/25/20 16:17) RunNo: 181916 PrepDate: 08/20/20 7:45 BatchID 17637 Spike Ref Samp %REC Analyte Result RL % Rec Limits Qual 108 5 50 75 - 125 Boron 63 912 Selenium 41.2 1.3 50 ND 82.4 75 - 125 Units: mg/Kg Total (3050) Metals by ICP - 6010C Sample Type MSD S2008131-009AMSD (08/25/20 16:26) RunNo: 181916 PrepDate: 08/20/20 7:45 BatchID 17637 %RPD % RPD Limits Analyte Result RL Conc %REC Qual 105 5 108 2.88 20 Boron 85.0 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 % RPD Limits Analyte Result RL Ref Samp %RPD %REC Qual Boron 61 5 59 3.10 20 Lithium 1.7 0.2 1.8 6.08 20 Selenium 1.3 ND 20 1.5 R S2008131-008AD (08/25/20 16:13) RunNo: 181916 PrepDate: 08/20/20 7:45 BatchID 17637 Ref Samp %RPD %REC % RPD Limits Analyte Result RL Qual 5 20 Boron 36 34 4.95 Lithium 12.9 0.2 12.4 3.79 20 Selenium ND 1.3 ND 20

Qualifiers: В Analyte detected in the associated Method Blank D Report limit raised due to dilution Е Value above quantitation range G Analyzed at IML Gillette laboratory н 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 0 Outside the Range of Dilutions R RPD outside accepted recovery limits s Spike Recovery outside accepted recovery limits х Matrix Effect

Barr Engineering Co. Chain of Custody Sample Origination State:					Analysis Requested COC Number: 58270			
Ann Arbor 🗌 Duluth 🗌 Hib	bing 🗆	ng Minneapolis MI ND WI			Water	Soil		
REPORT TO		on City  Salt Lake City  MN  SD Other:					Matrix Code: Preservative Code:	
Company: BARR ENGINEERING	Company	Company:					GW = Groundwater A = None SW = Surface Water B = HCI	
Address: 734 / CENTINDY		Address:					WW = Waste Water $C = HNO_3$	
Address: 234 W. CENTURY Name: SCOTT KOROM	Name:	Name: SAME					$DW = Drinking Water D = H_2SO_4$ S = Soil/Solid E = NaOH	
email: Skopom@barr.com	email:					177 E77	$\begin{array}{llllllllllllllllllllllllllllllllllll$	
Copy to: datamgt@barr.com	P.O.	P.O.				$\mathbb{A}$	$H = Na_2S_2O_3$ I = Ascorbic Acid	
Project Name:	Barr Pro	Barr Project No: 26411007.15				ATTA Solide	$J = NH_4CI$ K = Zn Acetate	
	Sample Dept	Lait Conection	Collection Matrix	orm MS,		SA &		
Location St.	art Stop (n	Unit Date m./ft. (mm/dd/yyyy)	Time (hh:mm)				Preservative Code	
1.	0		IN BAPE				Field Filtered Y/N	
SB-2 20.5-21			Accurlos 5D		5200	08131-001		
<sup>2</sup> .T-2 22,5-23.5'						200	SEE ATTACHED	
3. T-3 30-32.5'						03	LETTER FOR	
4. T-5 1D-15'						and	DETAILS	
5. T-6 19.5-20'						025		
6. T-17 1D.75-15'						ade	CONTRET SCOTT	
T-18 12.5'-14.5'						007	KORDM W/ QUESTIONS	
		1				0.28	701-335-3125	
"T-22 ID-15" COAL PLE COAL 2		V	+ +			009		
10.								
BARR USE ONLY	Relinquist	hed by:	2 , On Ice?	Date	Time	Received by:	Date Time	
Sampled by: DJZ		Una And V N B-4			1300	FECH	2	
Barr Proj. Manager: JJG3	Relinquish	hed by: Fedex	On Ice? Y N	Date	Time Received by:		lon 8 6 20 1030	
Barr DQ Manager:	Samples	Samples Shipped VIA:  Courier  Federal Expr				Air Bill Number:	Requested Due Date:	
Lab Name: PACE		Other:				77/173168518 Standard Turn Around		
Lab Location: Shoridan WY	Lab WO:	Lab WO: Temperature on Receipt (				Custody Seal Intact? Y N None Rush (mm/dd/yyyy)		

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Distribution - White-Original: Accompanies Shipment to Laboratory; Yellow Copy: Include in Field Documents; Pink Copy: Send to Data Management Administrators.