APPENDIX F – MONITORING, REPORTING, AND VERIFICATION (MRV) PLAN

TUNDRA SGS
SUBPART RR MONITORING, REPORTING, AND VERIFICATION (MRV) PLAN

Class VI Wells

Facility(GHGRP) ID 579201

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Within the text of this monitoring, reporting, and verification plan, Tundra SGS SFPs and their individual sections for Broom Creek and Deadwood are designated as follows:

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*Attachments within this MRV document will follow use the following referencing convention:

- A1 and A2 will refer to the Attachments, A1 being the Broom Creek SFP and A2 being the Deadwood SFP.
- Numbers or letters that appear after the colon will represent the numbered section or appendix of the appropriate Storage Facility Permit. For example:
    - A1:3.1.1 will direct the reader to refer to Section 3.1.1, (Area of Review Section, Written Description Subsection) within the Broom Creek SFP.
    - A2:A will direct the reader to refer to Appendix A (Data, Processing, Outcomes of CO_2 Storage Geomodeling and Simulations) within the Deadwood SFP

TUNDRA SGS
SUBPART RR MONITORING, REPORTING, AND VERIFICATION (MRV) PLAN

1.0 PROJECT DESCRIPTION

Minnkota Power Cooperative, Inc. (Minnkota) is a regional generation and transmission cooperative headquartered in Grand Forks, North Dakota, providing wholesale power to 11 member–owner rural electric distribution cooperatives in eastern North Dakota and northwestern Minnesota. Minnkota also acts as the operating agent of the Northern Municipal Power Agency, which serves the electric needs of 12 municipalities in the same geographic region as the Minnkota member–owners.

Minnkota's primary generating resource is the two-unit Milton R. Young Station (MRYS), a mine-mouth lignite coal-fired power plant. The mine, which provides the lignite coal for MRYS, is owned and operated by BNI Coal, Inc. (BNI) and is located adjacent to the MRYS facility. Minnkota prepared this MRV plan in support of the operation, reporting, and accounting for the storage component of Project Tundra, a carbon capture retrofit to MRYS with saline formation geologic storage. Project Tundra proposes 20 years of operation and the secure geologic storage of an approximate cumulative total of 77.5 MMt of carbon dioxide (CO_2) over the course of the 20 years of injection into two saline aquifer reservoirs: the Broom Creek and Deadwood–Black Island. The Broom Creek is being primarily targeted for the total injection of 77.5 MMt however the Deadwood-Black Island has a projected capacity of 23.4MMt over 20 years, which provides the project with contingent capacity or expansion opportunities. However, Deadwood-Black Island formation is being primarily contemplated as a back-up or redundant storage facility. The geologic storage facility and operation are referred to as Tundra SGS. The Tundra SGS surface facilities, wellsite, and operating location comprise land mostly associated with the coal-mining operation of BNI, the area where MRYS is located, and the land is primarily industrial and agricultural. The nearest densely populated area is Center, North Dakota, which is approximately 3.4 miles northwest of the Tundra SGS site (Figure 1-1).

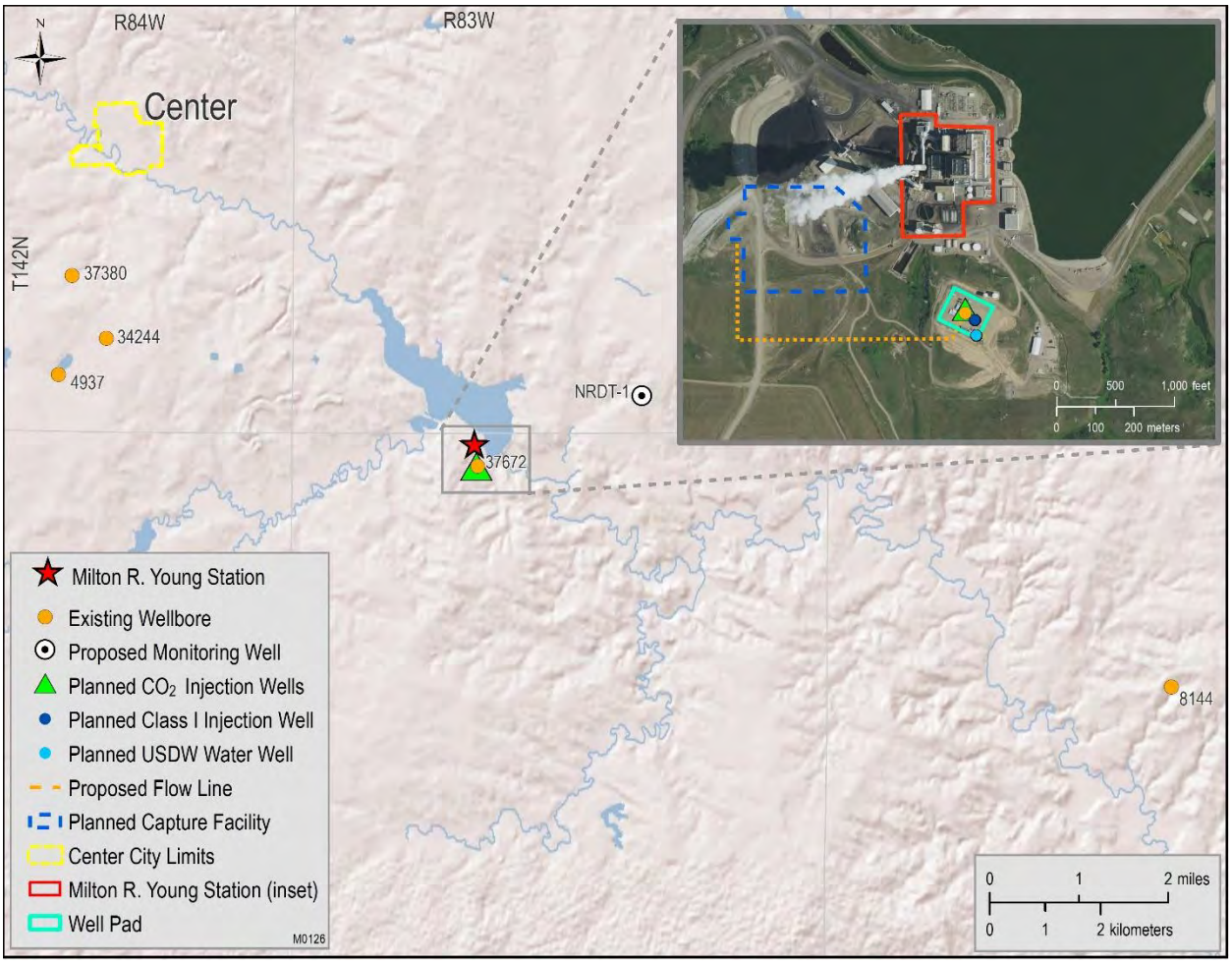


Figure 1-1. Map showing the location of Tundra SGS, NRDT-1, offset wells (orange dots), and the proposed CO_2 flowline and well pad layout. The red star denotes MRYS. The existing J-ROC1 wellbore (37672) is the wellbore planned for reentry and conversion to a Class VI injection well, which will be renamed Liberty 1. Offset wells (8144, 37380, 34244, and 4937) are included as they were evaluated in the area of review (AOR) of the Tundra SGS Carbon Dioxide Geologic Storage Facility Permit (SFP) for both Broom Creek and Deadwood storage reservoirs (A1 and A2).

1.1 Operation and Equipment

Tundra SGS plans to capture and store an average of 4 MMt/yr of CO_2 over the course of 20 years of injection, followed by 10 years of post-injection site care. MRYS Units 1 and 2 will be retrofitted with a capture facility system that utilizes amine absorption technology to generate a high-purity stream of CO_2 from the flue gas. The CO_2 captured will be dehydrated and compressed to a supercritical state, then transported via a 0.25-mile flowline to the storage site, where it will be securely and permanently stored in saline geologic formations. Figure 1-2 provides a simplified process flow diagram of the Tundra SGS project, which includes the CO_2 flowline from the metering station (M1) at the outlet of the capture facility compressor and the Phase 1 and Phase 2 injection and monitoring wells (Figure 1-2).

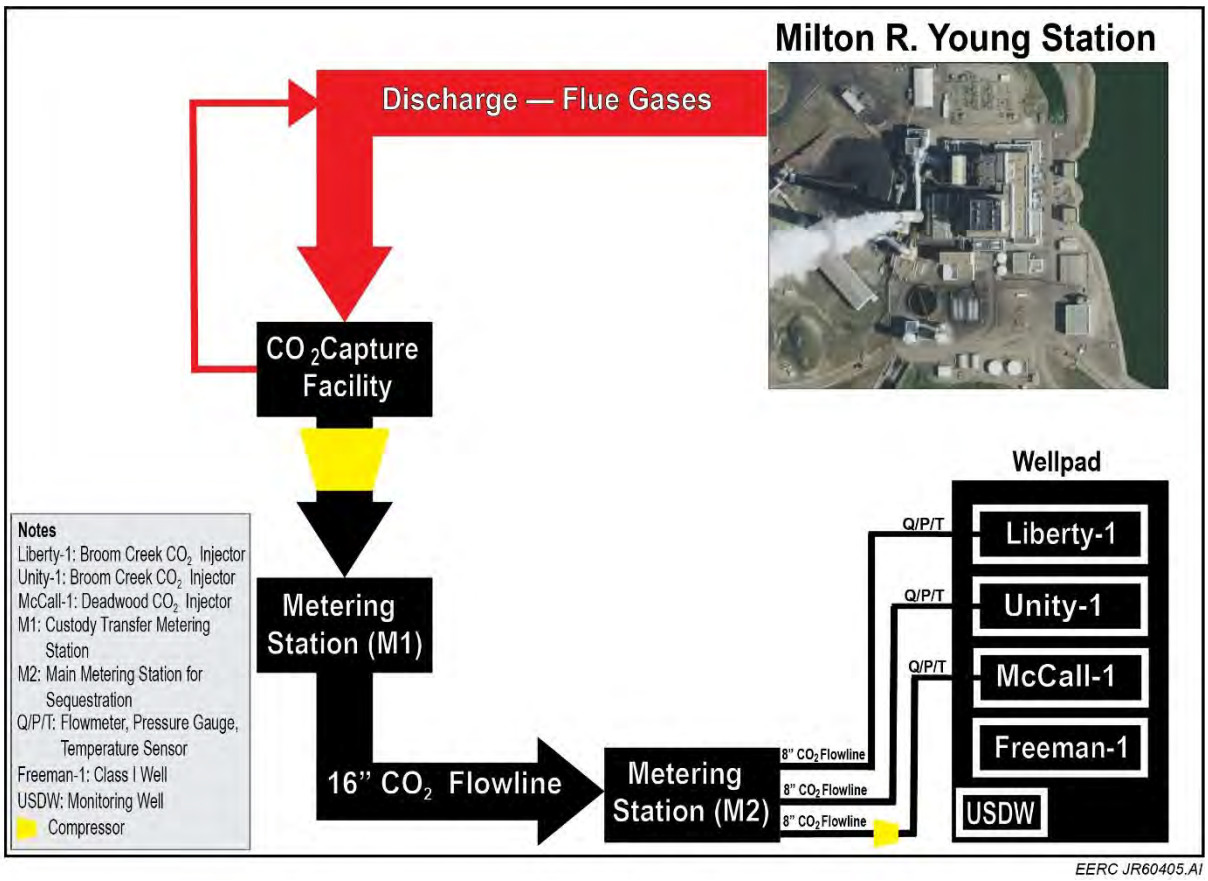


Figure 1-2. Flow diagram for Tundra SGS capture, transport, and storage facilities (USDW is underground source of drinking water).

Tundra SGS will receive captured and dehydrated CO_2 at the compressor outlet (M1), then it will be transported 0.25 miles via CO_2 flowline to the metering station (M2) for distribution to the injection wells for secure and permanent storage in the Broom Creek and Deadwood–Black Island geologic formations. These two storage formations as well as their confining seals have been extensively characterized by Minnkota through local and regional studies led by the Energy & Environmental Research Center (EERC). The focus of these studies includes North Dakota geology, results of three stratigraphic wells drilled on-site, special logs, coring, fluid sampling, seismic surveys, and an advanced numerical model, as described in A1:1 and A2:1.

The project proposes a phased development approach, with Phase 1 construction and operation of two injector wells in the Broom Creek reservoir (approximately 5,000 feet in depth), targeting 100% of the captured CO_2 volume. Following validation through operations in Phase 1, the owner and operator will assess the need to construct a third well, the McCall-1. This additional well would be completed in the Deadwood–Black Island reservoir (approximately 10,000 feet in depth) to store any excess CO_2 identified in Phase 1. The stacked storage concept and phased development approach allows the project to maximize the areal extent of the storage facilities,

provides operational flexibility and redundancy, and generates further assurance to investors and stakeholders.

In addition to the three proposed injection wells, the injection pad, located within the MRYS fence line, will include one dedicated monitoring well for the lowest USDW as well as associated surface facility infrastructure that will accept CO_2 transported via a CO_2 flowline. Layout of the wells and surface facility infrastructure can be found at Figure 1-2. Minnkota proposes one deep subsurface monitoring well (NRDT-1) installed on Minnkota property located approximately 2 miles northeast of the injection site.

This procedure is applicable to Tundra SGS storage facility operations consisting of the following infrastructure:

SFP Case Number: **29029, 29030, 29031**
UIC Class VI, ADP Form No. 28643[Unity-1]
UIC Class VI, ADP Form No. 30200[Liberty-1]
UIC Class VI, ADP Form No. 29077 [NRDT-1]
SFP Case Number: **29032, 29033, 29034**
UIC Class VI, ADP Form No. 28977 [McCall-1]
UIC Class VI, ADP Form No. 29077 [NRDT-1]

The current mailing address for the Tundra SGS facility, as the storage facility operator, is the following:

Minnkota Power Cooperative, Inc.
c/o Tundra SGS
5301 32nd Avenue South
Grand Forks, ND 58201

1.2 Environmental Setting/Geology

The Williston Basin lies in the western half of North Dakota; this area has a long history of hydrocarbon exploration and utilization. This region has been identified as an excellent candidate for long-term CO_2 storage because of the thick sequence of clastic and carbonate sedimentary rocks and the basin's subtle structural character and tectonic stability. The proposed location of Tundra SGS is approximately 3.4 miles southeast of the town of Center on the eastern flank of the Williston Basin. This proposed facility location serves as a suitable site for an injection operation, as it is located outside of the primary oil-producing fields, with little to no well development that would interfere with storage operations and containment. Further discussion of potential mineral zones is found at A1:2.6 and A2:2.6.

The target CO_2 storage reservoir for Tundra SGS Phase 1 is the Broom Creek Formation, a predominantly sandstone horizon lying 4,740 feet below the MRYS facility (Figure 1-3). The lower Piper and Opeche and Spearfish Formations (hereafter "Opeche/Spearfish Formation") serve as the primary confining zone overlying the Broom Creek Formation. This confining interval comprises 56 feet of mudstones, siltstones, and interbedded evaporites of the undifferentiated Opeche/Spearfish Formation overlain by 90 feet of mudstones and siltstones of the lower Piper Formation (Picard Member and lower). The Amsden Formation (dolostone, limestone, and

anhydrite) underlies the Broom Creek Formation and serves as the lower confining zone. Together, the Opeche–Picard (upper confining), Broom Creek, and Amsden Formations (lower confining) make up the CO_2 storage complex for Tundra SGS Phase 1 operations.

The target CO_2 storage reservoirs for Tundra SGS Phase 2, if pursued, are the predominantly sandstone horizons of the Black Island and Deadwood Formations, lying approximately 9280 feet below MRYS (Figure 1-3). The shales of the Icebox Formation conformably overlie the Black Island and serve as the primary confining zone. The Icebox Formation provides a suitable confining layer, with an average thickness of 118 feet. The continuous shales of the Deadwood Formation B Member serve as the lower confining zone. One hundred and fifty-five feet below the lower injection horizon in the Deadwood Formation B is Precambrian metamorphosed granite. Together, the Icebox (upper confining), Black Island, and Deadwood Formations comprise this CO_2 storage complex for Tundra SGS Phase 2. For additional details regarding the site characteristics, refer to A1:2 and A2:2.

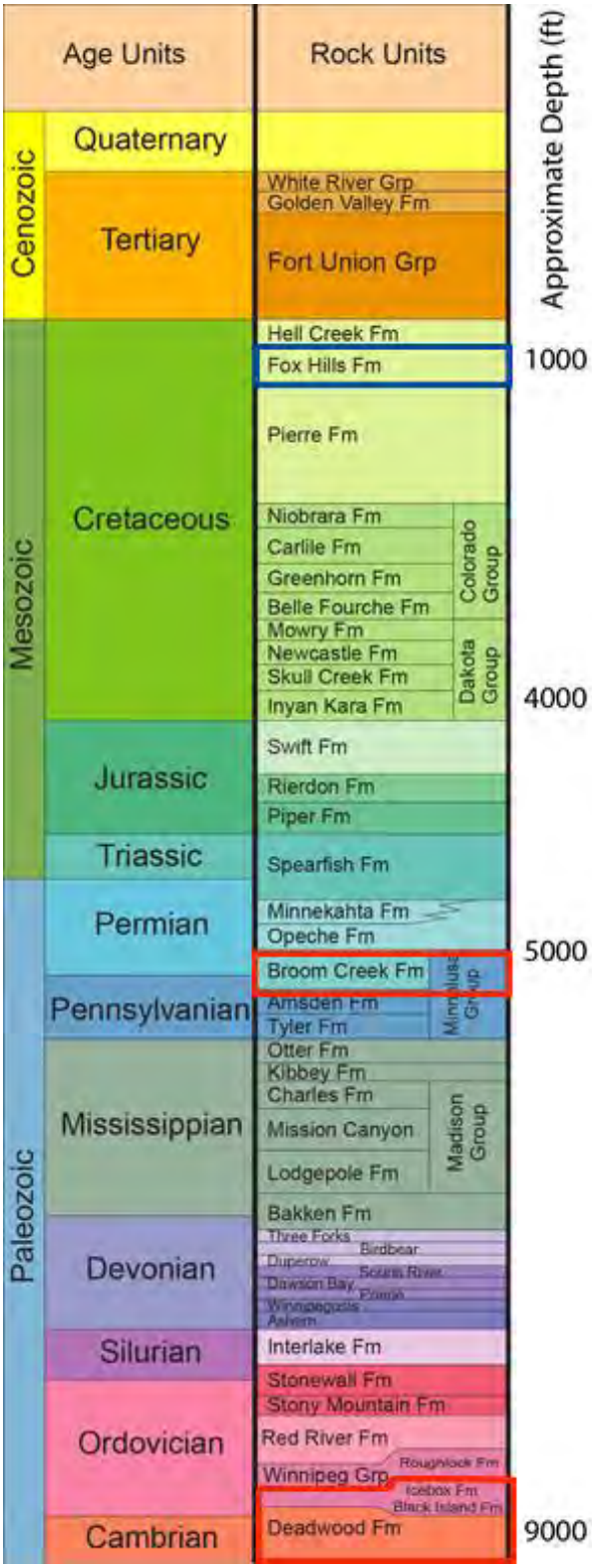


Figure 1-3. Stratigraphic column of North Dakota. Red boxes around the Broom Creek and Deadwood Formations delineate the targeted injection zones.

1.3 Reservoir Model

1.3.1 Broom Creek (Phase 1)

Phase 1 includes two wells: Liberty-1 (originally drilled as J-ROC 1, a stratigraphic well to be converted to a Class VI injector) and Unity-1 (Figure 1-2). Numerical simulation of CO_2 injection in the sandstones of the Broom Creek Formation predicted the wellhead injection pressure (WHP) of both wells would not exceed 1700 psi during injection. Bottomhole pressures (BHPs) reached 3,035.1 and 3,018.3 psi for Liberty-1 and Unity-1 wells, respectively. For the Broom Creek CO_2 plume boundary delineation, the CO_2 plume boundary was modeled using operating assumptions of 20 years at a rate of an annual 4 MMt/year for the first 15 years and 3.5 MMt/year for Years 16 through 20. The reservoir simulation model indicated target injection rates were consistently achievable over 20 years of injection. A total of 77.5 MMt of CO_2 would be injected into the Broom Creek Formation with two wells at the end of 20 years. Injected volumes were 41.1 and 36.4 MMt for the Unity-1 and Liberty-1 wells, respectively. A maximum formation pressure increase of 488 psi is estimated in the near-wellbore area during the injection period (A1:A).

1.3.2 Deadwood (Phase 2)

The Deadwood–Black Island reservoir model simulation for Phase 2 includes the McCall-1 well, drilled on the same pad as the Broom Creek wells (Figure 1-2). This model was constrained by WHP and bottomhole fracture gradient without any injection rate constraint. Within the sandstones of the Black Island and Deadwood Formations, numerical simulation of CO_2 injection predicted that injection BHP will not exceed 6,179 psi during injection operations, assuming a WHP limit of 2,800 psi is maintained. Cumulative CO_2 injection at the above-described pressure conditions was 23.4 MMt over the 20 years of injection. The resulting average injection rate of CO_2 into the Black Island and Deadwood Formations was 1.17 MMt/year. Near the wellbore area, a maximum increase of 1620 psi was estimated within the Black Island and Deadwood Formations.

Through numerical simulation efforts, long-term CO_2 migration potential was investigated in each of the Broom Creek and Deadwood models. The results did not indicate migration outside the storage facility area boundaries in either scenario. Storage facility area boundaries were established using a 20-year injection period, with the output boundary at Year 20 identified at a 5% CO_2 saturation rate and then rounded outward to the nearest 40-acre tract (A1:A).

2.0 DELINEATION OF MONITORING AREA AND TIME FRAMES

2.1 Active Monitoring Area

The active monitoring area (AMA) is defined as "the area that will be monitored over a specific time interval from the first year of the period (n) to the last year in the period (t). The boundary of the active monitoring area is established by superimposing two areas: (1) The area projected to contain the free-phase CO_2 plume at the end of year t, plus an all-around buffer zone of one-half mile or greater if known leakage pathways extend laterally more than one-half mile; (2) The area projected to contain the free-phase CO_2 plume at the end of year t+5" (40 Code of

Federal Regulations [CFR] § 98.449). For purposes of this MRV plan, Minnkota proposes that the Broom Creek AOR, as delineated in Attachment 1, Section 3, serve as the AMA for both the Broom Creek and the Deadwood–Black Island storage facilities (Figure 2-1). Based on review of the data and information of record, and data and information collected in support of A1 and A2, there are no known or suspected lateral leakage pathways within the area projected to contain free-phase CO_2 and the default one-half mile buffer zone.

2.1.1 Tundra SGS AOR Delineation in Accordance with U.S. Environmental Protection Agency (EPA) and North Dakota Rules

Under North Dakota Century Code (NDCC) and North Dakota Administrative Code (NDAC) storage facility and Class VI requirements for an AOR, delineation was completed based on the Project Tundra SFP. The AOR is defined as the "region surrounding the geologic sequestration project where underground sources of drinking water may be endangered by the injection activity" (NDAC § 43-05-01-01). The NDAC requires the operator develop an AOR and corrective action plan utilizing the geologic model, simulated operating assumptions, and site characterization data on which the model is based (NDAC § 43-05-01-5.1). Further, the NDAC requires a technical evaluation of the storage facility area plus a minimum buffer of 1 mile (NDAC § 43-05-01-05). The storage facility boundaries must be defined to include the areal extent of the CO_2 plume plus a buffer area to allow operations to occur safely and as proposed by the applicant (NDCC § 38-22-08). Minnkota elected to permit the storage facility area boundaries based on the 20-year reservoir model output discussed in Section 1.3 and then added an additional buffer rounding out to the nearest 40-acre tract.

The Broom Creek proposed AOR was delineated using a risk-based AOR approach (A1:3.1). The risk-based delineation examines the area encompassing the region overlying the injected free-phase CO_2 and the region overlying the extent of increased formation fluid pressure sufficient to drive formation fluids (e.g., brine) into USDWs, assuming pathways for this migration (e.g., abandoned wells or conductive fractures) are present. The risk-based approach established that the CO_2 plume boundary is also the extent of the AOR boundary (A1:3.1). However, in compliance with the NDAC evaluation and monitoring requirements, Minnkota extended the permitted AOR boundary beyond the risk-based delineation to encompass the storage facility boundary plus an additional 1-mile buffer (A1:3.1). Utilizing the 20-year operating output, plus a 1-mile buffer for monitoring from the outset of operations, provides significant assurance that operations can be conducted safely and as contemplated within the permitted storage facility.

The proposed AOR for the Deadwood–Black Island storage facility used EPA Method 1 to establish the AOR (A2:3.1). The Deadwood–Black Island reservoir model simulation discussed in Section 1.1 yielded an annual average injection rate of approximately 1.17 MMt/year for 20 years. Applying EPA Method 1, the Deadwood–Black Island AOR has a larger areal extent, due to the estimated pressure front under EPA Method 1, than the Broom Creek AOR, which applied the risk-based AOR approach; however, the free-phase CO_2 plume for Deadwood is contained in the delineated AOR for Broom Creek. Because of the significant overlap between the two AORs and the phased development approach, the Tundra SGS technical evaluation and proposed monitoring plan were developed to account for monitoring both injection horizons in accordance with the requirements and to the maximum areal extent simulated.

2.1.2 Tundra SGS AOR Encompasses Subpart RR AMA of both Broom Creek and Deadwood

AMA minimum delineation requirements are found in 40 CFR § 98.449 and used in Figure 2-1. Using a period of t=20 years, the Broom Creek delineated AMA boundary and the Deadwood–Black Island AMA boundary fall within the Broom Creek AOR. Minnkota proposes that the Broom Creek AOR serve as the AMA for both the Broom Creek and the Deadwood–Black Island storage facilities (AOR outlined in black in Figure 2-1), delineation of the AOR is discussed further in A1:3 and A2:3. Aligning the calculated AMA under the more expansive Broom Creek AOR allows for consistent monitoring and recording throughout the proposed injection and post-injection periods and avoids unnecessary duplication and complication in reporting.

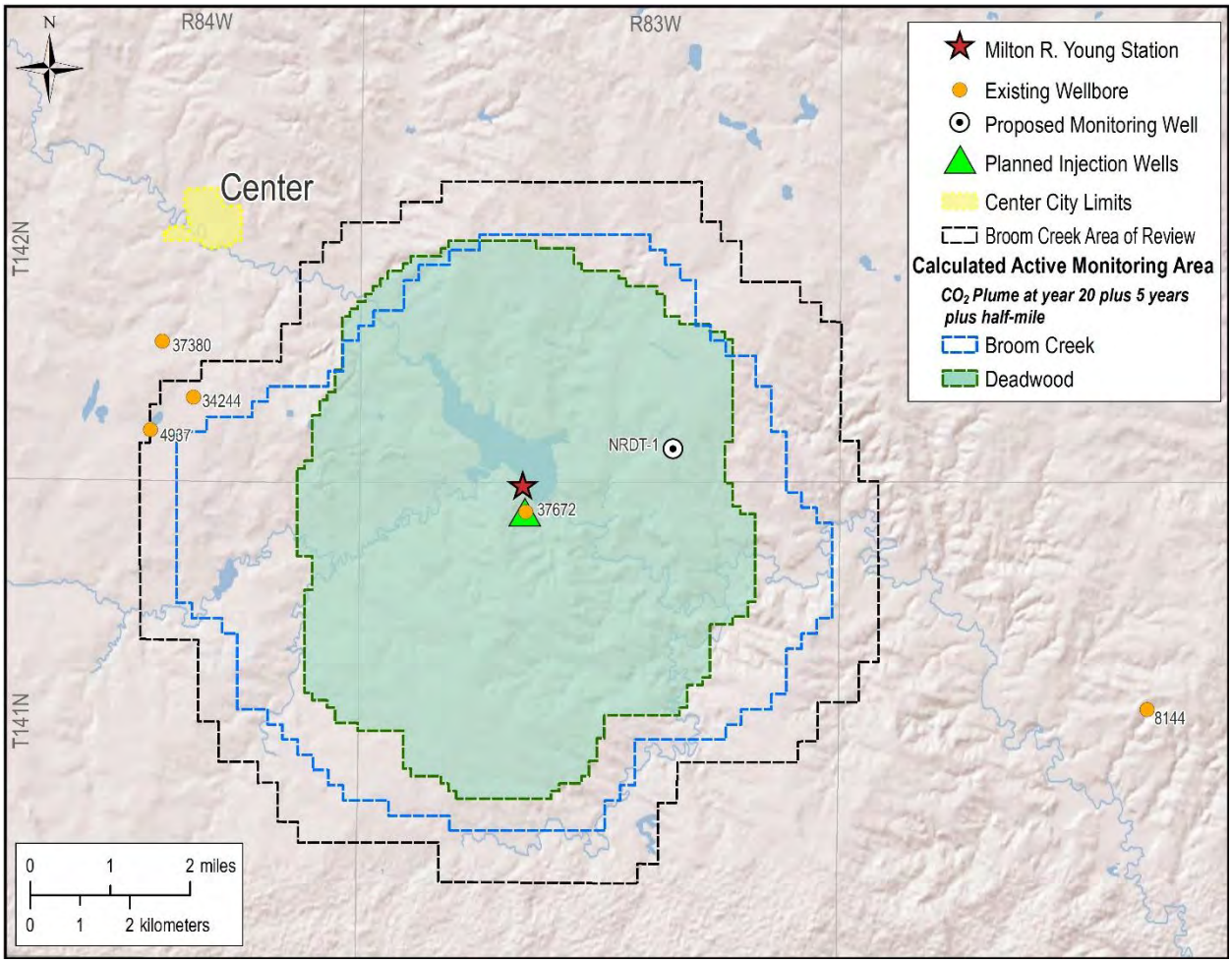


Figure 2-1. Map showing the location of Tundra SGS, NRDT-1, offset wells (orange dots), and the calculated AMA in comparison to the permitted AOR. AOR subsumes the calculated AMA for both formations and exceeds requirements for AMA; therefore, the AOR serves as the AMA for Project Tundra.

2.2 Maximum Monitoring Area

The maximum monitoring area (MMA) as defined in 40 CFR § 98.440–449 (Subpart RR) is the area defined as equal to or greater than the area expected to contain the free-phase CO_2 plume until the CO_2 plume has stabilized plus an all-around buffer zone of at least one-half mile. The calculated MMA delineated in Figure 2-2 for the Broom Creek and Deadwood–Black Island storage facilities uses a period of t=20 years and represents the period t+10 and a half-mile buffer extending beyond that boundary. The permitted AOR for Broom Creek, as delineated in A1 and A2, exceeds the minimum areal extent required by the Subpart RR approach for delineating the MMA (Figure 2-2); therefore, Minnkota proposes that the Broom Creek AOR serve as the calculated MMA for both the Broom Creek and the Deadwood–Black Island storage facilities.

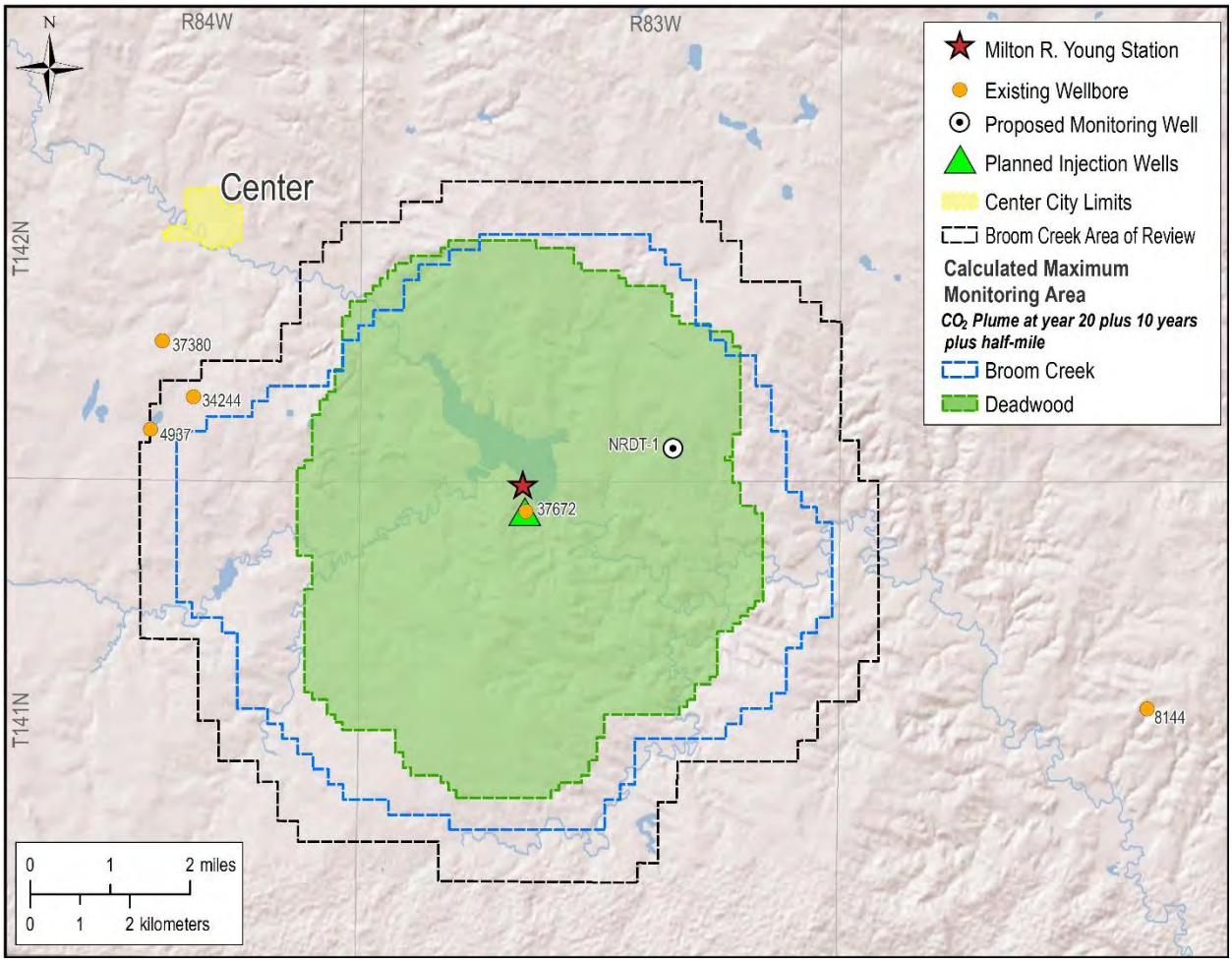


Figure 2-2. Map showing the location of Tundra SGS, NRDT-1, offset wells (orange dots), and the calculated MMA in comparison to the permitted AoR. AOR subsumes the MMA for both formations and exceeds requirements for the MMA; therefore, the AOR serves as both the AMA and MMA for Project Tundra.

Aligning the calculated AMA and MMA under the more expansive Broom Creek AOR allows for consistent monitoring and recording throughout the proposed injection and post-injection periods and avoids unnecessary duplication and complication in reporting.

2.3 Monitoring Time Frames

The monitoring program for the geologic storage of CO_2, as described in A1:4.1 and A2:4.1, comprises three distinct periods: 1) preoperational (pre-injection of CO_2) baseline monitoring, 2) operational (CO_2 injection) monitoring, and 3) post-operational (post-injection of CO_2) monitoring. The time frame of these monitoring periods will encompass the entire life cycle of the injection. For purposes of this MRV plan, it is expected that reporting will be initiated during the operational period and continue through the post-injection period.

The storage system parameters that are monitored during each period are essentially identical; however, the duration of the monitoring period and frequency of the measurements performed vary. A brief description of the purpose of each of these monitoring periods and their duration is provided below.

Preoperational baseline monitoring establishes the pre-CO_2 injection conditions of the storage system and inherent uncertainty associated with the measurement of each of the key storage system parameters. An understanding of the repeatability and variability of each measurement is key to successfully determining the amount of CO_2 that is contained in the formation at any given time. This information will be incorporated into the final Class VI permit. If results from this preoperational monitoring period necessitate changes to this MRV plan, an amendment will be submitted prior to the start of operations.

The operational injection period is focused on validating and updating numerical models of the storage system and ensuring that the geologic storage project is operating safely and is protecting USDWs. Lastly, the purpose of post-operational monitoring is to verify the stability of the CO_2 plume location and assess the integrity of all decommissioned wells. The duration of these three monitoring periods is a minimum of 1 year, 20 years, and a minimum of 10 years, respectively.

3.0 EVALUATION OF POTENTIAL PATHWAYS AND MECHANISMS FOR LEAKAGE TO THE SURFACE

An evaluation of potential pathways for CO_2 leakage to the surface during the implementation of the project was completed by representatives of Minnkota as well as third-party subject matter experts from Oxy Low Carbon Ventures and the EERC. During these meetings, potential leakage pathways were identified and evaluated for the following:

- Existing wellbores
- Faults and fractures
- Natural or induced seismicity
- Flowline and surface equipment
- Lateral migration of CO_2 beyond the AOR

- Vertical migration: injector and monitoring wells
- Vertical migration: diffuse leakage through seal

This leakage assessment determined that none of the pathways required corrective action and the probability of leakage is unlikely. However, a robust monitoring program, described in A1:4.1 and 2:4.1, and summarized in Table 5-2, forms the basis for this MRV plan.

3.1 Existing and Planned Wellbores

Five existing wellbores and one potential wellbore were evaluated as potential leakage pathways. There are no other known wellbores that could impact the project because there is no active or prior production of oil and gas in the vicinity of the Tundra SGS project. A detailed discussion of potential mineral zones is found at A1:2.6 and A2:2.6. Table 3-1 summarizes the existing wellbore names and status and future actions. Additional explanation is provided after the table.

Table 3-1. Wellbore Summary

	Well Name	Current Status	Future Status
a	J-ROC1 [NDIC[1] No. 37672]	Openhole plugged (surface casing installed)	Reenter and construct Class VI injection well
b	J-LOC1 [NDIC No. 37380]	Temporarily abandoned (cased hole)	TBD[2]
c	BNI-1 [NDIC No. 34244]	Openhole plugged	NA[3]
d	Herbert Dresser 1-34 [NDIC No. 4937]	Openhole plugged	NA
e	Little Boot 15-44 [NDIC No. 8144]	Openhole plugged	NA
f	Future Wells (Freeman-1)	NA	Class I injection well

[1] North Dakota Industrial Commission.
[2] To be determined.
[3] Not applicable.

3.1.1 J-ROC1 [NDIC No. 37672]

The J-ROC1 well was drilled by Minnkota and the EERC in 2020 as part of the CarbonSAFE North Dakota project, Phase III. An entire geologic column from surface to the Precambrian was drilled and core collected, and fluid samples as well as special logs were obtained. The well is currently in a plugged and abandoned status openhole in the injection section, which will be reentered and converted to a CO_2 injector well. Further discussion of reentry program provided in Supplement-1. Once the well conversion takes place, J-ROC1 will be renamed Liberty-1, on authorization of pending reentry drilling permit. This well will be monitored in real time during injection to detect any potential mechanical integrity issues associated with potential leakage, and once the injection period ceases, the well will be properly plugged and abandoned.

3.1.2 J-LOC1 [NDIC No. 37380]

The J-LOC1 well was drilled by Minnkota in 2020 as a stratigraphic well. The construction materials used were compatible with Class VI and CO_2 operating standards. The well was drilled through the entire geologic column from surface to the Precambrian. The drilling program included collecting core, obtaining fluid samples and special logs, and injectivity testing in the Broom Creek and Deadwood Formations. The well is currently in a temporarily abandoned status, plugged for future use. Abandonment procedure and well schematic details can be found in A2:3, Table 3-5 and Figure 3-8. In case the well has no future potential use, it will be permanently abandoned to ensure integrity. This well is located slightly outside the delineated AOR for the Broom Creek, but it is included in the pressure front delineated for Deadwood–Black Island Formation storage.

3.1.3 BNI-1 [NDIC No. 34244]

The BNI-1 well was drilled in 2018 as a stratigraphic well by the EERC under North Dakota CarbonSAFE Phase II. The well was drilled through the Broom Creek Formation and reached total depth in the Amsden Formation. The well was plugged and abandoned in 2018 in accordance with approved guidance and regulations of the state.

3.1.4 Herbert Dresser 1-34 [NDIC No. 4937]

The Herbert Dresser 1-34 well was drilled and plugged in 1970 after being classified as a dry hole. The well was replugged in 2001 by BNI. It was drilled through the Broom Creek Formation and reached total depth at the Charles Formation. Several cement plugs isolate any potential movement of fluids between the different flow units and USDW aquifers.

3.1.5 Little Boot 15-44 [NDIC No. 8144]

The Little Boot 15-44 well was drilled and abandoned as a dry hole in 1981. The well was drilled through the Broom Creek and reached the Black Island Formation. It was properly plugged and abandoned with cement plugs isolating the different flowing units before the Fox Hill Aquifer. This well is outside the delineated AOR for the Broom Creek Formation but is included in the pressure front delineated for the Deadwood–Black Island Formation.

3.1.6 Future Wells

Minnkota is planning to drill Freeman-1, a Class I well, on the same well pad of the injection site to dispose of the residual water from the capture process. The Inyan Kara is the proposed geologic formation for disposal and is stratigraphically located approximately 1,000 feet above the Broom Creek Formation. The water disposal zone is separated from the Phase 1 Broom Creek target by a series of impermeable rocks. Since the Class I well will not penetrate the primary or secondary confining seals of the Broom Creek storage facility, the risk of leakage is very unlikely.

There is no active or prior production of oil and gas in the vicinity of the Tundra SGS area. This fact, combined with the understanding that potential leakage pathways of injected CO_2 through existing wellbores are very unlikely, makes the Tundra SGS site an ideal location for the geologic storage of CO_2.

3.2 Faults and Fractures

No known or suspected regional faults or fractures with sufficient permeability and vertical extent to allow fluid movement between formations have been identified in the Tundra SGS area

through site-specific characterization activities, prior studies, or previous oil and gas exploration activities.

A 5-mile-long seismic source test and 6.5-mi^2 3D seismic survey were acquired in 2019, and a 12-mi^2 3D seismic survey and 21 miles of 2D seismic lines were acquired in 2020 (Figure 3-1). The 3D seismic data allowed for visualization of deep geologic formations at lateral spatial intervals as short as tens of feet. The 2D seismic data provided a means to connect the two 3D seismic data sets and ensure consistent interpretation across the Tundra SGS area. The seismic data were used for assessment of the geologic structure, interpretation of interwell heterogeneity, and well placement (A1:2.5 and A2:2.5). No structural features, faults, or discontinuities that would cause concern about seal integrity in the strata above the Broom Creek Formation extending to the deepest USDW, the Fox Hills Formation, were observed in the seismic data.

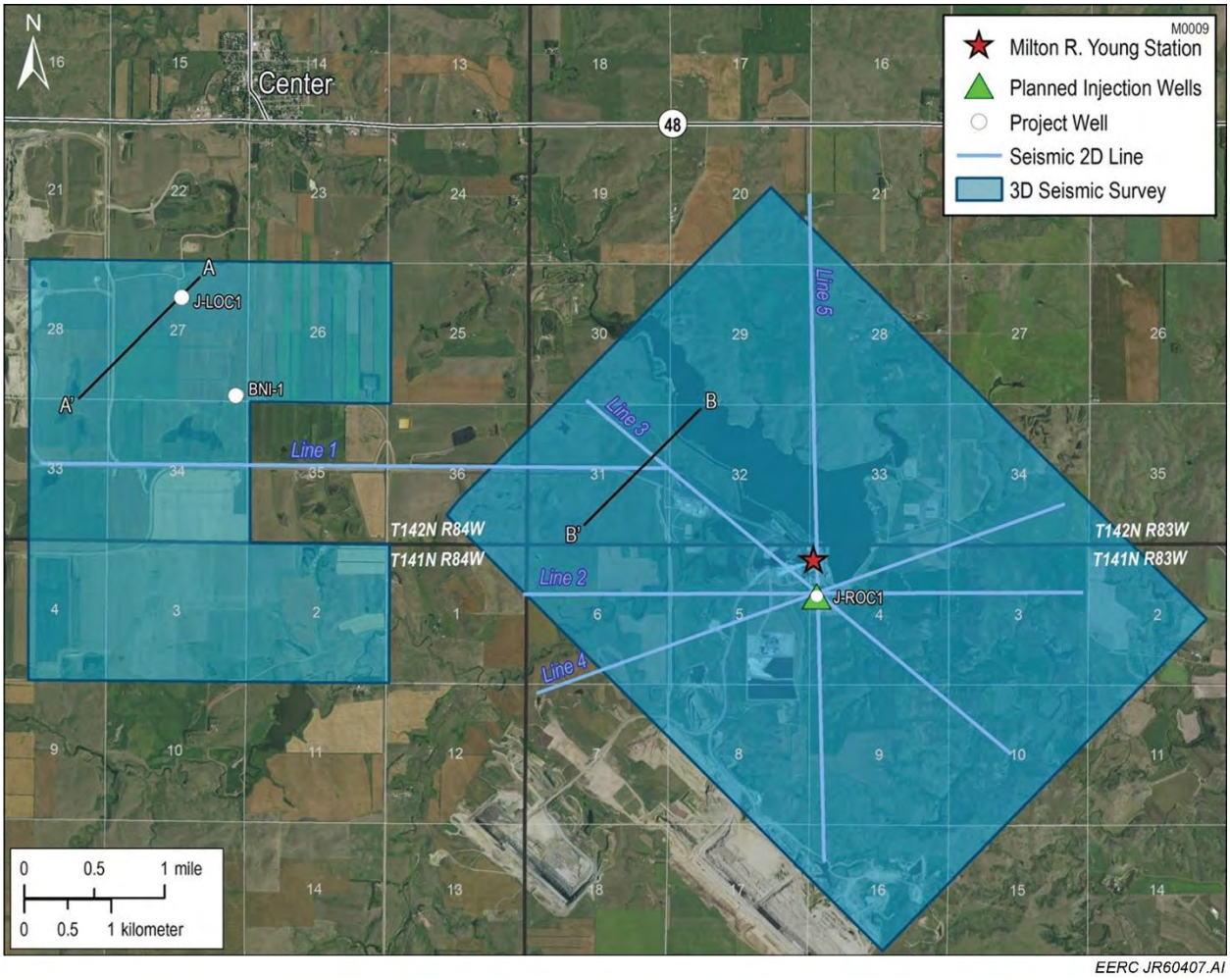


Figure 3-1. Map showing the 2D and 3D seismic surveys in the Tundra SGS area.

Leakage through faults and fractures was shown to be very unlikely to nearly impossible in the risk assessment carried out. In an unlikely scenario of leakage through any pathway, response and remediation would be performed in accordance with the emergency remedial and response plan (A1:E and A2:E). Estimating volumetric losses of CO_2 would require consideration of the

leakage event facts and circumstances, e.g., magnitude and timing of the CO_2 leak and pathway characteristics (fault or fracture permeability, geometry extension, and location). Based on the presenting facts and circumstances, modeling to estimate the CO_2 loss would be performed, and volumetric accounting would follow industry standards as applicable.

3.3 Natural or Induced Seismicity

Between 1870 and 2015, 13 seismic events were detected within the North Dakota portion of the Williston Basin (Table 3-2) (Anderson, 2016). Of these 13 seismic events, only three have occurred along one of the eight interpreted Precambrian basement faults in the North Dakota portion of the Williston Basin (Figure 3-2). The seismic event recorded closest to the Tundra SGS storage facility area occurred 39.6 miles from the J-ROC1 well in Huff, North Dakota (Table 3-2). This seismic event is estimated to have been a 4.4 magnitude from the reported modified Mercalli intensity (MMI) value. The results in Table 3-2 indicate stable geologic conditions in the region surrounding the potential injection site.

Table 3-2. Summary of Seismic Events Reported to Have Occurred in North Dakota (from Anderson, 2016)

Date	Magnitude	Depth, mile	Longitude	Latitude	City or Vicinity of Seismic Event	Map Label	Distance to Tundra SGS J-ROC1 Well, mile
Sept 28, 2012	3.3	0.4*	−103.48	48.01	Southeast of Williston	A	124.6
June 14, 2010	1.4	3.1	−103.96	46.03	Boxelder Creek	B	149.1
March 21, 2010	2.5	3.1	−103.98	47.98	Buford	C	144.1
Aug 30, 2009	1.9	3.1	−102.38	47.63	Ft. Berthold southwest	D	67.4
Jan. 3, 2009	1.5	8.3	−103.95	48.36	Grenora	E	156.0
Nov 15, 2008	2.6	11.2	−100.04	47.46	Goodrich	F	61.6
Nov 11, 1998	3.5	3.1	−104.03	48.55	Grenora	G	166.5
March 9, 1982	3.3	11.2	−104.03	48.51	Grenora	H	164.9
July 8, 1968	4.4	20.5	−100.74	46.59	Huff	I	39.6
May 13, 1947	3.7**	U	−100.90	46.00	Selfridge	J	74.9
Oct 26, 1946	3.7**	U	−103.70	48.20	Williston	K	140.2
April 29, 1927	0.2**	U	−102.10	46.90	Hebron	L	43.4
Aug 8, 1915	3.7**	U	−103.60	48.20	Williston	M	136.4

* Estimated depth.

** Magnitude estimated from reported MMI value.

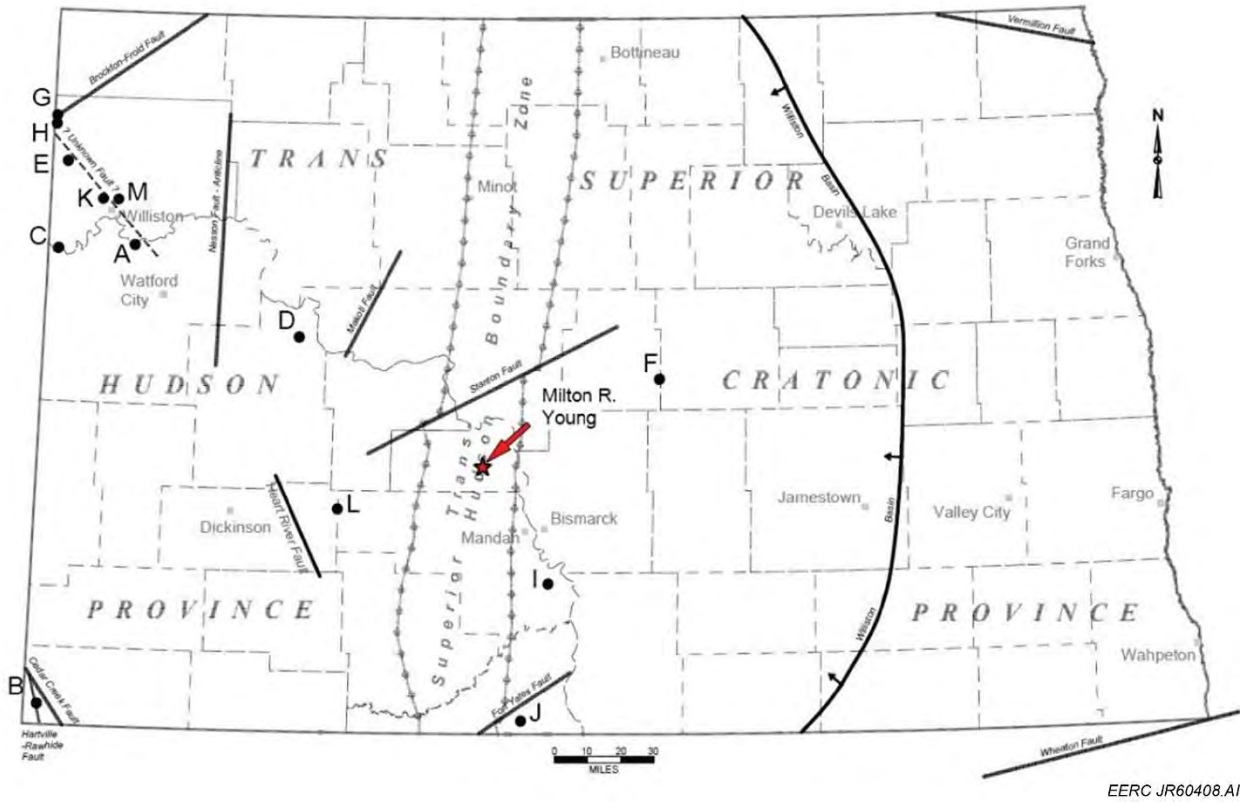


Figure 3-2. Location of major faults, tectonic boundaries, and seismic events in North Dakota (modified from Anderson, 2016).

The history of seismicity relative to regional fault interpretation in North Dakota demonstrates low probability that natural seismicity will interfere with containment. Studies completed by the U.S. Geological Survey (USGS) indicate there is a low probability of damaging seismic events occurring in North Dakota, with less than two such events predicted to occur over a 10,000-year time period (Figure 3-3) (U.S. Geological Survey, 2019).

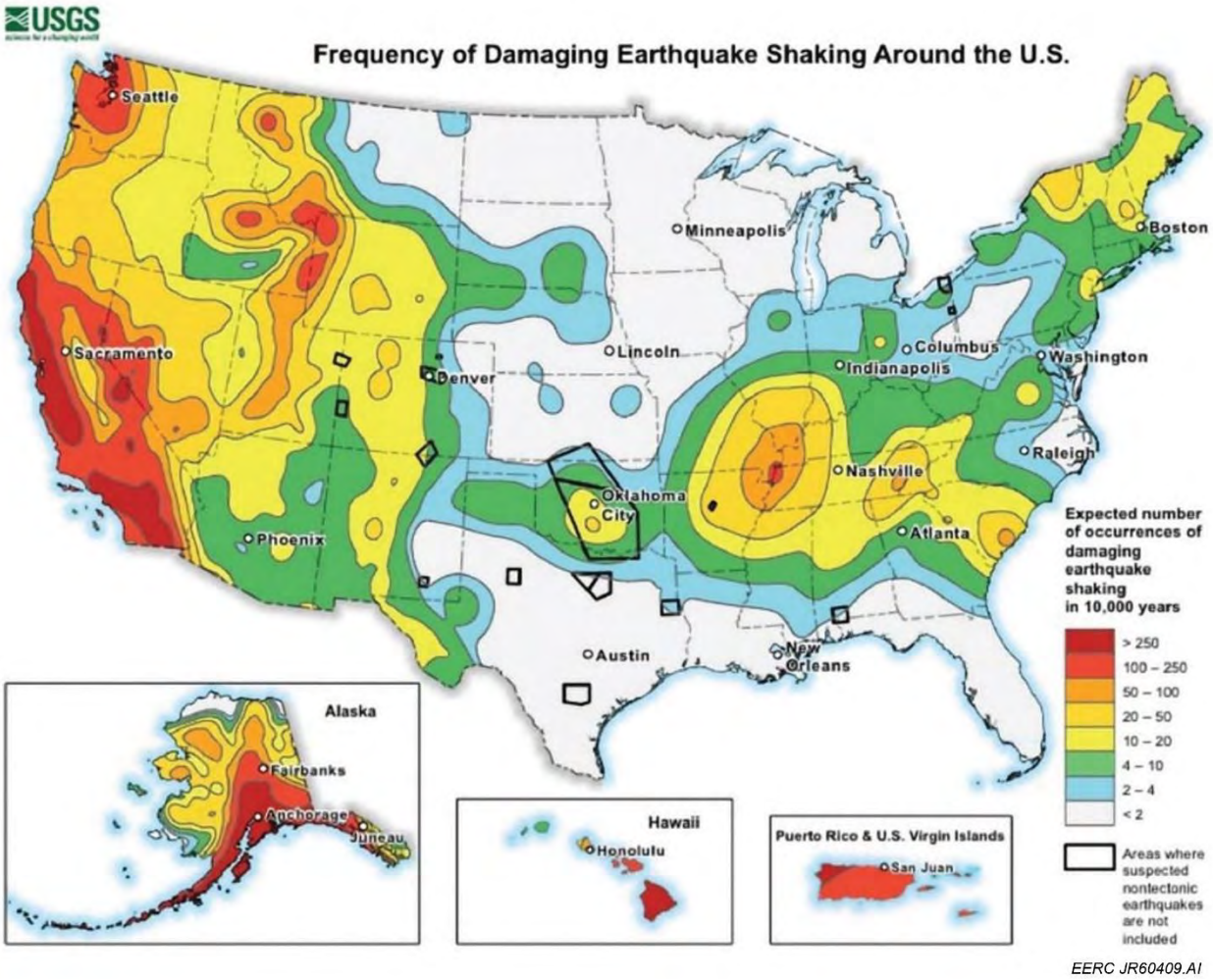


Figure 3-3. Probabilistic map showing how often scientists expect damaging seismic events to occur throughout the United States (U.S. Geological Survey, 2019). The map shows a low probability of damaging seismic events (less than two events per 10,000 years) occurring in North Dakota.

To understand potential induced seismicity, a detailed geomechanical study is described in A1:2.5 and A2:2.5, was carried out to understand the highest possible risk scenario. A scenario where the interpreted Precambrian fault extends into the Deadwood Formation was considered even though the seismic data suggest that it does not. The failure analysis indicated that a pressure increase of 3,600–4,800 psi would be required to induce shear failure.

The maximum expected pressure changes in the Deadwood Formation due to planned injection activities do not exceed 1,800 psi, which is well below the 3,600–4,800-psi pressure threshold for failure (Figure 3-4). Additionally, the injection interval is approximately 120 feet above the Precambrian–Deadwood boundary, and expected pressure change due to planned injection activities at the Precambrian–Deadwood boundary does not exceed 60 psi. Analysis of the geomechanics study results, as applied to the characteristics of the interpreted Precambrian fault and site-specific geomechanical data, suggests planned injection activities will not cause

induced seismicity. Furthermore, no faults interpreted in the AOR would affect the Broom Creek Formation; therefore, the probability of induced seismicity is minimal.

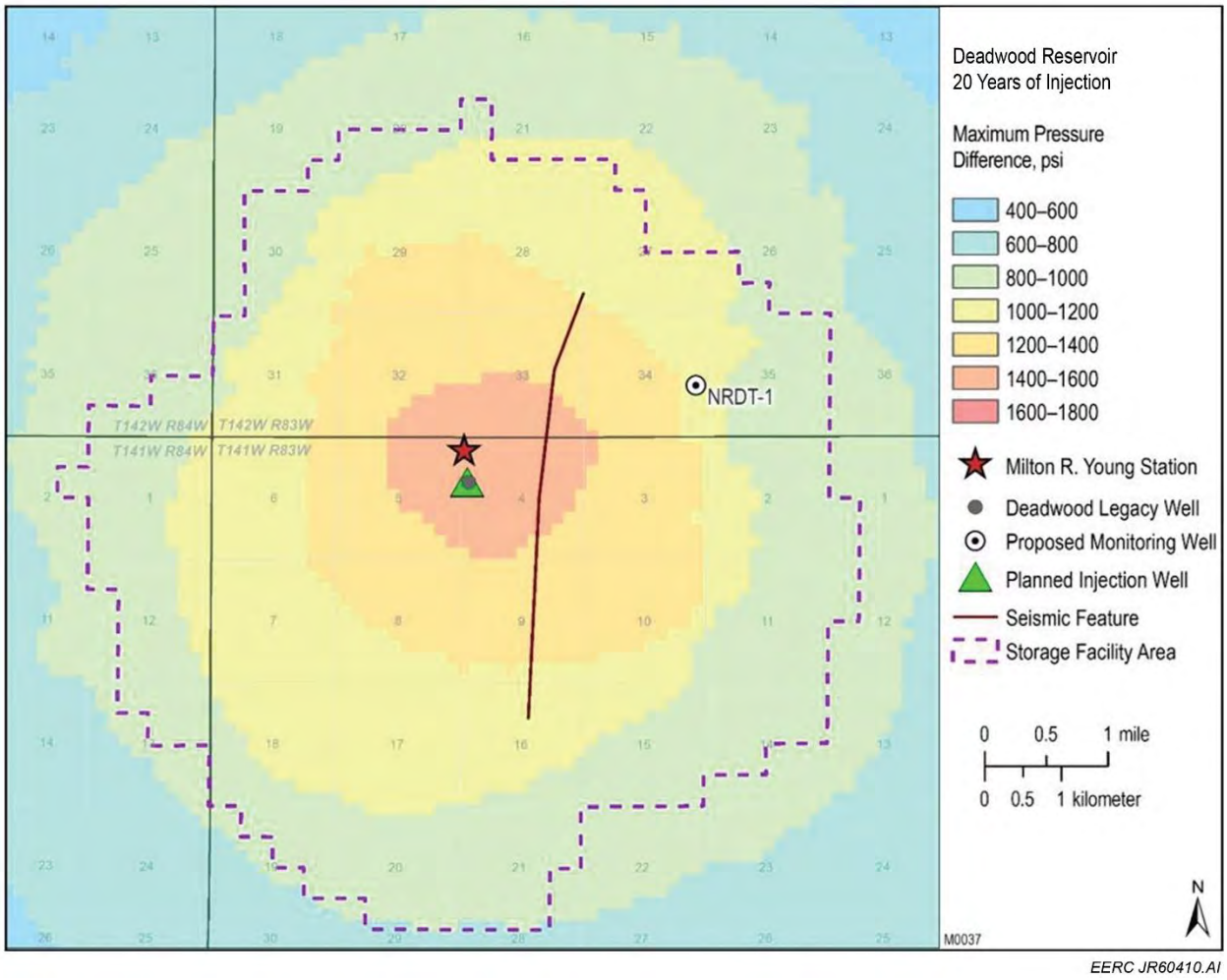


Figure 3-4. Map showing the maximum pressure change expected within the injection zone from the proposed injection activities. The location of the interpreted paleochannel and flexure is indicated by the red line.

Leakage through natural or induced seismicity was shown to be very unlikely to nearly impossible through the risk assessment. In an unlikely scenario of leakage through any pathway, response and remediation would be performed in accordance with the Emergency Remedial and Response Plan (A1:E and A2:E). Estimating volumetric losses of CO_2 would require consideration of the leakage event facts and circumstances, e.g., magnitude and timing of the CO_2 leak and pathway characteristics (fault or fracture permeability, geometry extension, and location). Based upon the presenting facts and circumstances, modeling to estimate the CO_2 loss would be performed and volumetric accounting would follow industry standards as applicable.

3.4 Flowline and Surface Equipment

Surface equipment is the likeliest leakage pathway on the Tundra SGS site during the injection period. Surface equipment is subject to deterioration due to normal aging throughout its functional life. Corrosion, lack of maintenance, and deviation from operational parameters may cause loss of mechanical integrity in these assets.

The Tundra SGS system includes a 16-inch surface flowline buried 4 feet to transport CO_2 from the capture facility to the sequestration site (0.25 miles). The flowline will be connected to the metering station (M2), which is located contiguous with the south side of the well pad. Distributed temperature-sensing/distributed acoustic-sensing (DTS/DAS) fiber optics will be installed along the flowline as part of the leak detection program and mechanical integrity protocol. Flowmeters and temperature and pressure transducers will be installed at each metering station.

Each well will be connected independently to the metering station (M2) by 8-inch flowlines equipped with a dedicated flowmeter and pressure and temperature transducers to monitor well performance. Shutoff devices will be installed in the well flowlines to control any potential release and send alarms to the automated system. Pressure gauges will be installed on the wellhead to monitor annular pressure between tubing and casing.

Surface components of the injection system, including the CO_2 transport flowline and wellhead, will be monitored using CO_2 leak detection equipment. Routine visual inspections will be conducted and real-time operating parameters tracked through an automated system for alarm notification and process management. The Tundra SGS mechanical integrity and monitoring program strives to proactively identify potential surface leak events to ensure the integrity of the facility and minimize the amount of CO_2 released to the ambient air. Maintenance on surface equipment after the delivery point (M2) may require venting cumulated CO_2 volumes before isolating a section of the system; this amount would be quantified and reported.

The risk of leakage in surface equipment is mitigated through:

i. Adhering to regulatory requirements for construction and operation of the site.
ii. Implementing highest standards on material selection and construction processes for the flowline and wells.
iii. The implementation of best practices and a robust mechanical integrity program as well as operating procedures.
iv. Continuous monitoring through an automated system and integrated databases.

As a result, the risk of leakage through surface equipment (under normal operating conditions) is unlikely and the magnitude will vary according to the failure observed. A leakage event from instrumentation or valves could represent a few pounds of CO_2 released during several hours, while a puncture in the flowline could represent several tons of CO_2 until the shutoff device stops the injection automatically or the operator ceases the CO_2 supply.

The second risk identified was potential leakage at surface equipment through catastrophic damage to surface facilities because of an object striking the equipment or a natural event that causes disconnection and loss of containment during the injection period at or before the wellhead. To account for such a hypothetical event, the project team performed a leak model simulating a worst-case blowout scenario and a dispersion model to evaluate risks and potential mass of CO_2 released. The model is referenced in the risk assessment evaluation matrix and emergency response

plan, with the results included in the financial assurance demonstration plan, referenced sections of the applications are found at A1:E, A2:E, and A1:4.3, A2:4.3. This leakage scenario could represent thousands of tons of CO_2 released during the pendency of the response period before the well is controlled and integrity is reestablished. Even though this event is considered high-impact, occurrence is very unlikely since most of the flowline will be buried; the wellhead, valves, and instrumentation will be protected by barriers; and will have a fence around the equipment location, located on private MRYS property. Further, containment of any leak is enhanced by the well pad design, including a 4-foot berm and double liner to avoid any brine spill to surface water bodies.

The risk of leakage through surface equipment or major damage is present during the injection phase of the project and reduces to almost zero during the post-injection site care period. At cessation of the injection period, the injector wells will be properly plugged and abandoned and facility equipment decommissioned according to regulatory requirements. The only remaining surface equipment leakage path will be the monitoring well, NRDT-1, identified as a potential leakage pathway at the wellhead valves or in the instrumentation.

3.5 Lateral Migration of CO_2 Beyond the AOR

Lateral movement of the injected CO_2 will be restricted by residual gas trapping (relative permeability) and solubility trapping (dissolution of the CO_2 into the native formation brine), which confines the CO_2 within the storage facility area. Numerical simulations of CO_2 injection predict slow lateral migration of the plume throughout the injection and post-injection period (A1:A and A2:A). This is the result of the trapping mechanisms combined with the effects of buoyancy and the low dipping structurally characteristic of the storage complexes. The slow lateral migration of the plume is caused by the effects of buoyancy where the free-phase CO_2 injected into the formation rises to the cap rock or lower-permeability layers present in the Broom Creek and Deadwood Formations and then outward. The free-phase CO_2 plume migrates outward, favoring relatively high permeabilities and low pressure bounded vertically by the low-permeability cap rock. This process results in a higher concentration of CO_2 at the center, which gradually spreads to the edge of the plume at Year t, where the CO_2 saturation is lower.

As the free-phase CO_2 plume spreads out within the reservoir, the potential energy of the buoyant CO_2 is gradually lost after year t+10. Eventually, the buoyant force of the CO_2 is no longer able to overcome the capillary entry pressure of the surrounding reservoir rock. At this point, the CO_2 plume ceases to move within the subsurface and becomes stabilized.

Early monitoring and operational data will be used to evaluate conformance of the operating storage system with the requirements of the SFP using both observations and history-matched simulation of CO_2 and pressure distribution. The early monitoring and operational data will be used for additional calibration of the geologic model and associated simulations. These calibrated simulations and model interpretations will be used to demonstrate the current and predicted future lateral and vertical containment of the injected CO_2 within the permitted geologic storage facility.

Tundra SGS will implement direct and indirect methods to monitor the location, thickness, and distribution of the free-phase CO_2 plume and associated pressure front for comparison to the information provided in the storage reservoir permit. If the data predicts additional lateral

movement of the plume, Tundra SGS would proactively meet with landowners to negotiate in good faith terms for leasing the pore space interests, good faith attempt to obtain consent is required under North Dakota Century Code, Chapter 38-22, and revise the monitoring area to appropriately establish equivalent monitoring protocols implemented in the original AMA. The time frame of these monitoring efforts will encompass the entire life cycle of the injection site, which includes the preoperational (baseline), operational, and post-operational periods.

The risk assessment identifies lateral migration and impact for surface leakage as events with very low likelihood.

3.6 Vertical Migration: Injection and Monitoring Wells

Design and construction of the Class VI injector wells (Liberty-1, Unity-1, and McCall-1) as well as the in-zone monitoring well, NRDT-1, will follow the standards required for UIC Class VI wells to minimize any potential leak due to loss of integrity in the wellbores. Material selection complies with CO_2 operating standards, and the wells will be instrumented for continuous, real-time monitoring of well integrity. Well instrumentation will be integrated with an automated data management system to provide alerts and activate the shutoff device if the threshold for controlling parameters is exceeded. Additionally, the wells will follow a rigorous corrosion and mechanical integrity program, described in A1:4.1 and A2:4.1, to ensure proper maintenance of the facilities and timely response in case substandard conditions are detected.

Once the injection period ceases, the injector wells will be evaluated for mechanical condition with corrosion and casing inspection logs and will be properly abandoned with CO_2-resistant cement according to the detailed plugging procedure proposed in A1:4.6 and A2:4.6. The NRDT-1 monitoring well will continue to be operational until plume stabilization and the issuance of a certificate of site closure, then the same rigorous plug-and-abandonment protocol will be followed as proposed for the injector wells.

Based on the design and monitoring program proposed, the project defined the risk of leak through these pathways as unlikely. The amount and timing, if it were to occur, will be minimum since the program is designed to shut off injection or alert the operator to manually shut off injection until the alarm is clear or remediation is complete. The timing of the leak will be estimated based on the collected data from the monitoring tools until the event is cleared or remediation is completed.

3.7 Vertical Migration: Diffuse Leakage Through Seal

The primary mechanism for geologic confinement of the stored CO_2 in the Broom Creek and Deadwood–Black Island Formations will be containment of the initially buoyant CO_2 by the cap rock (Opeche–Picard, Icebox), under the effects of relative permeability and capillary pressure. Figure 3-5 shows a stratigraphic column with the well schematic for the injector and monitoring wells and highlights the additional secondary seals and buffer formation.

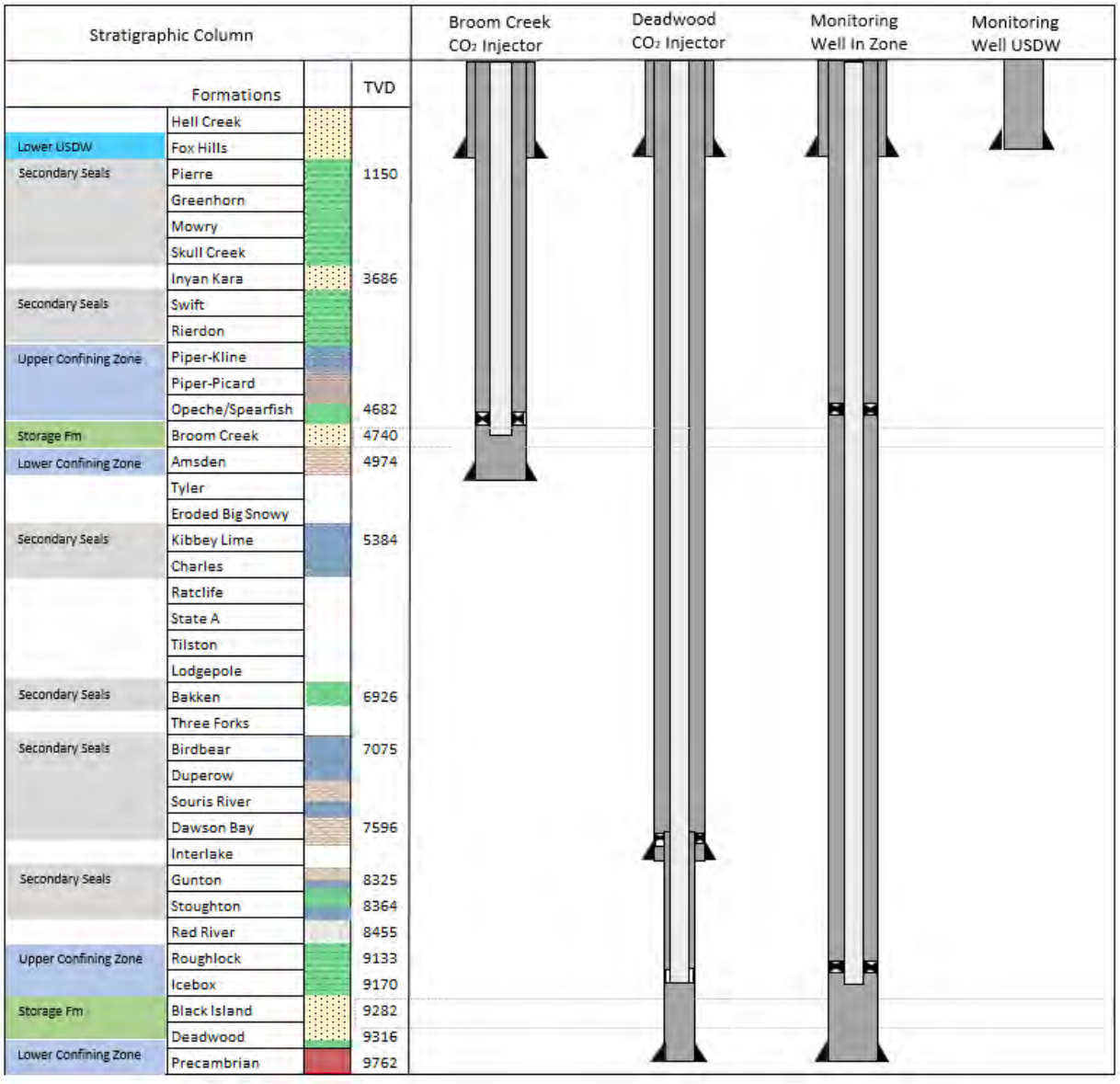


Figure 3-5. Stratigraphic column and well schematic for injector and monitoring wells.

The Picard Member of the Piper Formation within the study area consists of siltstone, while the Opeche/Spearfish Formation consists of tight, silty mudstone. Both intervals are free of transmissive faults and fractures. When considered as a single interval, the Opeche–Picard and other formations create an impermeable, laterally extensive cap rock to the Broom Creek Formation capable of containing injected CO_2. The Opeche–Picard interval is 4636 feet below the land surface at the storage site and 154 feet thick at the Tundra SGS site.

In addition to the Opeche–Picard interval, which serves as the cap rock for the Broom Creek Formation, 820 feet of impermeable rock formations separate the Broom Creek Formation and the next overlying permeable zone, the Inyan Kara Formation. Surrounding the storage facility area,

an average of 2,545 feet of impermeable intervals separates the Inyan Kara Formation and the lowest USDW, the Fox Hills Formation.

Within the Tundra SGS area, the Icebox Formation serves as the upper confining zone of the Black Island and Deadwood Formations. The Icebox Formation consists mostly of impermeable shale, is 9,308 feet below the land surface, and reaches a thickness of 118 feet within the storage facility area. The cap rock has sufficient areal extent and integrity and is free of transmissive faults and fractures to contain injected CO_2.

Impermeable rocks above the primary cap rock include the Roughlock Formation and Red River D Member, which make up the first significant group of secondary confining formations. Together with the Icebox Formation, these formations reach a thickness of 612 feet separating the next overlying permeable zone: the Red River A, B, and C Members. Above the Red River Formation, more than 1,000 feet of impermeable rock acts as an additional seal between the Red River and Broom Creek Formations. No known transmissible faults are within these confining systems in the project area.

As previously noted, at the same time, lateral movement of the injected CO_2 will be restricted by residual gas trapping (relative permeability) and solubility trapping (dissolution of the CO_2 into the native formation brine). After the injected CO_2 becomes dissolved in the formation brine, the brine density will increase. This higher-density brine will ultimately sink in the storage formation (convective mixing). As the free-phase CO_2 plume spreads out within the reservoir, the potential energy of the buoyant CO_2 is gradually lost after Year t+10. Eventually, the buoyant force of the CO_2 is no longer able to overcome the capillary entry pressure of the surrounding reservoir rock. At this point, the CO_2 plume ceases to move within the subsurface and becomes stabilized. Over a much longer period (>100 years), mineralization of the injected CO_2 will ensure its long-term, permanent geologic confinement. Injected CO_2 is not expected to adsorb to any of the mineral constituents of the target formation; therefore, adsorption is not considered to be a viable trapping mechanism in this project (A1:A and A2:A).

The upper and lower confining zones for the proposed storage formations were largely characterized through core sampling and lab analysis as well as imaging and sonic tools to define the sealing capacity. The great thickness of impermeable rock above each of the storage formations provides a best-in-class secondary seal if the main confining zone were to fail, thereby further reducing the risk of diffusion through the leak to almost zero.

Leakage through vertical migration was shown to be very unlikely to nearly impossible in the risk assessment carried out. In an unlikely scenario of leakage through any pathway, response and remediation would be performed in accordance with the Emergency Remedial and Response Plan (A1:4.2, A1:E, A2:4.2, and A2:E). Estimating volumetric losses of CO_2 would require consideration of the leakage event facts and circumstances, e.g., magnitude and timing of the CO_2 leak and pathway characteristics (fault or fracture permeability, geometry extension, and location). Based on the presenting facts and circumstances, modeling to estimate the CO_2 loss would be performed and volumetric accounting would follow industry standards as applicable.

The risk assessment defined this risk as an unlikely event. Response and remediation would be performed in accordance with the Emergency Remedial and Response Plan (A1:4.2, A1:E, A2:4.2, and A2:E). Estimating volumetric losses would require consideration of the leakage event facts and circumstances, e.g., magnitude and timing of the CO_2 leak and pathway characteristics (fault or fracture permeability, geometry extension, and location). Based on the presenting facts

and circumstances, a modeling of the geophysical measurements to estimate the CO_2 loss would be performed and volumetric accounting would follow industry standards as applicable.

4.0 STRATEGY FOR DETECTING AND QUANTIFYING SURFACE LEAKAGE OF CO_2

Tundra SGS proposes a robust monitoring program based on the detailed risk assessment performed during the application for the storage facility and UIC Class VI permit. The program covers direct and indirect monitoring of the CO_2 plume, a corrosion and mechanical integrity protocol, and monitoring of near-surface conditions as well as induced seismicity and continuous, real-time surveillance of injection performance. Tundra SGS also proposes a detailed emergency remedial and response plan that covers the actions to be implemented from detection, verification, analysis, remediation, and reporting for each risk.

Figure 4-1 summarizes the monitoring techniques proposed based on the leakage pathway analyzed for this MRV plan to provide a vision for the surveillance and management of the site.

These methodologies target early detection of the abnormalities in operating parameters or deviations from the baseline and threshold established for the project. These methodologies will lead to a verification process to validate if a leak has occurred or if the system has lost mechanical integrity. The data collected during monitoring are also used to calibrate the numerical model and improve the prediction for the injectivity, CO_2 plume, and pressure front. Table 4-1 provides a full picture of the monitoring frequency in different periods of the project life, and Table 4-2 summarizes for each technique the leakage path that it is targeting to detect. For additional details regarding strategy for detecting and quantifying surface leakage of CO_2, refer to A1:4.1, E, F and A2:4.1, E, F.

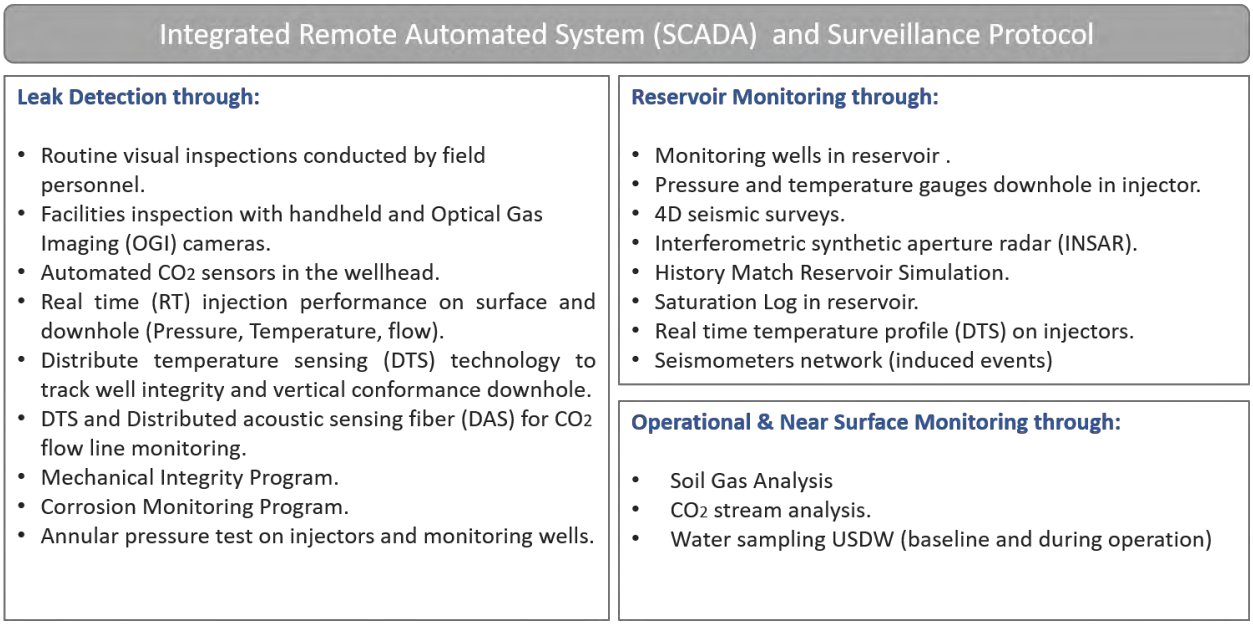


Figure 4-1. Tundra SGS monitoring strategy.

Table 4-1. Summary of Tundra SGS Monitoring Strategy

Method	Pre-injection (baseline 1 year)	Injection Period (20 years)	Post-injection (10 years)
CO_2 Stream Analysis – Gas Composition	Pre-injection	Quarterly	NA
Pressure Gauges and Temperature Sensors at Surface – Injection Wells and Flowline	NA[1]	Real time	NA
Pressure Gauges and Temperature Sensors at Surface – Monitoring Wells	NA	Real time	Quarterly
Flowmeters (mass/volume) – Injection Wells and Flowline	NA	Real time	NA
Visual Inspections	Start-up	Weekly	Quarterly
Automated Remote System (SCADA)[2]	Start-up	Real time	NA
OGI[3] Cameras	Start-up	Quarterly	If required
NDIA4 CO_2 Leak Sensors in Wellhead – Injectors	NA	Real time	NA
NDIR CO_2 Leak Sensors in Wellhead – Monitors	NA	Real time	Real time
Handheld CO_2 Monitor	NA	Weekly	Quarterly
Soil Gas Analysis	3–4 seasonal samples per year	Three to four seasonal samples per year	Three to four seasonal samples every 3 years
Water Sampling USDW	Three to four sample events per selected wells (baseline)	One sample in each selected well at the following frequency: • Year 1 to 3: once a year • At Year 5 • Every 5 years after that	• Three to four sample events at cessation of injection • Three to four sample events before site closure
Water Sampling Surface Water	Three to four sample events per selected wells (baseline)	One sample in each selected well at the following frequency: • Year 1 to 3: once a year • At Year 5 • Every 5 years after that	• Three to four sample events at cessation of injection • Three to four sample events before site closure
Cement Bond Logs	After cementing	If needed	Prior to P&A[5]

[1] Not applicable.
[2] Supervisory control and data acquisition.
[3] Optical gas imaging.
[4] Nondispersive infrared.
[5] Plugged and abandoned.
[6] Electromagnetic.
[7] Downhole.
[8] Reservoir saturation tool.

Continued . . .

Table 4-1 Summary of Tundra SGS Monitoring Strategy (continued)

Casing Inspection Tool (EM[6]/sonic) – Injection Wells	Baseline	• Every 5 years for Broom Creek • Annually for Deadwood–Black Island • During workover	Prior P&A
Casing Inspection Tool (EM/sonic) – Monitoring Wells	Baseline	Every 5 years	Prior to P&A
Temperature Log – Monitoring Wells	Baseline	Annually	Annually
Annular Pressure Test – Injection Wells	Prior injection	• Every 5 years for Broom Creek • Annually for Deadwood–Black Island • During workovers	Prior to P&A
Annular Pressure Test – Monitoring Wells	During completion	• Every 5 years	• Every 5 years • During workovers • Prior to P&A
Corrosion Coupons	NA	Quarterly	NA
DTS/DAS Fiber – Installed on the Casing – Injection Wells	NA	Real time	NA
DTS/DAS Fiber – Main Flowline	NA	Real time	NA
DH[7] Pressure Gauges and Temperature Sensors – Injection Wells	NA	Real time	NA
DH Pressure Gauges and Temperature Sensors – Monitoring Wells	NA	Real time	Bimonthly
RST[8] Log (pulse neutron) – Monitoring Wells	Baseline	Every 5 years	Every 5 years
RST Log (pulse neutron) – Injection Wells	Baseline	As needed	NA
Pressure Falloff Test – Injection Wells	Prior injection	Every 5 years	Prior to P&A
2D/3D Time-Lapsed Surface Seismic	Baseline	Every 5 years	Every 5 years
Interferometric Synthetic Aperture Radar	Baseline	Continuous monitoring	Continuous monitoring
Surface Seismometers	Baseline	Real time	NA

[1] Not applicable.
[2] Supervisory control and data acquisition.
[3] Optical gas imaging.
[4] Nondispersive infrared.
[5] Plugged and abandoned.
[6] Electromagnetic.
[7] Downhole.
[8] Reservoir saturation tool.

Table 4-2. Monitoring Strategies and Leakage Pathway Associated to Detect CO_2

Method	Existing Wellbores	Faults and Fractures	Natural and Induced Seismicity	Flowline and Surface Equipment	Vertical Migration Injectors and Monitoring Wells	Lateral	Diffuse Leakage Through Seal
CO_2 Stream Analysis – Gas Composition		X		X	X		
Pressure Gauges and Temperature Sensors at Surface – Injection Wells and Flow Line				X	X		
Pressure Gauges and Temperature Sensors at Surface – Monitoring Wells				X	X	X	
Flowmeters (mass/volume) – Injection Wells and Flowline				X	X		
Visual Inspection	X			X	X		
Automated Remote System (SCADA)			X	X	X		
OGI Cameras				X	X		
NDIR CO_2 Leak Sensors in Wellhead – Injectors				X	X		
NDIR CO_2 Leak Sensors in Wellhead – Monitors				X	X		
Handheld CO_2 Monitor	X			X	X		X
Soil Gas Analysis		X			X		
Water Sampling USDW		X			X		X
Water Sampling Surface Water		X			X		X
Cement Bond Logs					X		
Casing Inspection Tool (EM/sonic) – Injection Wells					X		

Continued . . .

Table 4-2. Monitoring Strategies and Leakage Pathway Associated to Detect (continued)

Method	Existing Wellbores	Faults and Fractures	Natural and Induced Seismicity	Flowline and Surface Equipment	Vertical Migration Injectors and Monitoring Wells	Lateral Migration	Diffuse Leakage Through Seal
Casing Inspection Tool (EM/sonic) – Monitoring Wells					X		
Temperature Log – Monitoring Wells					X		
Annular Pressure Test – Injection Wells				X	X		
Annular Pressure Test – Monitoring Wells				X	X		
Corrosion Coupons				X	X		
DTS/DAS Fiber Installed on the Casing – Injection Wells		X			X		
DTS/DAS Fiber – Main Flowline				X			
DH Pressure Gauges and Temperature Sensors – Injection Wells		X			X	X	
DH Pressure Gauges and Temperature Sensors – Monitoring Wells		X			X	X	
RST Log (pulse neutron) – Monitoring Wells		X			X	X	X
RST Log (pulse neutron) – Injection Wells		X			X	X	X
Pressure Falloff Test – Injection Wells		X			X	X	
2D/3D Time-Lapsed Surface Seismic	X	X			X	X	X
Interferometric Synthetic Aperture Radar	X	X			X	X	
Surface Seismometers		X	X				

4.1 Leak Verification

Tundra SGS will monitor injection wells through continuous, automated pressure and temperature monitoring in the injection zone, monitoring of the annular pressure in wellheads, DTS alongside the casing, and routine maintenance and inspection.

As part of the surveillance protocol, Tundra SGS will use reservoir simulation modeling, based on history-matched data obtained from the monitoring system, to compare the initial numerical model with the real development of the plume and pressure front. The model will be continuously calibrated with the acquisition of real-time data. Every 5 years, a formal AOR review will be submitted and the monitoring plan revised and modified if needed.

The model history match allows the project operator and owner to identify conditions that differ from those proposed by the numerical model and deviations in the operating conditions from the originals. For example, injector wells will be monitored, and if the injection pressure, temperature, or rate measurements deviate significantly from the specified set points, then a data flag will be automatically triggered by the automated system and field personnel will investigate the excursion. These excursions will be reviewed to determine if CO_2 leakage is occurring. Excursions are not necessarily indicators of leaks; rather, they indicate that injection rates, temperatures, and pressures are not conforming to the expected pattern of the injection plan. In many cases, problems are straightforward and easy to fix (e.g., a meter needs to be recalibrated) and there is no indication that CO_2 leakage has occurred. In the case of issues that are not readily resolved, a more detailed investigation will be initiated. If further investigation indicates a leak has occurred, efforts will be made to quantify its magnitude.

The model history-matching in combination with the mechanical integrity data, geophysical surveys, and near-surface monitoring form a powerful tool to appropriately follow changes in CO_2 concentration at the surface. Many variations of CO_2 concentration detected on the surface are the result of natural processes or external events not related to the CO_2 storage complex.

Because a CO_2 surface leak is of lower temperature than ambient, it will often lead to the formation of bright white clouds and ice that are easily visually observed unaided. With this understanding, Tundra SGS will also rely on a routine visual inspection process to detect unexpected releases from wellbores of the Tundra SGS project.

Discovery of an event triggers a response, as presented in the A1 and A2, Section 4.2, emergency remedial and response plan. Response plan actions and activities will depend upon the circumstances and severity of the event. The Tundra SGS operator will address an event immediately and, if warranted, communicate the event to the UIC program director within 24 hours of discovery.

If an event triggers cessation of injection and remedial actions, Tundra SGS will demonstrate the efficacy of the response/remedial actions to the satisfaction of the UIC program director before resuming injection operations. Injection operations will only resume upon receipt of written authorization of the UIC program director.

4.2 Quantification of Leakage

As discussed above, the potential pathways for leakage include failure or issue in surface equipment or subsurface equipment (wellbores), faults or induced fractures, and competency of the seal to contain the CO_2 in the storage reservoir.

Given the uncertainty concerning the nature and characteristics of any leaks that may be encountered, the most appropriate methods to quantify the volume of CO_2 will be determined on a case-by-case basis. Any volume of CO_2 detected as leaking to the surface will be quantified using acceptable emission factors, engineering estimates of leak amount based on subsurface measurements, numerical models, history-matching of the reservoir performance, detailed analysis of the collected monitoring parameters, and delineation of the affected area, among others.

Leaks will be documented, evaluated, and addressed in a timely manner. Records of leakage events will be retained in an electronic central database. For additional details regarding quantification of leakage, refer to A1: 4.3.1 and A2:4.3.1.

5.0 DETERMINATION OF BASELINES

Pre-injection baselines will be established through the Tundra SGS project by implementing a monitoring program prior to any CO_2 injection and during each of the four primary seasonal ranges. This baseline will be created by monitoring the targeted surface, near-surface, and deep subsurface. The baseline will contain information on the characteristics of a range of environmental media such as surface water, soil gas in the vadose zone, shallow groundwater, storage reservoir formation water, and gas saturation/oil saturation.

These baselines provide a basis for determining if CO_2 leaks are occurring by providing a foundation against which characteristics of these same media during CO_2 injection can be compared and evaluated. For example, changes in concentrations or levels of certain parameters in these media during injection might suggest that they have been impacted by leaking CO_2.

Determinations of these baselines are a critical component of a Class VI SFP. A detailed description of these baselines for both the surface and subsurface for the Tundra SGS project area are provided in A1: 4.1.6, A, B and A2: 4.1.6, A, B.

5.1 Surface Baselines

Baseline sampling includes selected domestic wells in the Square Butte Creek, Tongue River, Upper Hell Creek–Lower Cannonball and Ludlow, and Upper Fox Hills–Lower Hell Creek Aquifers and one USGS Fox Hills observation well. Verification of the domestic well status, based on viability of the well (existence, depth, access, etc.) and landowner cooperation, has been completed and selected wells sampled August 11–13, 2021.

The locations of these candidate wells are shown in A1:C and A2:C, Figure 4-2. Characterization of selected domestic wells and one USGS Fox Hills observation well will include

the water quality parameters; anions; dissolved and total carbon, major cations, and trace metals; and isotope analysis to establish the natural partitioning of the groundwater constituents listed in A1:C and A2:C.

5.2 Subsurface Baseline

Preoperational baseline data will be collected in the injection and monitoring wells. These time-lapse saturation data will be used as an assurance-monitoring technique for CO_2 in the formation directly above the storage reservoir, otherwise known as the above-zone monitoring interval.

Indirect monitoring methods will also track the extent of the CO_2 plume within the storage reservoir and can be accomplished by performing time-lapse geophysical surveys of the AOR. A 3D seismic survey was conducted to establish baseline conditions in the storage reservoir.

A feasibility study of surface deformation monitoring with InSAR (interferometric synthetic aperture radar) technology will be performed to determine application before injection and to establish a baseline for the future application of this technology.

For passive seismicity monitoring, the project will install seismometer stations sufficient to confidently measure baseline seismicity 5 km from the injection area a year prior to injection. For additional information regarding surface baseline, refer to A1: 4.1.8 and A2: 4.1.8.

6.0 DETERMINATION OF SEQUESTRATION VOLUMES USING MASS BALANCE EQUATIONS

Tundra SGS is a CO_2 storage site in a saline aquifer with no production associated from the storage complex. The proposed main metering station for mass balance calculation is identified as M2 in the facility diagram (Figure 1-2).

CO2I is equal to annual CO2 mass injected (metric tons) through all injection wells) for Tundra SGS, because we are not producing rather Tundra SGS is a permanent geologic sequestration operation. To calculate the annual mass of CO_2 that is stored in the storage complex, the project will use Equation RR-12 from 40 CFR Part 98, Subpart RR:

$$CO_2 = CO_{2I} - CO_{2E} - CO_{2FI} \quad \text{[Eq. 1]}$$

Where:

CO_2 = Total annual CO_2 mass stored in subsurface geologic formations (metric tons) at the facility.

CO_{2I} = Total annual CO_2 mass injected (metric tons) in the well or group of wells.

CO_{2E} = Total annual CO_2 mass emitted (metric tons) by surface leakage.

CO_{2FI} = Total annual CO_2 mass emitted (metric tons) from equipment leaks and vented emissions of CO_2 from equipment located on the surface between the flowmeter used

to measure injection quantity and the injection wellhead, for which a calculation procedure is provided in Part 98, Subpart W.

6.1 Mass of CO_2 Injected (CO_{2I})

The Tundra SGS project will use a volumetric flowmeter (M2) (Figure 1-2) to measure the flow of the injected CO_2 stream and will calculate annually the total mass of CO_2 (in metric tons) in the CO_2 stream injected each year by multiplying the volumetric flow at standard conditions by the CO_2 concentration in the flow and the density of CO_2 at standard conditions, according to Equation RR-5 from 40 CFR Part 98, Subpart RR:

$$CO_{2,u} = \sum_{p=1}^{4} Q_{p,u} * D * C_{CO_2,p,u} \quad \text{[Eq. 2]}$$

Where:

$CO_{2,u}$ = Annual CO_2 mass injected (metric tons) as measured by Flowmeter u.

$Q_{p,u}$ = Quarterly volumetric flow rate measurement for Flowmeter u in Quarter p at standard conditions (standard cubic meters per quarter).

D = Density of CO_2 at standard conditions (metric tons per standard cubic meter): 0.0018682.

$C_{CO2,p,u}$ = Quarterly CO_2 concentration measurement in flow for Flowmeter u in Quarter p (volume percent CO_2, expressed as a decimal fraction).

p = Quarter of the year.

u = Flowmeter.

6.2 Annual Mass of CO_2 Emitted by Surface Leakage (CO_{2E})

The Tundra SGS project characterized, in detail, potential leakage paths on the surface and subsurface, concluding that the probability is very low in each scenario. However, a detailed monitoring and surveillance plan is proposed in A1:4 and A2:4, to detect any potential leak and defined a baseline for monitoring.

If the monitoring and surveillance plan detects a deviation from the threshold established for each method, the project will conduct a detailed analysis based on technology available and type of leak to quantify the CO_2 volume to the best of its the capabilities. The process for quantifying leakage could entail using best engineering principles, emission factors, advanced geophysical methods, delineation of the leak, and numerical and predictive models among others.

Tundra SGS project will calculate the total annual mass of CO_2 emitted from all leakage pathways in accordance with the procedure specified in Equation RR-10 from 40 CFR Part 98, Subpart RR:

$$CO_{2E} = \sum_{x=1}^{X} CO_{2,x} \quad \text{[Eq. 3]}$$

Where:

CO_{2E} = Total annual CO_2 mass emitted by surface leakage (metric tons) in the reporting year.

$CO_{2,x}$ = Annual CO_2 mass emitted (metric tons) at Leakage Pathway x in the reporting year.
x = Leakage pathway.

The calculation of CO_{2FI}, the annual mass of CO_2 emitted (in metric tons) from equipment leaks and vented emissions of CO_2 from equipment located on the surface between the flowmeter used to measure injection quantity and injection wellhead, will comply with the calculation and quality assurance/quality control requirements in Part 98, Subpart W, and will be reconciled with the annual data collected through the monitoring and surveillance plan proposed in A1:4, D and A2:4, D.

7.0 MRV PLAN IMPLEMENTATION SCHEDULE

It is proposed that this MRV plan will be implemented within 90 days of the placed-in-service date of the capture and storage equipment, including the Class VI injection wells. The project will not be placed in service until successfully completing performance testing, an essential milestone in achieving substantial completion. At the placed-in-service date, the project will commence collecting data for calculating total amount sequestered according to equations outlined in Section 7.0. As discussed under Sections 2.1 and 3.1, this proposed MRV plan was developed to account for both Phase 1 and Phase 2, and thus no modification to the MRV is anticipated if Phase 2 is pursued. Other greenhouse gas (GHG) reports are filed by the end of the third month of the year after the reporting year, and it is anticipated that the Annual Subpart RR Report will be filed at the same time.

As described in Section 3.3, Tundra SGS anticipates that the MRV program will be in effect during the operational and post-operational monitoring periods, during which time Tundra SGS will operate the storage facilities for the purpose of secure, long-term containment of a measurable quantity of CO_2 in subsurface geologic formations. Tundra SGS anticipates a measurable amount of CO_2 injected during the operational period will be stored in a manner not expected to migrate resulting in future surface leakage. At such time, Tundra SGS will prepare a demonstration supporting the long-term containment determination in accordance with North Dakota statutes and regulations and submit a request to discontinue reporting under this MRV plan consistent with the North Dakota and Subpart RR requirements (see 40 CFR § 98.441[b][2][ii]).

8.0 QUALITY ASSURANCE PROGRAM

A detailed quality assurance procedure for Tundra SGS monitoring techniques and data management is provided in the Quality Assurance and Surveillance Plan found in A1:D and A2:D.

Tundra SGS will ensure compliance with the quality assurance requirement in § 98.444.

<u>CO_2 received</u>:

- The quarterly flow rate of CO_2 received by pipeline is measured at a receiving meter on the injection well path.

- The CO_2 concentration is measured quarterly upstream or downstream of the receiving meter on the injection well path.

Flowmeter provision:

- Operated continuously, except as necessary for maintenance and calibration.
- Operated using calibration and accuracy requirements in § 98.3(i).
- Operated in conformance with consensus-based standards organizations including, but not limited to, ASTM International, the American National Standards Institute, the American Gas Association, the American Society of Mechanical Engineers, the American Petroleum Institute, and the North American Energy Standards Board.

Concentration of CO_2:

- CO_2 concentration will be measured using the appropriate standard method. All measured volumes will be converted from CO_2 to standard cubic meters at a temperature of 60°F and an absolute pressure of 1 atmosphere.

8.1 Missing Data Procedures

In the event Tundra SGS is unable to collect data needed for the mass balance calculations, procedures for estimating missing data in § 98.445 will be used as follows.

8.1.1 Quarterly Flow Rate of CO_2 Received

- Tundra SGS may use the quarterly flow rate data from the sales contract from the capture facility or invoices associated with the commercial transaction.

- A quarterly flow rate value that is missing must be estimated using a representative flow rate value from the nearest previous time period.

8.1.2 Quarterly CO_2 Concentration of a CO_2 Stream Received

- Tundra SGS may use the CO_2 concentration data from the sales contract for that quarter if the sales contract was contingent on CO_2 concentration and the supplier of the CO_2 sampled the CO_2 stream in a quarter and measured its concentration in accordance with the sales contract terms.

- A quarterly concentration value that is missing must be estimated using a representative concentration value from the nearest previous time period.

8.1.3 Quarterly Quantity of CO_2 Injected

- The quarterly amount of CO_2 injected will be estimated using a representative quantity of CO_2 injected from the nearest previous period of time at a similar injection pressure.

8.1.4 Values Associated with CO_2 Emissions from Equipment Leaks and Vented Emissions of CO_2 from Surface Equipment at the Facility

- Implementation will follow missing data estimation procedures specified in 40 CFR, Part 98, Subpart W.

Any missing data should be followed up with an investigation into issues, whether they are concerned with equipment failure or incorrect estimations.

9.0 MRV PLAN REVISIONS

In the event there is a material change to the monitoring and/or operational parameters of the Tundra SGS project that is not anticipated in this MRV plan, the MRV plan will be revised and submitted to the EPA Administrator within 180 days as required in § 98.448(d). Minnkota is the project sponsor of Tundra SGS and will contribute a portion of the total equity for the proposed storage project; other equity participants for the project have not yet been identified. As such, the MRV plan names Minnkota as the sole storage facility owner, operator, and applicant. However, at a time prior to construction of the Tundra SGS site infrastructure, Minnkota plans to contribute all necessary permits to the Tundra SGS project entity, resulting in the transfer of owner and operatorship to the Tundra SGS project. This transfer of ownership will be treated as a minor modification, which will be accomplished through submission of a certificate of representation identifying the change in ownership in accordance with 40 CFR 98.4(h) and will accurately identify and align MRV plan owner/operator/representative designation. Minnkota does not anticipate any material modification to the MRV plan, and as discussed under Section 2.1, if Phase 2 development is pursued, this proposed MRV plan accounts for all monitoring and reporting obligations under Subpart RR.

Tundra SGS reserves the opportunity to submit supplemental revisions to this proposed plan, which take into considerations responses, inquiries, and final determinations from the regulatory agencies having jurisdiction in A1 and A2 and associated Class VI drilling permits.

10.0 RECORDS RECORDING AND RETENTION

Tundra SGS will follow the records retention requirements specified by § 98.3(g). In addition, it will follow the requirements in Subpart RR § 98.447 by maintaining the following records for at least 3 years:

- Quarterly records of CO_2 received at standard conditions and operating conditions, operating temperature and pressure, and concentration of the streams.
- Quarterly records of injected CO_2, including volumetric flow at standard conditions and operating conditions, operating temperature and pressure, and concentration of the streams.
- Annual records of information used to calculate the CO_2 emitted by surface leakage from leakage pathways.

- Annual records of information used to calculate the CO_2 emitted from equipment leaks and vented emissions of CO_2 from equipment located on the surface between the flowmeter used to measure injection quantity and the injection wellhead.

These data will be collected, generated, and aggregated as required for reporting purposes.

11.0 REFERENCES

Anderson, F.J., 2016, North Dakota earthquake catalog (1870–2015): North Dakota Geological Survey Miscellaneous Series No. 93.

U.S. Geological Survey, 2016, Induced earthquakes raise chances of damaging shaking in 2016: https://www.usgs.gov/news/induced-earthquakes-raise-chances-damaging-shaking-2016 (accessed December 2019).

University of North Dakota Energy and Environmental Research Center
Responses to U.S. Department of Energy's Questions on Seismic Monitoring and the Monitoring, Reporting, and Verification (MRV) Plan

University of North Dakota Energy and Environmental Research Center
Responses to U.S. Department of Energy's Questions on Seismic Monitoring and the Monitoring, Reporting, and Verification (MRV) Plan

1. What is the area around the wells that you will be surveying—will it be included in the same areas you show on p. 14?

Repeat (monitor) seismic surveys to track the extent of the CO_2 plume in the storage reservoir will be conducted within the extent of the three-dimensional (3D) seismic survey displayed on page 14 of Minnkota's approved Greenhouse Gas Reporting Program (GHGRP) Subpart RR Monitoring, Reporting, and Verification (MRV) Plan.

2. When you indicate the 2D/3D seismic, what type of equipment is planned—vibroseis trucks or something else?

For two-dimensional (2D) or 3D seismic surveys, vibroseis trucks are the intended source.

3. Will you be using existing roads/ previously disturbed areas?

Existing roads and any previously disturbed paths will be used, if possible, to acquire repeat (monitor) seismic surveys. This depends largely on the availability of roads within the project area and would be more challenging to achieve with a 3D seismic survey given the greater density of receivers and source points.

4. I saw a note about 4D seismic in the table on p. 25. Can you clarify?

The term four-dimensional (4D) seismic is synonymous with repeat, monitor, or time-lapse seismic. This method of surveying involves acquisition of a baseline, or initial, seismic survey prior to CO_2 injection. After injection begins, repeat seismic surveys are conducted periodically throughout the project duration. These repeat seismic surveys are compared against the baseline survey to detect (time-lapse or 4D) changes in storage reservoir properties after injection of CO_2. The change in reservoir properties due to CO_2 injection is detectable in seismic data and is a proven method for plume extent monitoring.

5. What procedures/BMPs would your seismic company use to minimize impacts to wetlands/surface waters, cultural resources, biological resources, agricultural/irrigation tiles (i.e., avoiding certain areas, consulting w SHPO for the proposed routes, precluding seismic activity during mating or migration seasons, etc.)?

To mitigate environmental and cultural impacts, seismic surveying contractors will need to obtain all necessary permits, including land access permissions and right-of-way. Prior to seismic acquisition, site surveying and cultural mapping (e.g., pipelines, fences, waterways, etc.) will be conducted for the purpose of designing the survey to minimize acquisition impact. In North Dakota, the winter season has proven to be the ideal time for seismic acquisition due to the lower ground temperatures improving the seismic signal. Additionally, the impact to the ground from the vibroseis trucks is minimized in winter, where in warmer months ruts can become an issue in softer soil. This is also outside of the growing season, mitigating the impact to agricultural activities and land. Monitoring seismic surveys can be planned for the winter season for these reasons. Also, North Dakota regulations require that all operational incidents be reported and resolved.

6. With respect to other surface equipment, such as soil gas monitors, or other fixed arrays for monitoring, can you give approximate locations and the size of the impact? I know we're projecting a lot and we may not have locations nailed down, so understanding the size of the disturbance, approximate number of each

particular monitor, and any BMPs is helpful. For example, I have a geothermal project where they were installing some monitors in something about the size of a 5-gal bucket at the bottom of a 60ft borehole with a solar panel at the surface. Tina's team needs enough info to describe the fixed monitors and be able to quantify the impacts and discuss the ways that EERC will avoid or mitigate those impacts --consulting with agencies to avoid wetlands/ cultural resources/biological resources, getting applicable permits, following BMPs, reclaiming the drill pad, etc.

Induced seismicity monitoring (ISM) stations, as shown in Figure 1, require permanent installation of equipment at the surface for the duration of the project. This typically includes the seismometer, which is installed either at the surface or within a shallow hole, a digitizer, communication equipment, and a solar panel for power. The ISM station is enclosed within a fence to prevent damage to the station. For a project of this size, approximately 3–5 ISM stations are anticipated. The ISM survey can be designed to place seismometer stations in locations to minimize environmental and cultural impact.

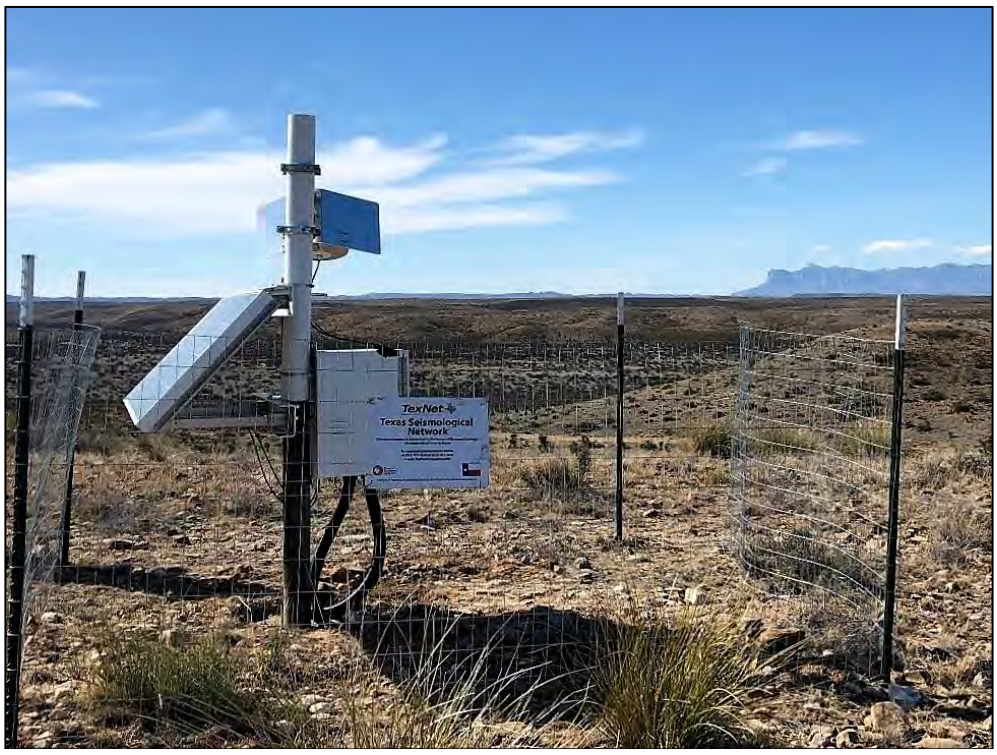


Figure 1. Example of an ISM station from the Texas Seismological Network. Image source: https://news.utexas.edu/2021/03/08/texas-earthquake-system-strengthens-national-network/

As shown in Figure 2, other surface equipment associated with monitoring the storage facility will include three soil gas profile stations, one Fox Hills (lowest underground source of drinking water [USDW]) groundwater monitoring well, and a reservoir-monitoring well (NRDT-1). The soil gas profile stations are approximately 4" in diameter and are drilled to approximately 15-20 feet beneath the ground surface. The surface footprint of each soil gas profile station is about 0.5'x0.5'. The groundwater monitoring well is approximately 8" in diameter and drilled to a depth of approximately 1,200'. The surface footprint of the groundwater well is about 1'x1'.

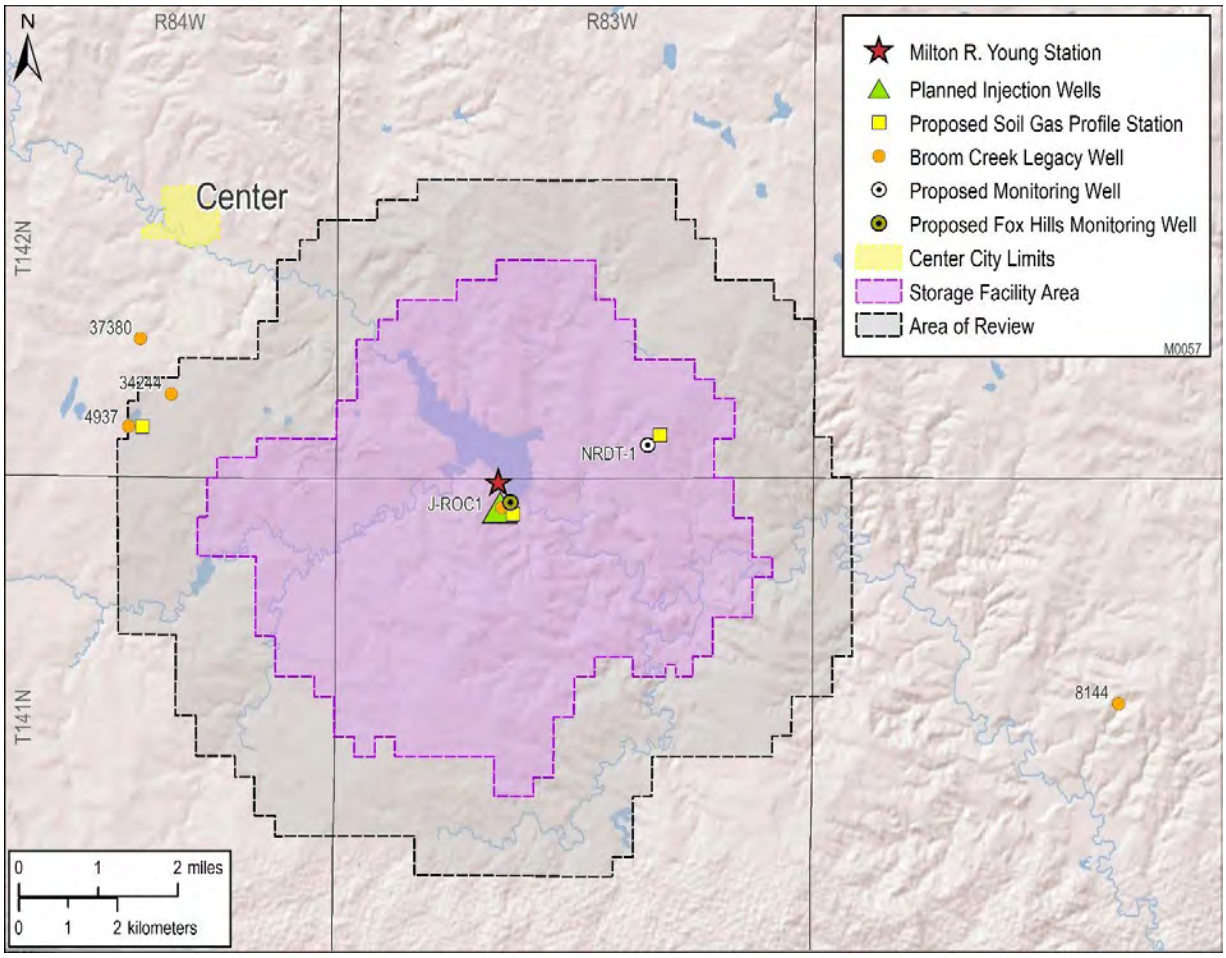
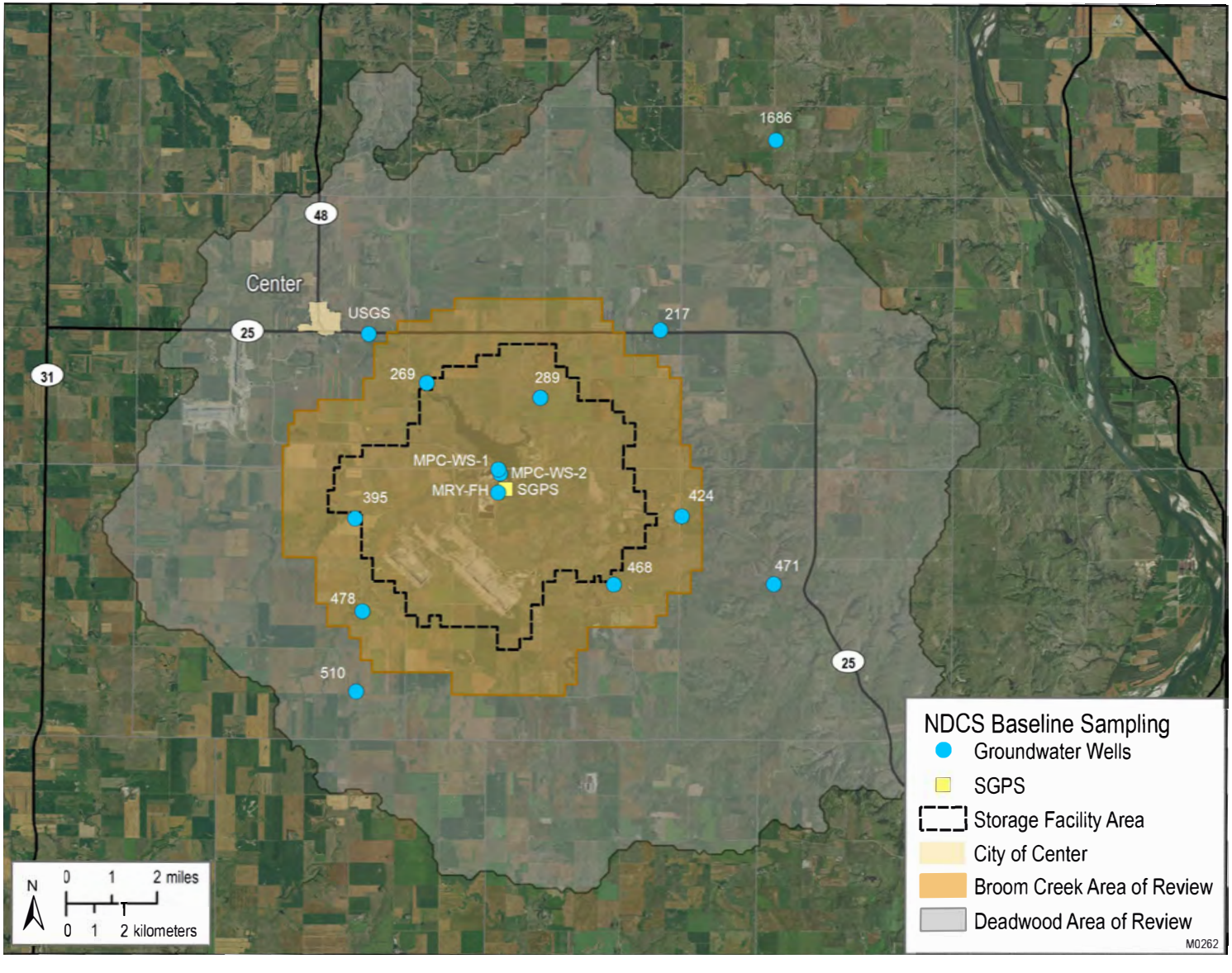


Figure 2. Map illustrating the locations of the soil gas profile stations, Fox Hills monitoring well, and the reservoir-monitoring well (NRDT-1) relative to the project storage facility area and area of review.

APPENDIX G – BASELINE GROUNDWATER MONITORING STUDY

Note, Information and data provided in Appendix G *is a derived from a baseline monitoring program throughout the area of study with respect to select hydrogeologic conditions. The monitoring program is ongoing as part of the approved SFP. A report summarizing the associated data will be prepared upon completion of baseline monitoring activities. For the purposes of the E*A*, data review is limited to the Fox Hills-Hell Creek Formations.*


1686
48
Center
USGS
25
217
31
269
289
MPC-WS-1
MPC-WS-2
MRY-FH
SGPS
395
424
468
471
478
510
25
N
0 1 2 miles
0 1 2 kilometers
NDCS Baseline Sampling
Groundwater Wells
SGPS
Storage Facility Area
City of Center
Broom Creek Area of Review
Deadwood Area of Review
M0262

MINNESOTA VALLEY TESTING LABORATORIES, INC.

MVTL

1126 N. Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 E. Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Amended 2Feb21 (TDS)

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 28 Jan 21
Lab Number: 21-W40
Work Order #: 82-0072
Account #: 007033
Date Sampled: 12 Jan 21 12:45
Date Received: 12 Jan 21 14:35
Sampled By: MVTL Field Services

Project Name: Center USGS Well

PO #: B. Botnen

Sample Description: USGS Well

Temp at Receipt: 8.9C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	12 Jan 21	HT
pH - Field	8.42	units	NA	SM 4500 H+ B	12 Jan 21 12:45	JSM
Temperature - Field	11.8	Degrees C	NA	SM 2550B	12 Jan 21 12:45	JSM
Total Alkalinity	938	mg/l CaCO3	20	SM2320B-11	12 Jan 21 17:00	HT
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	12 Jan 21 17:00	HT
Bicarbonate	912	mg/l CaCO3	20	SM2320B-11	12 Jan 21 17:00	HT
Carbonate	26	mg/l CaCO3	20	SM2320B-11	12 Jan 21 17:00	HT
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	12 Jan 21 17:00	HT
Conductivity - Field	2641	umhos/cm	1	EPA 120.1	12 Jan 21 12:45	JSM
Tot Dis Solids(Summation)	1520	mg/l	12.5	SM1030-F	15 Jan 21 11:45	Calculated
Nitrate as N	< 0.2	mg/l	NA	EPA 353.2	14 Jan 21 9:17	Calculated
Bromide	2.83	mg/l	0.100	EPA 300.0	14 Jan 21 22:24	RMV
Total Organic Carbon	1.7	mg/l	0.5	SM5310C-11	22 Jan 21 17:28	NAS
Dissolved Organic Carbon	1.7	mg/l	0.5	SM5310C-96	22 Jan 21 17:28	NAS
Fluoride	3.54	mg/l	0.10	SM4500-F-C	12 Jan 21 17:00	HT
Sulfate	< 5	mg/l	10.0	ASTM D516-11	15 Jan 21 8:50	EV
Chloride	323	mg/l	2.0	SM4500-Cl-E-11	13 Jan 21 11:25	EV
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	14 Jan 21 9:17	EV
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	14 Jan 21 7:59	EV
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	15 Jan 21 8:17	EV
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	15 Jan 21 8:17	EV
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	13 Jan 21 11:16	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	13 Jan 21 11:16	MDE

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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1126 N. Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 E. Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
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MEMBER ACIL

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Barry Botnen
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Report Date: 28 Jan 21
Lab Number: 21-W40
Work Order #: 82-0072
Account #: 007033
Date Sampled: 12 Jan 21 12:45
Date Received: 12 Jan 21 14:35
Sampled By: MVTL Field Services

Project Name: Center USGS Well

PO #: B. Botnen

Sample Description: USGS Well

Temp at Receipt: 8.9C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Calcium - Total	4.0	mg/l	1.0	6010D	15 Jan 21 11:45	MDE
Magnesium - Total	< 1	mg/l	1.0	6010D	15 Jan 21 11:45	MDE
Sodium - Total	630	mg/l	1.0	6010D	15 Jan 21 11:45	MDE
Potassium - Total	2.8	mg/l	1.0	6010D	15 Jan 21 11:45	MDE
Lithium - Total	0.186	mg/l	0.020	6010D	21 Jan 21 15:22	MDE
Aluminum - Total	< 0.1	mg/l	0.10	6010D	20 Jan 21 10:36	MDE
Iron - Total	0.40	mg/l	0.10	6010D	20 Jan 21 10:36	MDE
Silicon - Total	5.04	mg/l	0.10	6010D	26 Jan 21 9:37	MDE
Strontium - Total	0.16	mg/l	0.10	6010D	20 Jan 21 10:36	MDE
Zinc - Total	< 0.05	mg/l	0.05	6010D	20 Jan 21 10:36	MDE
Boron - Total	2.87	mg/l	0.10	6010D	26 Jan 21 10:46	MDE
Calcium - Dissolved	3.7	mg/l	1.0	6010D	15 Jan 21 9:45	MDE
Magnesium - Dissolved	< 1	mg/l	1.0	6010D	15 Jan 21 9:45	MDE
Sodium - Dissolved	670	mg/l	1.0	6010D	15 Jan 21 9:45	MDE
Potassium - Dissolved	3.2	mg/l	1.0	6010D	15 Jan 21 9:45	MDE
Lithium - Dissolved	0.102	mg/l	0.020	6010D	21 Jan 21 15:22	MDE
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	20 Jan 21 9:36	MDE
Iron - Dissolved	0.25	mg/l	0.10	6010D	20 Jan 21 9:36	MDE
Silicon - Dissolved	5.12	mg/l	0.10	6010D	26 Jan 21 9:37	MDE
Strontium - Dissolved	0.15	mg/l	0.10	6010D	20 Jan 21 9:36	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	20 Jan 21 9:36	MDE
Boron - Dissolved	2.85	mg/l	0.10	6010D	26 Jan 21 10:46	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	14 Jan 21 19:47	MDE

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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Date Received: 12 Jan 21 14:35
Sampled By: MVTL Field Services

Project Name: Center USGS Well

PO #: B. Botnen

Sample Description: USGS Well

Temp at Receipt: 8.9C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Barium - Total	0.0966	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	14 Jan 21 19:47	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	14 Jan 21 19:47	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Copper - Total	< 0.002	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Lead - Total	0.0006	mg/l	0.0005	6020B	14 Jan 21 19:47	MDE
Manganese - Total	0.0088	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Molybdenum - Total	0.0058	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	14 Jan 21 19:47	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	14 Jan 21 19:47	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	14 Jan 21 19:47	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	15 Jan 21 14:56	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE
Barium - Dissolved	0.0954	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	15 Jan 21 14:56	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	15 Jan 21 14:56	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE

RL = Method Reporting Limit

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

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Amended 2Feb21 (TDS)

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 28 Jan 21
Lab Number: 21-W40
Work Order #: 82-0072
Account #: 007033
Date Sampled: 12 Jan 21 12:45
Date Received: 12 Jan 21 14:35
Sampled By: MVTL Field Services

PO #: B. Botnen

Temp at Receipt: 8.9C ROI

Project Name: Center USGS Well

Sample Description: USGS Well

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	15 Jan 21 14:56	MDE
Manganese - Dissolved	0.0081	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE
Molybdenum - Dissolved	0.0058	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	15 Jan 21 14:56	MDE
Silver - Dissolved	< 0.001 ^	mg/l	0.0005	6020B	15 Jan 21 14:56	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	15 Jan 21 14:56	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE

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

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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CERTIFICATION: ND # ND-00016

MVTL

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MEMBER ACIL

Report Date: 23 Aug 21
Lab Number: 21-W2892
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 15:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: ND Carbon Safe
Sample Description: NDCS-MPC-WS-1

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	12 Aug 21	RAA
pH	* 7.8	units	N/A	SM4500-H+-B-11	13 Aug 21 17:00	RAA
Conductivity (EC)	1320	umhos/cm	N/A	SM2510B-11	12 Aug 21 17:00	RAA
pH - Field	7.28	units	NA	SM 4500 H+ B	11 Aug 21 15:00	
Temperature - Field	17.6	Degrees C	NA	SM 2550B	11 Aug 21 15:00	
Total Alkalinity	464	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Bicarbonate	464	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Tot Dis Solids(Summation)	812	mg/l	12.5	SM1030-F	19 Aug 21 14:04	Calculated
Percent Sodium of Cations	54.8	%	NA	N/A	19 Aug 21 14:04	Calculated
Total Hardness as CaCO3	329	mg/l	NA	SM2340B-11	19 Aug 21 14:04	Calculated
Hardness in grains/gallon	19.3	gr/gal	NA	SM2340-B	19 Aug 21 14:04	Calculated
Cation Summation	14.8	meq/L	NA	SM1030-F	19 Aug 21 14:04	Calculated
Anion Summation	14.2	meq/L	NA	SM1030-F	16 Aug 21 12:01	Calculated
Percent Error	1.99	%	NA	SM1030-F	19 Aug 21 14:04	Calculated
Sodium Adsorption Ratio	4.46		NA	USDA 20b	19 Aug 21 14:04	Calculated
Bromide	< 0.5 @	mg/l	0.100	EPA 300.0	18 Aug 21 12:10	RMV
Total Organic Carbon	4.8	mg/l	0.5	SM5310C-11	13 Aug 21 18:17	NAS
Dissolved Organic Carbon	4.5	mg/l	0.5	SM5310C-96	13 Aug 21 18:17	NAS
Fluoride	0.32	mg/l	0.10	SM4500-F-C	12 Aug 21 17:00	RAA
Sulfate	222	mg/l	5.00	ASTM D516-11	16 Aug 21 11:34	EV
Chloride	10.4	mg/l	2.0	SM4500-Cl-E-11	16 Aug 21 12:01	SD
Nitrate-Nitrite as N	0.30	mg/l	0.20	EPA 353.2	12 Aug 21 15:36	SD

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 23 Aug 21
Lab Number: 21-W2892
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 15:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Project Name: ND Carbon Safe
Sample Description: NDCS-MPC-WS-1

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	12 Aug 21 10:40	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	13 Aug 21 13:53	SD
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	13 Aug 21 13:53	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 11:43	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 12:58	MDE
Total Dissolved Solids	832	mg/l	10	USGS I1750-85	13 Aug 21 15:00	RAA
Calcium - Total	76.7	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Magnesium - Total	33.5	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Sodium - Total	186	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Potassium - Total	4.7	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Lithium - Total	0.048	mg/l	0.020	6010D	17 Aug 21 8:51	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	16 Aug 21 11:31	SZ
Iron - Total	1.03	mg/l	0.10	6010D	16 Aug 21 11:31	SZ
Silicon - Total	11.5	mg/l	0.10	6010D	17 Aug 21 11:40	SZ
Strontium - Total	1.14	mg/l	0.10	6010D	16 Aug 21 11:31	SZ
Zinc - Total	0.05	mg/l	0.05	6010D	16 Aug 21 11:31	SZ
Boron - Total	0.36	mg/l	0.10	6010D	20 Aug 21 9:34	SZ
Calcium - Dissolved	75.9	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Magnesium - Dissolved	33.0	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Sodium - Dissolved	187	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Potassium - Dissolved	4.9	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Lithium - Dissolved	0.043	mg/l	0.020	6010D	17 Aug 21 9:51	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	19 Aug 21 11:06	MDE
Iron - Dissolved	0.30	mg/l	0.10	6010D	19 Aug 21 11:06	MDE
Silicon - Dissolved	11.4	mg/l	0.10	6010D	17 Aug 21 12:40	SZ

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 23 Aug 21
Lab Number: 21-W2892
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 15:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Project Name: ND Carbon Safe
Sample Description: NDCS-MPC-WS-1

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Strontium - Dissolved	1.14	mg/l	0.10	6010D	19 Aug 21 11:06	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	19 Aug 21 11:06	MDE
Boron - Dissolved	0.35	mg/l	0.10	6010D	20 Aug 21 11:34	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Aug 21 11:16	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Barium - Total	0.0947	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Copper - Total	0.0235	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Manganese - Total	0.2512	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Nickel - Total	0.0053	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	20 Aug 21 11:16	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	20 Aug 21 12:22	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Barium - Dissolved	0.0903	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

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CERTIFICATION: ND # ND-00016

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Report Date: 23 Aug 21
Lab Number: 21-W2892
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 15:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: ND Carbon Safe
Sample Description: NDCS-MPC-WS-1

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Copper - Dissolved	0.0074	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Manganese - Dissolved	0.2518	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Nickel - Dissolved	0.0058	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	20 Aug 21 12:22	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Report Date: 23 Aug 21
Lab Number: 21-W2893
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 16:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: ND Carbon Safe
Sample Description: NDCS-MPC-WS-1 Dup

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	12 Aug 21	RAA
pH	* 7.8	units	N/A	SM4500-H+-B-11	13 Aug 21 17:00	RAA
Conductivity (EC)	1298	umhos/cm	N/A	SM2510B-11	12 Aug 21 17:00	RAA
Total Alkalinity	468	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Bicarbonate	468	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Tot Dis Solids(Summation)	816	mg/l	12.5	SM1030-F	19 Aug 21 14:04	Calculated
Percent Sodium of Cations	52.8	%	NA	N/A	19 Aug 21 14:04	Calculated
Total Hardness as CaCO3	321	mg/l	NA	SM2340B-11	19 Aug 21 14:04	Calculated
Hardness in grains/gallon	18.8	gr/gal	NA	SM2340-B	19 Aug 21 14:04	Calculated
Cation Summation	14.9	meq/L	NA	SM1030-F	19 Aug 21 14:04	Calculated
Anion Summation	14.5	meq/L	NA	SM1030-F	16 Aug 21 12:01	Calculated
Percent Error	1.56	%	NA	SM1030-F	19 Aug 21 14:04	Calculated
Sodium Adsorption Ratio	4.40		NA	USDA 20b	19 Aug 21 14:04	Calculated
Bromide	< 0.5 @	mg/l	0.100	EPA 300.0	18 Aug 21 12:31	RMV
Total Organic Carbon	4.6	mg/l	0.5	SM5310C-11	13 Aug 21 18:17	NAS
Dissolved Organic Carbon	4.5	mg/l	0.5	SM5310C-96	13 Aug 21 18:17	NAS
Fluoride	0.32	mg/l	0.10	SM4500-F-C	12 Aug 21 17:00	RAA
Sulfate	232	mg/l	5.00	ASTM D516-11	16 Aug 21 11:34	EV
Chloride	10.3	mg/l	2.0	SM4500-Cl-E-11	16 Aug 21 12:01	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	12 Aug 21 15:36	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	12 Aug 21 10:40	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	13 Aug 21 13:53	SD

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 23 Aug 21
Lab Number: 21-W2893
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 16:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Project Name: ND Carbon Safe
Sample Description: NDCS-MPC-WS-1 Dup

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	13 Aug 21 13:53	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 11:43	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 12:58	MDE
Total Dissolved Solids	824	mg/l	10	USGS I1750-85	13 Aug 21 15:00	RAA
Calcium - Total	74.7	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Magnesium - Total	32.6	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Sodium - Total	181	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Potassium - Total	4.7	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Lithium - Total	0.046	mg/l	0.020	6010D	17 Aug 21 8:51	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	16 Aug 21 11:31	SZ
Iron - Total	0.92	mg/l	0.10	6010D	16 Aug 21 11:31	SZ
Silicon - Total	11.5	mg/l	0.10	6010D	17 Aug 21 11:40	SZ
Strontium - Total	1.13	mg/l	0.10	6010D	16 Aug 21 11:31	SZ
Zinc - Total	< 0.05	mg/l	0.05	6010D	16 Aug 21 11:31	SZ
Boron - Total	0.36	mg/l	0.10	6010D	20 Aug 21 9:34	SZ
Calcium - Dissolved	75.6	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Magnesium - Dissolved	33.4	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Sodium - Dissolved	190	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Potassium - Dissolved	5.0	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Lithium - Dissolved	0.043	mg/l	0.020	6010D	17 Aug 21 9:51	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	19 Aug 21 12:06	MDE
Iron - Dissolved	0.23	mg/l	0.10	6010D	19 Aug 21 12:06	MDE
Silicon - Dissolved	11.4	mg/l	0.10	6010D	17 Aug 21 12:40	SZ
Strontium - Dissolved	1.16	mg/l	0.10	6010D	19 Aug 21 12:06	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	19 Aug 21 12:06	MDE

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CERTIFICATION: ND # ND-00016

MVTL

MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 N. Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 E. Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 23 Aug 21
Lab Number: 21-W2893
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 16:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Project Name: ND Carbon Safe
Sample Description: NDCS-MPC-WS-1 Dup

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Boron - Dissolved	0.35	mg/l	0.10	6010D	20 Aug 21 11:34	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Aug 21 11:16	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Barium - Total	0.0954	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Copper - Total	0.0200	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Manganese - Total	0.2528	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Nickel - Total	0.0055	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	20 Aug 21 11:16	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	20 Aug 21 12:22	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Barium - Dissolved	0.0909	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Copper - Dissolved	0.0021	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

RL = Method Reporting Limit

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

Report Date: 23 Aug 21
Lab Number: 21-W2893
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 16:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: ND Carbon Safe
Sample Description: NDCS-MPC-WS-1 Dup

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Manganese - Dissolved	0.2476	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Nickel - Dissolved	0.0053	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	20 Aug 21 12:22	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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MEMBER ACIL

Report Date: 23 Aug 21
Lab Number: 21-W2894
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 17:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: ND Carbon Safe
Sample Description: NDCS-W289

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	12 Aug 21	RAA
pH	* 8.5	units	N/A	SM4500-H+-B-11	13 Aug 21 17:00	RAA
Conductivity (EC)	1846	umhos/cm	N/A	SM2510B-11	12 Aug 21 17:00	RAA
Total Alkalinity	883	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Bicarbonate	855	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Carbonate	28	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Tot Dis Solids(Summation)	1090	mg/l	12.5	SM1030-F	19 Aug 21 14:04	Calculated
Percent Sodium of Cations	96.4	%	NA	N/A	19 Aug 21 14:04	Calculated
Total Hardness as CaCO3	14.6	mg/l	NA	SM2340B-11	19 Aug 21 14:04	Calculated
Hardness in grains/gallon	0.85	gr/gal	NA	SM2340-B	19 Aug 21 14:04	Calculated
Cation Summation	20.3	meq/L	NA	SM1030-F	19 Aug 21 14:04	Calculated
Anion Summation	19.8	meq/L	NA	SM1030-F	16 Aug 21 12:01	Calculated
Percent Error	1.07	%	NA	SM1030-F	19 Aug 21 14:04	Calculated
Sodium Adsorption Ratio	51.2		NA	USDA 20b	19 Aug 21 14:04	Calculated
Bromide	< 0.5 @	mg/l	0.100	EPA 300.0	18 Aug 21 12:52	RMV
Total Organic Carbon	6.3	mg/l	0.5	SM5310C-11	13 Aug 21 18:17	NAS
Dissolved Organic Carbon	7.1	mg/l	0.5	SM5310C-96	13 Aug 21 18:17	NAS
Fluoride	1.96	mg/l	0.10	SM4500-F-C	12 Aug 21 17:00	RAA
Sulfate	93.2	mg/l	5.00	ASTM D516-11	16 Aug 21 11:34	EV
Chloride	8.6	mg/l	2.0	SM4500-Cl-E-11	16 Aug 21 12:01	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	12 Aug 21 15:36	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	12 Aug 21 10:40	SD
Phosphorus as P - Total	0.31	mg/l	0.20	EPA 365.1	13 Aug 21 13:53	SD

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 23 Aug 21
Lab Number: 21-W2894
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 17:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Project Name: ND Carbon Safe
Sample Description: NDCS-W289

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Phosphorus as P-Dissolved	0.31	mg/l	0.20	EPA 365.1	13 Aug 21 13:53	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 11:43	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 12:58	MDE
Total Dissolved Solids	1180	mg/l	10	USGS I1750-85	13 Aug 21 15:00	RAA
Calcium - Total	3.2	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Magnesium - Total	1.6	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Sodium - Total	449	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Potassium - Total	2.4	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Lithium - Total	0.051	mg/l	0.020	6010D	17 Aug 21 8:51	SZ
Aluminum - Total	0.35	mg/l	0.10	6010D	16 Aug 21 11:31	SZ
Iron - Total	0.51	mg/l	0.10	6010D	16 Aug 21 11:31	SZ
Silicon - Total	4.05	mg/l	0.10	6010D	17 Aug 21 11:40	SZ
Strontium - Total	0.11	mg/l	0.10	6010D	16 Aug 21 11:31	SZ
Zinc - Total	< 0.05	mg/l	0.05	6010D	16 Aug 21 11:31	SZ
Boron - Total	0.46	mg/l	0.10	6010D	20 Aug 21 9:34	SZ
Calcium - Dissolved	2.4	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Magnesium - Dissolved	1.3	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Sodium - Dissolved	459	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Potassium - Dissolved	2.3	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Lithium - Dissolved	0.049	mg/l	0.020	6010D	17 Aug 21 9:51	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	19 Aug 21 12:06	MDE
Iron - Dissolved	0.11	mg/l	0.10	6010D	19 Aug 21 12:06	MDE
Silicon - Dissolved	3.22	mg/l	0.10	6010D	17 Aug 21 12:40	SZ
Strontium - Dissolved	0.11	mg/l	0.10	6010D	19 Aug 21 12:06	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	19 Aug 21 12:06	MDE

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UND-Energy & Environmental
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Grand Forks ND 58201

Report Date: 23 Aug 21
Lab Number: 21-W2894
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 17:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Project Name: ND Carbon Safe
Sample Description: NDCS-W289

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Boron - Dissolved	0.45	mg/l	0.10	6010D	20 Aug 21 11:34	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Aug 21 11:16	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Barium - Total	0.0786	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Copper - Total	0.0047	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Lead - Total	0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Manganese - Total	0.0194	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	20 Aug 21 11:16	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	20 Aug 21 12:22	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Barium - Dissolved	0.0750	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

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MEMBER ACIL

Report Date: 23 Aug 21
Lab Number: 21-W2894
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 17:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: ND Carbon Safe
Sample Description: NDCS-W289

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Manganese - Dissolved	0.0080	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	20 Aug 21 12:22	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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MEMBER ACIL

Report Date: 23 Aug 21
Lab Number: 21-W2895
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 19:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: ND Carbon Safe
Sample Description: NDCS-W510

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	12 Aug 21	RAA
pH	* 8.4	units	N/A	SM4500-H+-B-11	16 Aug 21 13:30	RAA
Conductivity (EC)	2699	umhos/cm	N/A	SM2510B-11	12 Aug 21 17:00	RAA
Total Alkalinity	1350	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Phenolphthalein Alk	25	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Bicarbonate	1300	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Carbonate	50	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 17:00	RAA
Tot Dis Solids(Summation)	1580	mg/l	12.5	SM1030-F	19 Aug 21 14:04	Calculated
Percent Sodium of Cations	98.0	%	NA	N/A	19 Aug 21 14:04	Calculated
Total Hardness as CaCO3	17.8	mg/l	NA	SM2340B-11	19 Aug 21 14:04	Calculated
Hardness in grains/gallon	1.04	gr/gal	NA	SM2340-B	19 Aug 21 14:04	Calculated
Cation Summation	28.1	meq/L	NA	SM1030-F	19 Aug 21 14:04	Calculated
Anion Summation	30.6	meq/L	NA	SM1030-F	16 Aug 21 12:01	Calculated
Percent Error	-4.24	%	NA	SM1030-F	19 Aug 21 14:04	Calculated
Sodium Adsorption Ratio	65.2		NA	USDA 20b	19 Aug 21 14:04	Calculated
Bromide	0.740	mg/l	0.100	EPA 300.0	18 Aug 21 13:13	RMV
Total Organic Carbon	3.5	mg/l	0.5	SM5310C-11	13 Aug 21 18:17	NAS
Dissolved Organic Carbon	3.4	mg/l	0.5	SM5310C-96	13 Aug 21 18:17	NAS
Fluoride	0.88	mg/l	0.10	SM4500-F-C	12 Aug 21 17:00	RAA
Sulfate	13.4	mg/l	5.00	ASTM D516-11	16 Aug 21 11:34	EV
Chloride	116	mg/l	2.0	SM4500-Cl-E-11	16 Aug 21 12:01	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	12 Aug 21 15:36	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	12 Aug 21 10:40	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	13 Aug 21 13:53	SD

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Report Date: 23 Aug 21
Lab Number: 21-W2895
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 19:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Project Name: ND Carbon Safe
Sample Description: NDCS-W510

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	13 Aug 21 13:53	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 11:43	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 12:58	MDE
Total Dissolved Solids	1690	mg/l	10	USGS I1750-85	13 Aug 21 15:00	RAA
Calcium - Total	3.5	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Magnesium - Total	2.2	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Sodium - Total	632	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Potassium - Total	2.7	mg/l	1.0	6010D	19 Aug 21 9:54	SZ
Lithium - Total	0.105	mg/l	0.020	6010D	17 Aug 21 8:51	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	16 Aug 21 11:31	SZ
Iron - Total	0.43	mg/l	0.10	6010D	16 Aug 21 11:31	SZ
Silicon - Total	5.69	mg/l	0.10	6010D	17 Aug 21 11:40	SZ
Strontium - Total	0.18	mg/l	0.10	6010D	16 Aug 21 11:31	SZ
Zinc - Total	0.23	mg/l	0.05	6010D	16 Aug 21 11:31	SZ
Boron - Total	1.55	mg/l	0.10	6010D	20 Aug 21 9:34	SZ
Calcium - Dissolved	3.6	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Magnesium - Dissolved	2.2	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Sodium - Dissolved	635	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Potassium - Dissolved	2.8	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Lithium - Dissolved	0.100	mg/l	0.020	6010D	17 Aug 21 9:51	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	19 Aug 21 12:06	MDE
Iron - Dissolved	< 0.1	mg/l	0.10	6010D	19 Aug 21 12:06	MDE
Silicon - Dissolved	5.51	mg/l	0.10	6010D	17 Aug 21 12:40	SZ
Strontium - Dissolved	0.18	mg/l	0.10	6010D	19 Aug 21 12:06	MDE
Zinc - Dissolved	0.10	mg/l	0.05	6010D	19 Aug 21 12:06	MDE

RL = Method Reporting Limit

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

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MINNESOTA VALLEY TESTING LABORATORIES, INC.

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 23 Aug 21
Lab Number: 21-W2895
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 19:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Project Name: ND Carbon Safe
Sample Description: NDCS-W510

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Boron - Dissolved	1.50	mg/l	0.10	6010D	20 Aug 21 11:34	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Aug 21 11:16	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Barium - Total	0.1028	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Copper - Total	0.0058	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Lead - Total	0.0020	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Manganese - Total	0.0242	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Nickel - Total	0.0023	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	20 Aug 21 11:16	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	20 Aug 21 12:22	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Barium - Dissolved	0.0964	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Copper - Dissolved	0.0029	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Report Date: 23 Aug 21
Lab Number: 21-W2895
Work Order #:82-2103
Account #: 007033
Date Sampled: 11 Aug 21 19:00
Date Received: 12 Aug 21 8:00
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: ND Carbon Safe
Sample Description: NDCS-W510

Temp at Receipt: 4.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Manganese - Dissolved	0.0240	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	20 Aug 21 12:22	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Report Date: 7 Sep 21
Lab Number: 21-W2920
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 10:30
Date Received: 13 Aug 21 7:21
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W269

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	13 Aug 21	RAA
pH	* 7.6	units	N/A	SM4500-H+-B-11	13 Aug 21 18:00	RAA
Conductivity (EC)	1968	umhos/cm	N/A	SM2510B-11	13 Aug 21 18:00	RAA
Total Alkalinity	396	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Bicarbonate	396	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Tot Dis Solids(Summation)	1370	mg/l	12.5	SM1030-F	20 Aug 21 9:07	Calculated
Percent Sodium of Cations	41.6	%	NA	N/A	19 Aug 21 14:04	Calculated
Total Hardness as CaCO3	710	mg/l	NA	SM2340B-11	19 Aug 21 14:04	Calculated
Hardness in grains/gallon	41.5	gr/gal	NA	SM2340-B	19 Aug 21 14:04	Calculated
Cation Summation	24.2	meq/L	NA	SM1030-F	19 Aug 21 14:04	Calculated
Anion Summation	21.7	meq/L	NA	SM1030-F	20 Aug 21 9:07	Calculated
Percent Error	5.42	%	NA	SM1030-F	20 Aug 21 9:07	Calculated
Sodium Adsorption Ratio	3.74		NA	USDA 20b	19 Aug 21 14:04	Calculated
Bromide	< 0.5 @	mg/l	0.100	EPA 300.0	18 Aug 21 13:34	RMV
Total Organic Carbon	7.5	mg/l	0.5	SM5310C-11	13 Aug 21 21:34	NAS
Dissolved Organic Carbon	7.6	mg/l	0.5	SM5310C-96	13 Aug 21 21:34	NAS
Fluoride	0.23	mg/l	0.10	SM4500-F-C	13 Aug 21 18:00	RAA
Sulfate	649	mg/l	5.00	ASTM D516-11	16 Aug 21 12:13	EV
Chloride	9.4	mg/l	2.0	SM4500-Cl-E-11	16 Aug 21 12:36	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	20 Aug 21 9:07	EV
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	13 Aug 21 14:52	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	20 Aug 21 9:25	EMS

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 7 Sep 21
Lab Number: 21-W2920
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 10:30
Date Received: 13 Aug 21 7:21
Sampled By: Client

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W269

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	20 Aug 21 10:00	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 11:43	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 12:58	MDE
Total Dissolved Solids	1540	mg/l	10	USGS I1750-85	13 Aug 21 15:00	RAA
Calcium - Total	170	mg/l	1.0	6010D	19 Aug 21 11:04	SZ
Magnesium - Total	69.3	mg/l	1.0	6010D	19 Aug 21 11:04	SZ
Sodium - Total	229	mg/l	1.0	6010D	19 Aug 21 11:04	SZ
Potassium - Total	5.0	mg/l	1.0	6010D	19 Aug 21 11:04	SZ
Lithium - Total	0.059	mg/l	0.020	6010D	17 Aug 21 8:51	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Iron - Total	7.05	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Silicon - Total	13.5	mg/l	0.10	6010D	17 Aug 21 11:40	SZ
Strontium - Total	2.05	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Zinc - Total	0.05	mg/l	0.05	6010D	16 Aug 21 12:31	SZ
Boron - Total	0.27	mg/l	0.10	6010D	20 Aug 21 9:34	SZ
Calcium - Dissolved	168	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Magnesium - Dissolved	69.5	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Sodium - Dissolved	223	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Potassium - Dissolved	5.2	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Lithium - Dissolved	0.056	mg/l	0.020	6010D	17 Aug 21 9:51	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	19 Aug 21 13:06	MDE
Iron - Dissolved	6.54	mg/l	0.10	6010D	19 Aug 21 13:06	MDE
Silicon - Dissolved	13.5	mg/l	0.10	6010D	17 Aug 21 12:40	SZ
Strontium - Dissolved	2.06	mg/l	0.10	6010D	19 Aug 21 13:06	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	19 Aug 21 13:06	MDE

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 7 Sep 21
Lab Number: 21-W2920
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 10:30
Date Received: 13 Aug 21 7:21
Sampled By: Client

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W269

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Boron - Dissolved	0.27	mg/l	0.10	6010D	20 Aug 21 11:34	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Aug 21 11:16	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Barium - Total	0.0563	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Copper - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Manganese - Total	0.5066	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Molybdenum - Total	0.0025	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	20 Aug 21 11:16	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	20 Aug 21 12:22	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Barium - Dissolved	0.0522	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

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MEMBER ACIL

Report Date: 7 Sep 21
Lab Number: 21-W2920
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 10:30
Date Received: 13 Aug 21 7:21
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W269

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Manganese - Dissolved	0.5240	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Molybdenum - Dissolved	0.0025	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	20 Aug 21 12:22	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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MEMBER ACIL

Report Date: 7 Sep 21
Lab Number: 21-W2921
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 14:30
Date Received: 13 Aug 21 7:21
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W217

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	13 Aug 21	RAA
pH	* 8.2	units	N/A	SM4500-H+-B-11	13 Aug 21 18:00	RAA
Conductivity (EC)	2780	umhos/cm	N/A	SM2510B-11	13 Aug 21 18:00	RAA
Total Alkalinity	1040	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Bicarbonate	1040	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Tot Dis Solids(Summation)	1660	mg/l	12.5	SM1030-F	20 Aug 21 9:07	Calculated
Percent Sodium of Cations	100	%	NA	N/A	19 Aug 21 14:04	Calculated
Total Hardness as CaCO3	13.6	mg/l	NA	SM2340B-11	19 Aug 21 14:04	Calculated
Hardness in grains/gallon	0.80	gr/gal	NA	SM2340-B	19 Aug 21 14:04	Calculated
Cation Summation	26.9	meq/L	NA	SM1030-F	19 Aug 21 14:04	Calculated
Anion Summation	32.3	meq/L	NA	SM1030-F	20 Aug 21 9:07	Calculated
Percent Error	-9.18	%	NA	SM1030-F	20 Aug 21 9:07	Calculated
Sodium Adsorption Ratio	73.0		NA	USDA 20b	19 Aug 21 14:04	Calculated
Free Carbon Dioxide	12.9	mg/L	NA			Calculated
Total Carbon Dioxide	921	mg/L	NA			Calculated
Bromide	2.90	mg/l	0.100	EPA 300.0	18 Aug 21 13:55	RMV
Total Organic Carbon	1.7	mg/l	0.5	SM5310C-11	13 Aug 21 21:34	NAS
Dissolved Organic Carbon	1.8	mg/l	0.5	SM5310C-96	13 Aug 21 21:34	NAS
Fluoride	3.11	mg/l	0.10	SM4500-F-C	13 Aug 21 18:00	RAA
Sulfate	< 5	mg/l	5.00	ASTM D516-11	16 Aug 21 12:13	EV
Chloride	408	mg/l	2.0	SM4500-Cl-E-11	16 Aug 21 12:36	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	20 Aug 21 9:07	EV

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CERTIFICATION: ND # ND-00016

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UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 7 Sep 21
Lab Number: 21-W2921
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 14:30
Date Received: 13 Aug 21 7:21
Sampled By: Client

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W217

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	13 Aug 21 14:52	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	20 Aug 21 9:25	EMS
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	20 Aug 21 10:00	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 11:43	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 12:58	MDE
Total Dissolved Solids	1540	mg/l	10	USGS I1750-85	13 Aug 21 15:00	RAA
Calcium - Total	3.8	mg/l	1.0	6010D	19 Aug 21 11:04	SZ
Magnesium - Total	1.0	mg/l	1.0	6010D	19 Aug 21 11:04	SZ
Sodium - Total	619	mg/l	1.0	6010D	19 Aug 21 11:04	SZ
Potassium - Total	2.3	mg/l	1.0	6010D	19 Aug 21 11:04	SZ
Lithium - Total	0.088	mg/l	0.020	6010D	17 Aug 21 8:51	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Iron - Total	0.17	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Silicon - Total	5.28	mg/l	0.10	6010D	17 Aug 21 11:40	SZ
Strontium - Total	0.15	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Zinc - Total	0.12	mg/l	0.05	6010D	16 Aug 21 12:31	SZ
Boron - Total	2.88	mg/l	0.10	6010D	20 Aug 21 9:34	SZ
Calcium - Dissolved	3.8	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Magnesium - Dissolved	< 1	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Sodium - Dissolved	612	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Potassium - Dissolved	2.4	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Lithium - Dissolved	0.088	mg/l	0.020	6010D	17 Aug 21 9:51	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	19 Aug 21 13:06	MDE
Iron - Dissolved	0.15	mg/l	0.10	6010D	19 Aug 21 13:06	MDE
Silicon - Dissolved	5.25	mg/l	0.10	6010D	17 Aug 21 12:40	SZ

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CERTIFICATION: ND # ND-00016

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Report Date: 7 Sep 21
Lab Number: 21-W2921
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 14:30
Date Received: 13 Aug 21 7:21
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W217

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Strontium - Dissolved	0.16	mg/l	0.10	6010D	19 Aug 21 13:06	MDE
Zinc - Dissolved	0.12	mg/l	0.05	6010D	19 Aug 21 13:06	MDE
Boron - Dissolved	2.89	mg/l	0.10	6010D	20 Aug 21 11:34	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Aug 21 11:16	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Barium - Total	0.1130	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Copper - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Manganese - Total	< 0.005 ^	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Molybdenum - Total	0.0043	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	20 Aug 21 11:16	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	20 Aug 21 12:22	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Barium - Dissolved	0.1112	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

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MEMBER ACIL

Report Date: 7 Sep 21
Lab Number: 21-W2921
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 14:30
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Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W217

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Manganese - Dissolved	< 0.005 ^	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Molybdenum - Dissolved	0.0039	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	20 Aug 21 12:22	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

* Holding time exceeded

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

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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MEMBER ACIL

Report Date: 7 Sep 21
Lab Number: 21-W2922
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 15:30
Date Received: 13 Aug 21 7:21
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W1686

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	13 Aug 21	RAA
pH	* 7.2	units	N/A	SM4500-H+-B-11	13 Aug 21 18:00	RAA
Conductivity (EC)	2894	umhos/cm	N/A	SM2510B-11	13 Aug 21 18:00	RAA
Total Alkalinity	530	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Bicarbonate	530	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Tot Dis Solids(Summation)	2420	mg/l	12.5	SM1030-F	20 Aug 21 9:28	Calculated
Percent Sodium of Cations	23.0	%	NA	N/A	19 Aug 21 14:04	Calculated
Total Hardness as CaCO3	1440	mg/l	NA	SM2340B-11	19 Aug 21 14:04	Calculated
Hardness in grains/gallon	84.5	gr/gal	NA	SM2340-B	19 Aug 21 14:04	Calculated
Cation Summation	39.2	meq/L	NA	SM1030-F	19 Aug 21 14:04	Calculated
Anion Summation	39.9	meq/L	NA	SM1030-F	20 Aug 21 9:28	Calculated
Percent Error	-0.86	%	NA	SM1030-F	20 Aug 21 9:28	Calculated
Sodium Adsorption Ratio	2.36		NA	USDA 20b	19 Aug 21 14:04	Calculated
Bromide	< 0.5 @	mg/l	0.100	EPA 300.0	18 Aug 21 14:16	RMV
Total Organic Carbon	9.9	mg/l	0.5	SM5310C-11	13 Aug 21 21:34	NAS
Dissolved Organic Carbon	10.1	mg/l	0.5	SM5310C-96	13 Aug 21 21:34	NAS
Fluoride	0.14	mg/l	0.10	SM4500-F-C	13 Aug 21 18:00	RAA
Sulfate	1370	mg/l	5.00	ASTM D516-11	16 Aug 21 12:13	EV
Chloride	25.8	mg/l	2.0	SM4500-Cl-E-11	16 Aug 21 12:36	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	20 Aug 21 9:28	EV
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	13 Aug 21 14:52	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	20 Aug 21 9:25	EMS

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MEMBER ACIL

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UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 7 Sep 21
Lab Number: 21-W2922
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 15:30
Date Received: 13 Aug 21 7:21
Sampled By: Client

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W1686

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	20 Aug 21 10:00	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 11:43	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 12:58	MDE
Total Dissolved Solids	2680	mg/l	10	USGS I1750-85	13 Aug 21 15:00	RAA
Calcium - Total	364	mg/l	1.0	6010D	19 Aug 21 11:04	SZ
Magnesium - Total	130	mg/l	1.0	6010D	19 Aug 21 11:04	SZ
Sodium - Total	206	mg/l	1.0	6010D	19 Aug 21 11:04	SZ
Potassium - Total	5.4	mg/l	1.0	6010D	19 Aug 21 11:04	SZ
Lithium - Total	0.076	mg/l	0.020	6010D	17 Aug 21 8:51	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Iron - Total	4.96	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Silicon - Total	5.11	mg/l	0.10	6010D	17 Aug 21 11:40	SZ
Strontium - Total	3.62	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Zinc - Total	< 0.05	mg/l	0.05	6010D	16 Aug 21 12:31	SZ
Boron - Total	0.13	mg/l	0.10	6010D	20 Aug 21 9:34	SZ
Calcium - Dissolved	374	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Magnesium - Dissolved	136	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Sodium - Dissolved	207	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Potassium - Dissolved	5.8	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Lithium - Dissolved	0.075	mg/l	0.020	6010D	17 Aug 21 9:51	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	19 Aug 21 13:06	MDE
Iron - Dissolved	4.97	mg/l	0.10	6010D	19 Aug 21 13:06	MDE
Silicon - Dissolved	5.18	mg/l	0.10	6010D	17 Aug 21 12:40	SZ
Strontium - Dissolved	3.76	mg/l	0.10	6010D	19 Aug 21 13:06	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	19 Aug 21 13:06	MDE

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UND-Energy & Environmental
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Grand Forks ND 58201

Report Date: 7 Sep 21
Lab Number: 21-W2922
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 15:30
Date Received: 13 Aug 21 7:21
Sampled By: Client

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W1686

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Boron - Dissolved	0.13	mg/l	0.10	6010D	20 Aug 21 11:34	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Aug 21 11:16	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Barium - Total	0.0270	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Copper - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Manganese - Total	0.5100	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	20 Aug 21 11:16	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	20 Aug 21 12:22	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Barium - Dissolved	0.0270	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

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MEMBER ACIL

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Date Received: 13 Aug 21 7:21
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W1686

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Manganese - Dissolved	0.5124	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	20 Aug 21 12:22	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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MEMBER ACIL

Report Date: 7 Sep 21
Lab Number: 21-W2923
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 17:00
Date Received: 13 Aug 21 7:21
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-471

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	13 Aug 21	RAA
pH	* 8.5	units	N/A	SM4500-H+-B-11	13 Aug 21 18:00	RAA
Conductivity (EC)	2561	umhos/cm	N/A	SM2510B-11	13 Aug 21 18:00	RAA
Total Alkalinity	1160	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Phenolphthalein Alk	22	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Bicarbonate	1117	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Carbonate	43	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Tot Dis Solids(Summation)	1510	mg/l	12.5	SM1030-F	20 Aug 21 9:28	Calculated
Percent Sodium of Cations	97.8	%	NA	N/A	19 Aug 21 14:04	Calculated
Total Hardness as CaCO3	13.8	mg/l	NA	SM2340B-11	19 Aug 21 14:04	Calculated
Hardness in grains/gallon	0.80	gr/gal	NA	SM2340-B	19 Aug 21 14:04	Calculated
Cation Summation	27.0	meq/L	NA	SM1030-F	19 Aug 21 14:06	Calculated
Anion Summation	28.9	meq/L	NA	SM1030-F	20 Aug 21 9:28	Calculated
Percent Error	-3.43	%	NA	SM1030-F	20 Aug 21 9:28	Calculated
Sodium Adsorption Ratio	71.1		NA	USDA 20b	19 Aug 21 14:04	Calculated
Bromide	1.28	mg/l	0.100	EPA 300.0	18 Aug 21 14:37	RMV
Total Organic Carbon	5.2	mg/l	0.5	SM5310C-11	13 Aug 21 21:34	NAS
Dissolved Organic Carbon	5.5	mg/l	0.5	SM5310C-96	13 Aug 21 21:34	NAS
Fluoride	1.12	mg/l	0.10	SM4500-F-C	13 Aug 21 18:00	RAA
Sulfate	< 5	mg/l	5.00	ASTM D516-11	16 Aug 21 12:13	EV
Chloride	201	mg/l	2.0	SM4500-Cl-E-11	16 Aug 21 12:36	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	20 Aug 21 9:28	EV
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	13 Aug 21 14:52	SD
Phosphorus as P - Total	0.22	mg/l	0.20	EPA 365.1	20 Aug 21 9:25	EMS

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Report Date: 7 Sep 21
Lab Number: 21-W2923
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 17:00
Date Received: 13 Aug 21 7:21
Sampled By: Client

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-471

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Phosphorus as P-Dissolved	0.24	mg/l	0.20	EPA 365.1	20 Aug 21 10:00	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 11:43	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 12:58	MDE
Total Dissolved Solids	1600	mg/l	10	USGS I1750-85	13 Aug 21 15:00	RAA
Calcium - Total	3.2	mg/l	1.0	6010D	19 Aug 21 12:04	SZ
Magnesium - Total	1.4	mg/l	1.0	6010D	19 Aug 21 12:04	SZ
Sodium - Total	606	mg/l	1.0	6010D	19 Aug 21 12:04	SZ
Potassium - Total	2.3	mg/l	1.0	6010D	19 Aug 21 12:04	SZ
Lithium - Total	0.092	mg/l	0.020	6010D	17 Aug 21 8:51	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Iron - Total	< 0.1	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Silicon - Total	4.62	mg/l	0.10	6010D	17 Aug 21 11:40	SZ
Strontium - Total	0.15	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Zinc - Total	< 0.05	mg/l	0.05	6010D	16 Aug 21 12:31	SZ
Boron - Total	2.34	mg/l	0.10	6010D	20 Aug 21 10:34	SZ
Calcium - Dissolved	3.2	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Magnesium - Dissolved	1.4	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Sodium - Dissolved	612	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Potassium - Dissolved	2.3	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Lithium - Dissolved	0.089	mg/l	0.020	6010D	17 Aug 21 9:51	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	19 Aug 21 14:06	MDE
Iron - Dissolved	< 0.1	mg/l	0.10	6010D	19 Aug 21 14:06	MDE
Silicon - Dissolved	4.46	mg/l	0.10	6010D	17 Aug 21 12:40	SZ
Strontium - Dissolved	0.15	mg/l	0.10	6010D	19 Aug 21 14:06	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	19 Aug 21 14:06	MDE

RL = Method Reporting Limit

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

MVTL

MINNESOTA VALLEY TESTING LABORATORIES, INC.

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 7 Sep 21
Lab Number: 21-W2923
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 17:00
Date Received: 13 Aug 21 7:21
Sampled By: Client

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-471

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Boron - Dissolved	2.44	mg/l	0.10	6010D	20 Aug 21 11:34	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Aug 21 11:16	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Barium - Total	0.1326	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Copper - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Manganese - Total	0.0110	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	20 Aug 21 11:16	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	20 Aug 21 12:22	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Barium - Dissolved	0.1258	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

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MEMBER ACIL

Report Date: 7 Sep 21
Lab Number: 21-W2923
Work Order #: 82-2121
Account #: 007033
Date Sampled: 12 Aug 21 17:00
Date Received: 13 Aug 21 7:21
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-471

Temp at Receipt: 7.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Manganese - Dissolved	0.0102	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	20 Aug 21 12:22	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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MEMBER ACIL

Report Date: 23 Aug 21
Lab Number: 21-W2932
Work Order #: 82-2129
Account #: 007033
Date Sampled: 13 Aug 21 8:00
Date Received: 13 Aug 21 11:38
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-MPC-WS-2

Temp at Receipt: 9.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	13 Aug 21	RAA
pH	* 7.9	units	N/A	SM4500-H+-B-11	13 Aug 21 18:00	RAA
Conductivity (EC)	1296	umhos/cm	N/A	SM2510B-11	13 Aug 21 18:00	RAA
Total Alkalinity	492	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Bicarbonate	492	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	13 Aug 21 18:00	RAA
Tot Dis Solids(Summation)	792	mg/l	12.5	SM1030-F	20 Aug 21 9:28	Calculated
Percent Sodium of Cations	56.9	%	NA	N/A	19 Aug 21 14:04	Calculated
Total Hardness as CaCO3	293	mg/l	NA	SM2340B-11	19 Aug 21 14:04	Calculated
Hardness in grains/gallon	17.1	gr/gal	NA	SM2340-B	19 Aug 21 14:04	Calculated
Cation Summation	14.9	meq/L	NA	SM1030-F	19 Aug 21 14:06	Calculated
Anion Summation	14.1	meq/L	NA	SM1030-F	20 Aug 21 9:28	Calculated
Percent Error	2.77	%	NA	SM1030-F	20 Aug 21 9:28	Calculated
Sodium Adsorption Ratio	4.93		NA	USDA 20b	19 Aug 21 14:04	Calculated
Bromide	< 0.5 @	mg/l	0.100	EPA 300.0	18 Aug 21 14:58	RMV
Total Organic Carbon	5.4	mg/l	0.5	SM5310C-11	13 Aug 21 21:34	NAS
Dissolved Organic Carbon	5.4	mg/l	0.5	SM5310C-96	13 Aug 21 21:34	NAS
Fluoride	0.29	mg/l	0.10	SM4500-F-C	13 Aug 21 18:00	RAA
Sulfate	191	mg/l	5.00	ASTM D516-11	16 Aug 21 13:53	EV
Chloride	8.8	mg/l	2.0	SM4500-Cl-E-11	16 Aug 21 14:24	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	20 Aug 21 9:28	EV
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	13 Aug 21 14:52	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	20 Aug 21 10:00	EMS

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 23 Aug 21
Lab Number: 21-W2932
Work Order #: 82-2129
Account #: 007033
Date Sampled: 13 Aug 21 8:00
Date Received: 13 Aug 21 11:38
Sampled By: Client

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-MPC-WS-2

Temp at Receipt: 9.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	20 Aug 21 10:00	EMS
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 11:43	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Aug 21 12:58	MDE
Total Dissolved Solids	838	mg/l	10	USGS I1750-85	13 Aug 21 15:00	RAA
Calcium - Total	68.8	mg/l	1.0	6010D	19 Aug 21 12:04	SZ
Magnesium - Total	29.4	mg/l	1.0	6010D	19 Aug 21 12:04	SZ
Sodium - Total	194	mg/l	1.0	6010D	19 Aug 21 12:04	SZ
Potassium - Total	4.6	mg/l	1.0	6010D	19 Aug 21 12:04	SZ
Lithium - Total	0.051	mg/l	0.020	6010D	17 Aug 21 8:51	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Iron - Total	0.98	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Silicon - Total	9.15	mg/l	0.10	6010D	17 Aug 21 11:40	SZ
Strontium - Total	1.15	mg/l	0.10	6010D	16 Aug 21 12:31	SZ
Zinc - Total	< 0.05	mg/l	0.05	6010D	16 Aug 21 12:31	SZ
Boron - Total	0.36	mg/l	0.10	6010D	20 Aug 21 10:34	SZ
Calcium - Dissolved	67.6	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Magnesium - Dissolved	28.9	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Sodium - Dissolved	206	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Potassium - Dissolved	4.8	mg/l	1.0	6010D	19 Aug 21 14:04	SZ
Lithium - Dissolved	0.050	mg/l	0.020	6010D	17 Aug 21 9:51	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	19 Aug 21 14:06	MDE
Iron - Dissolved	0.94	mg/l	0.10	6010D	19 Aug 21 14:06	MDE
Silicon - Dissolved	9.12	mg/l	0.10	6010D	17 Aug 21 12:40	SZ
Strontium - Dissolved	1.17	mg/l	0.10	6010D	19 Aug 21 14:06	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	19 Aug 21 14:06	MDE

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 23 Aug 21
Lab Number: 21-W2932
Work Order #: 82-2129
Account #: 007033
Date Sampled: 13 Aug 21 8:00
Date Received: 13 Aug 21 11:38
Sampled By: Client

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-MPC-WS-2

Temp at Receipt: 9.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Boron - Dissolved	0.38	mg/l	0.10	6010D	20 Aug 21 11:34	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	20 Aug 21 11:16	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Barium - Total	0.0776	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Copper - Total	0.0029	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Manganese - Total	0.1527	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Nickel - Total	0.0026	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	20 Aug 21 11:16	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 11:16	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	20 Aug 21 11:16	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	20 Aug 21 12:22	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Barium - Dissolved	0.0719	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

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MEMBER ACIL

Report Date: 23 Aug 21
Lab Number: 21-W2932
Work Order #: 82-2129
Account #: 007033
Date Sampled: 13 Aug 21 8:00
Date Received: 13 Aug 21 11:38
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-MPC-WS-2

Temp at Receipt: 9.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Manganese - Dissolved	0.1232	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Nickel - Dissolved	0.0023	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	20 Aug 21 12:22	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	20 Aug 21 12:22	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	20 Aug 21 12:22	MDE

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 14 Sep 21
Lab Number: 21-W3137
Work Order #: 82-2307
Account #: 007033
Date Sampled: 30 Aug 21 10:45
Date Received: 30 Aug 21 13:10
Sampled By: MVTL Field Services

Project Name: Center USGS Well

PO #: B. Botnen

Sample Description: USGS Well

Temp at Receipt: 9.3C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	31 Aug 21	RAA
pH - Field	8.46	units	NA	SM 4500 H+ B	30 Aug 21 10:45	JSM
Temperature - Field	13.5	Degrees C	NA	SM 2550B	30 Aug 21 10:45	JSM
Total Alkalinity	948	mg/l CaCO3	20	SM2320B-11	31 Aug 21 17:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	31 Aug 21 17:00	RAA
Bicarbonate	909	mg/l CaCO3	20	SM2320B-11	31 Aug 21 17:00	RAA
Carbonate	39	mg/l CaCO3	20	SM2320B-11	31 Aug 21 17:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	31 Aug 21 17:00	RAA
Conductivity - Field	2623	umhos/cm	1	EPA 120.1	30 Aug 21 10:45	JSM
Tot Dis Solids(Summation)	1540	mg/l	12.5	SM1030-F	2 Sep 21 11:43	Calculated
Cation Summation	29.4	meq/L	NA	SM1030-F	2 Sep 21 11:20	Calculated
Anion Summation	27.0	meq/L	NA	SM1030-F	2 Sep 21 11:43	Calculated
Percent Error	4.18	%	NA	SM1030-F	2 Sep 21 11:43	Calculated
Bromide	2.51	mg/l	0.100	EPA 300.0	13 Sep 21 15:47	RMV
Total Organic Carbon	2.0	mg/l	0.5	SM5310C-11	3 Sep 21 13:29	NAS
Dissolved Organic Carbon	2.1	mg/l	0.5	SM5310C-96	3 Sep 21 13:29	NAS
Fluoride	3.70	mg/l	0.10	SM4500-F-C	31 Aug 21 17:00	RAA
Sulfate	< 5	mg/l	5.00	ASTM D516-11	1 Sep 21 10:57	SD
Chloride	286	mg/l	2.0	SM4500-Cl-E-11	1 Sep 21 14:43	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	2 Sep 21 11:43	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	31 Aug 21 13:11	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	3 Sep 21 8:56	SD
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	3 Sep 21 8:56	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	1 Sep 21 12:57	MDE

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CERTIFICATION: ND # ND-00016

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MINNESOTA VALLEY TESTING LABORATORIES, INC.

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2616 E. Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 14 Sep 21
Lab Number: 21-W3137
Work Order #: 82-2307
Account #: 007033
Date Sampled: 30 Aug 21 10:45
Date Received: 30 Aug 21 13:10
Sampled By: MVTL Field Services

Project Name: Center USGS Well

PO #: B. Botnen

Sample Description: USGS Well

Temp at Receipt: 9.3C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	1 Sep 21 14:26	MDE
Total Dissolved Solids	1670	mg/l	10	USGS I1750-85	3 Sep 21 14:43	RAA
Calcium - Total	3.5	mg/l	1.0	6010D	2 Sep 21 11:20	MDE
Magnesium - Total	< 1	mg/l	1.0	6010D	2 Sep 21 11:20	MDE
Sodium - Total	675	mg/l	1.0	6010D	2 Sep 21 11:20	MDE
Potassium - Total	2.5	mg/l	1.0	6010D	2 Sep 21 11:20	MDE
Lithium - Total	0.083	mg/l	0.020	6010D	9 Sep 21 10:31	MDE
Aluminum - Total	< 0.1	mg/l	0.10	6010D	1 Sep 21 10:53	MDE
Iron - Total	0.29	mg/l	0.10	6010D	1 Sep 21 10:53	MDE
Silicon - Total	5.02	mg/l	0.10	6010D	9 Sep 21 14:18	MDE
Strontium - Total	0.15	mg/l	0.10	6010D	1 Sep 21 10:53	MDE
Zinc - Total	< 0.05	mg/l	0.05	6010D	1 Sep 21 10:53	MDE
Boron - Total	2.81	mg/l	0.10	6010D	2 Sep 21 16:20	MDE
Calcium - Dissolved	3.4	mg/l	1.0	6010D	2 Sep 21 11:20	MDE
Magnesium - Dissolved	< 1	mg/l	1.0	6010D	2 Sep 21 11:20	MDE
Sodium - Dissolved	670	mg/l	1.0	6010D	2 Sep 21 11:20	MDE
Potassium - Dissolved	2.7	mg/l	1.0	6010D	2 Sep 21 11:20	MDE
Lithium - Dissolved	0.086	mg/l	0.020	6010D	9 Sep 21 11:31	MDE
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	1 Sep 21 10:53	MDE
Iron - Dissolved	0.20	mg/l	0.10	6010D	1 Sep 21 10:53	MDE
Silicon - Dissolved	4.93	mg/l	0.10	6010D	9 Sep 21 14:18	MDE
Strontium - Dissolved	0.15	mg/l	0.10	6010D	1 Sep 21 10:53	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	1 Sep 21 10:53	MDE
Boron - Dissolved	2.79	mg/l	0.10	6010D	2 Sep 21 15:20	MDE

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

MVTL

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 14 Sep 21
Lab Number: 21-W3137
Work Order #: 82-2307
Account #: 007033
Date Sampled: 30 Aug 21 10:45
Date Received: 30 Aug 21 13:10
Sampled By: MVTL Field Services

Project Name: Center USGS Well

PO #: B. Botnen

Sample Description: USGS Well

Temp at Receipt: 9.3C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Antimony - Total	< 0.001	mg/l	0.0010	6020B	8 Sep 21 12:29	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	8 Sep 21 12:29	MDE
Barium - Total	0.0966	mg/l	0.0020	6020B	8 Sep 21 12:29	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	8 Sep 21 12:29	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	8 Sep 21 12:29	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	8 Sep 21 12:29	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	8 Sep 21 12:29	MDE
Copper - Total	< 0.002	mg/l	0.0020	6020B	8 Sep 21 12:29	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	8 Sep 21 12:29	MDE
Manganese - Total	0.0063	mg/l	0.0020	6020B	8 Sep 21 12:29	MDE
Molybdenum - Total	0.0057	mg/l	0.0020	6020B	8 Sep 21 12:29	MDE
Nickel - Total	< 0.005 ^	mg/l	0.0020	6020B	8 Sep 21 12:29	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	8 Sep 21 12:29	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	8 Sep 21 12:29	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	8 Sep 21 12:29	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	8 Sep 21 12:29	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	8 Sep 21 10:01	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	8 Sep 21 10:01	MDE
Barium - Dissolved	0.0910	mg/l	0.0020	6020B	8 Sep 21 10:01	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	8 Sep 21 10:01	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	8 Sep 21 10:01	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	8 Sep 21 10:01	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	8 Sep 21 10:01	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	8 Sep 21 10:01	MDE

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CERTIFICATION: ND # ND-00016

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UND-Energy & Environmental
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Report Date: 14 Sep 21
Lab Number: 21-W3137
Work Order #: 82-2307
Account #: 007033
Date Sampled: 30 Aug 21 10:45
Date Received: 30 Aug 21 13:10
Sampled By: MVTL Field Services

PO #: B. Botnen

Temp at Receipt: 9.3C ROI

Project Name: Center USGS Well

Sample Description: USGS Well

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	8 Sep 21 10:01	MDE
Manganese - Dissolved	0.0052	mg/l	0.0020	6020B	8 Sep 21 10:01	MDE
Molybdenum - Dissolved	0.0051	mg/l	0.0020	6020B	8 Sep 21 10:01	MDE
Nickel - Dissolved	< 0.005 ^	mg/l	0.0020	6020B	8 Sep 21 10:01	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	8 Sep 21 10:01	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	8 Sep 21 10:01	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	8 Sep 21 10:01	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	8 Sep 21 10:01	MDE

Bromide was analyzed at MVTL, New Ulm, MN.
ND Certification #:R-040

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

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4368
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 8:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-MPC-WS1

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	11 Nov 21	RAA
pH	* 7.5	units	N/A	SM4500-H+-B-11	10 Nov 21 17:00	AC
Conductivity (EC)	1438	umhos/cm	N/A	SM2510B-11	10 Nov 21 17:00	AC
pH - Field	7.28	units	NA	SM 4500 H+ B	9 Nov 21 8:30	
Temperature - Field	15.3	Degrees C	NA	SM 2550B	9 Nov 21 8:30	
Total Alkalinity	475	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Bicarbonate	475	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Tot Dis Solids(Summation)	911	mg/l	12.5	SM1030-F	18 Nov 21 14:17	Calculated
Cation Summation	15.2	meq/L	NA	SM1030-F	16 Nov 21 10:36	Calculated
Anion Summation	15.9	meq/L	NA	SM1030-F	18 Nov 21 14:17	Calculated
Percent Error	-1.98	%	NA	SM1030-F	18 Nov 21 14:17	Calculated
Bromide	< 0.5 @	mg/l	0.100	EPA 300.0	15 Nov 21 19:17	RMV
Total Organic Carbon	5.9	mg/l	0.5	SM5310C-11	16 Nov 21 18:16	NAS
Dissolved Organic Carbon	5.8	mg/l	0.5	SM5310C-96	16 Nov 21 18:16	NAS
Fluoride	0.29	mg/l	0.10	SM4500-F-C	10 Nov 21 17:00	AC
Sulfate	290	mg/l	5.00	ASTM D516-11	15 Nov 21 14:26	SD
Chloride	10.6	mg/l	2.0	SM4500-Cl-E-11	10 Nov 21 10:55	SD
Nitrate-Nitrite as N	0.28	mg/l	0.20	EPA 353.2	18 Nov 21 14:17	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	10 Nov 21 14:18	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 8:56	SD
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 10:05	SD

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4368
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 8:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-MPC-WS1

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 12:33	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 12:33	MDE
Total Dissolved Solids	959	mg/l	10	USGS I1750-85	12 Nov 21 9:25	RAA
Calcium - Total	85.0	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Magnesium - Total	35.0	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Sodium - Total	200	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Potassium - Total	5.0	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Lithium - Total	0.045	mg/l	0.020	6010D	16 Nov 21 9:32	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Iron - Total	0.98	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Silicon - Total	11.3	mg/l	0.10	6010D	16 Nov 21 13:55	SZ
Strontium - Total	1.14	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Zinc - Total	0.09	mg/l	0.05	6010D	12 Nov 21 11:33	MDE
Boron - Total	0.37	mg/l	0.10	6010D	17 Nov 21 9:08	SZ
Calcium - Dissolved	80.0	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Magnesium - Dissolved	34.3	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Sodium - Dissolved	190	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Potassium - Dissolved	4.8	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Lithium - Dissolved	0.048	mg/l	0.020	6010D	16 Nov 21 11:32	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 9:55	MDE
Iron - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 9:55	MDE
Silicon - Dissolved	11.5	mg/l	0.10	6010D	16 Nov 21 15:55	SZ
Strontium - Dissolved	1.23	mg/l	0.10	6010D	15 Nov 21 9:55	MDE
Zinc - Dissolved	0.05	mg/l	0.05	6010D	15 Nov 21 9:55	MDE

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Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4368
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 8:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-MPC-WS1

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Boron - Dissolved	0.38	mg/l	0.10	6010D	17 Nov 21 14:08	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	16 Nov 21 11:07	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Barium - Total	0.0902	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Copper - Total	0.0264	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Manganese - Total	0.2717	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Nickel - Total	0.0064	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	16 Nov 21 11:07	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	16 Nov 21 14:31	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Barium - Dissolved	0.0851	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 16:48	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

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Report Date: 26 Nov 21
Lab Number: 21-W4368
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 8:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-MPC-WS1

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Copper - Dissolved	0.0133	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Manganese - Dissolved	0.2154	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Nickel - Dissolved	0.0055	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	16 Nov 21 14:31	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

Bromide was analyzed at MVTL, New Ulm, MN.
ND Certification #:R-040

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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Report Date: 26 Nov 21
Lab Number: 21-W4369
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 9:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-MPC-WS1 Dup

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	10 Nov 21	AC
pH	* 7.3	units	N/A	SM4500-H+-B-11	10 Nov 21 17:00	AC
Conductivity (EC)	1432	umhos/cm	N/A	SM2510B-11	10 Nov 21 17:00	AC
pH - Field	7.28	units	NA	SM 4500 H+ B	9 Nov 21 9:30	
Temperature - Field	7.28	Degrees C	NA	SM 2550B	9 Nov 21 9:30	
Total Alkalinity	572	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Bicarbonate	572	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Tot Dis Solids(Summation)	999	mg/l	12.5	SM1030-F	18 Nov 21 14:34	Calculated
Cation Summation	16.9	meq/L	NA	SM1030-F	15 Nov 21 9:55	Calculated
Anion Summation	17.9	meq/L	NA	SM1030-F	18 Nov 21 14:34	Calculated
Percent Error	-2.83	%	NA	SM1030-F	18 Nov 21 14:34	Calculated
Bromide	< 0.5 @	mg/l	0.100	EPA 300.0	15 Nov 21 19:38	RMV
Total Organic Carbon	5.9	mg/l	0.5	SM5310C-11	16 Nov 21 18:16	NAS
Dissolved Organic Carbon	5.8	mg/l	0.5	SM5310C-96	16 Nov 21 18:16	NAS
Fluoride	0.29	mg/l	0.10	SM4500-F-C	10 Nov 21 17:00	AC
Sulfate	294	mg/l	5.00	ASTM D516-11	15 Nov 21 14:26	SD
Chloride	10.8	mg/l	2.0	SM4500-Cl-E-11	10 Nov 21 10:55	SD
Nitrate-Nitrite as N	0.27	mg/l	0.20	EPA 353.2	18 Nov 21 14:34	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	10 Nov 21 14:18	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 8:56	SD
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 10:05	SD

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

MVTL

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4369
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 9:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-MPC-WS1 Dup

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	11 Nov 21 13:07	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	11 Nov 21 14:29	MDE
Total Dissolved Solids	967	mg/l	10	USGS I1750-85	12 Nov 21 9:25	RAA
Calcium - Total	90.7	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Magnesium - Total	39.8	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Sodium - Total	215	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Potassium - Total	5.4	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Lithium - Total	0.051	mg/l	0.020	6010D	16 Nov 21 9:32	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Iron - Total	0.30	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Silicon - Total	11.7	mg/l	0.10	6010D	16 Nov 21 13:55	SZ
Strontium - Total	1.24	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Zinc - Total	0.06	mg/l	0.05	6010D	12 Nov 21 11:33	MDE
Boron - Total	0.42	mg/l	0.10	6010D	17 Nov 21 9:08	SZ
Calcium - Dissolved	90.7	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Magnesium - Dissolved	38.6	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Sodium - Dissolved	208	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Potassium - Dissolved	5.1	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Lithium - Dissolved	0.052	mg/l	0.020	6010D	16 Nov 21 11:32	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 9:55	MDE
Iron - Dissolved	0.87	mg/l	0.10	6010D	15 Nov 21 9:55	MDE
Silicon - Dissolved	11.7	mg/l	0.10	6010D	16 Nov 21 15:55	SZ
Strontium - Dissolved	1.29	mg/l	0.10	6010D	15 Nov 21 9:55	MDE
Zinc - Dissolved	0.14	mg/l	0.05	6010D	15 Nov 21 9:55	MDE

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CERTIFICATION: ND # ND-00016

MVTL

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4369
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 9:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-MPC-WS1 Dup

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Boron - Dissolved	0.42	mg/l	0.10	6010D	17 Nov 21 14:08	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	16 Nov 21 11:07	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Barium - Total	0.0956	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Copper - Total	< 0.01 @	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Manganese - Total	0.2548	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Nickel - Total	0.0051	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	16 Nov 21 11:07	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	16 Nov 21 14:31	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Barium - Dissolved	0.0906	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 16:48	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

MVTL

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4369
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 9:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

PO #: 25411

Temp at Receipt: 0.4C ROI

Project Name: NDCS

Sample Description: NDCS-MPC-WS1 Dup

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Copper - Dissolved	< 0.01 @	mg/l	0.0020	6020B	23 Nov 21 15:59	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Manganese - Dissolved	0.2392	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Nickel - Dissolved	0.0047	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	16 Nov 21 14:31	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

Bromide was analyzed at MVTL, New Ulm, MN.
ND Certification #:R-040

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4370
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 10:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-MPC-WS2

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	10 Nov 21	AC
pH	* 7.2	units	N/A	SM4500-H+-B-11	10 Nov 21 17:00	AC
Conductivity (EC)	1247	umhos/cm	N/A	SM2510B-11	10 Nov 21 17:00	AC
pH - Field	7.30	units	NA	SM 4500 H+ B	9 Nov 21 10:30	
Temperature - Field	11.1	Degrees C	NA	SM 2550B	9 Nov 21 10:30	
Total Alkalinity	580	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Bicarbonate	580	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Tot Dis Solids(Summation)	833	mg/l	12.5	SM1030-F	18 Nov 21 14:34	Calculated
Cation Summation	14.6	meq/L	NA	SM1030-F	15 Nov 21 9:55	Calculated
Anion Summation	15.5	meq/L	NA	SM1030-F	18 Nov 21 14:34	Calculated
Percent Error	-3.02	%	NA	SM1030-F	18 Nov 21 14:34	Calculated
Bromide	< 0.5 @	mg/l	0.100	EPA 300.0	15 Nov 21 19:59	RMV
Total Organic Carbon	3.9	mg/l	0.5	SM5310C-11	16 Nov 21 21:44	NAS
Dissolved Organic Carbon	4.0	mg/l	0.5	SM5310C-96	16 Nov 21 21:44	NAS
Fluoride	0.30	mg/l	0.10	SM4500-F-C	10 Nov 21 17:00	AC
Sulfate	176	mg/l	5.00	ASTM D516-11	15 Nov 21 14:26	SD
Chloride	6.9	mg/l	2.0	SM4500-Cl-E-11	10 Nov 21 10:55	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	18 Nov 21 14:34	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	10 Nov 21 14:18	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 8:56	SD
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 10:05	SD

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4370
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 10:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-MPC-WS2

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	11 Nov 21 13:07	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	11 Nov 21 14:29	MDE
Total Dissolved Solids	829	mg/l	10	USGS I1750-85	12 Nov 21 9:25	RAA
Calcium - Total	69.5	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Magnesium - Total	27.8	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Sodium - Total	200	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Potassium - Total	4.8	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Lithium - Total	0.052	mg/l	0.020	6010D	16 Nov 21 9:32	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Iron - Total	0.97	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Silicon - Total	8.85	mg/l	0.10	6010D	16 Nov 21 13:55	SZ
Strontium - Total	1.11	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Zinc - Total	< 0.05	mg/l	0.05	6010D	12 Nov 21 11:33	MDE
Boron - Total	0.36	mg/l	0.10	6010D	17 Nov 21 9:08	SZ
Calcium - Dissolved	70.6	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Magnesium - Dissolved	28.0	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Sodium - Dissolved	197	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Potassium - Dissolved	4.8	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Lithium - Dissolved	0.055	mg/l	0.020	6010D	16 Nov 21 11:32	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 9:55	MDE
Iron - Dissolved	0.99	mg/l	0.10	6010D	15 Nov 21 9:55	MDE
Silicon - Dissolved	9.18	mg/l	0.10	6010D	16 Nov 21 15:55	SZ
Strontium - Dissolved	1.16	mg/l	0.10	6010D	15 Nov 21 9:55	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	15 Nov 21 9:55	MDE

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4370
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 10:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-MPC-WS2

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Boron - Dissolved	0.38	mg/l	0.10	6010D	17 Nov 21 14:08	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	16 Nov 21 11:07	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Barium - Total	0.0728	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Copper - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Manganese - Total	0.1033	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Nickel - Total	0.0025	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	16 Nov 21 11:07	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	16 Nov 21 14:31	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Barium - Dissolved	0.0686	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 16:48	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

RL = Method Reporting Limit

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CERTIFICATION: ND # ND-00016

MVTL

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4370
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 10:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-MPC-WS2

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Manganese - Dissolved	0.0986	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Nickel - Dissolved	0.0023	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	16 Nov 21 14:31	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

Bromide was analyzed at MVTL, New Ulm, MN.
ND Certification #:R-040

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Report Date: 26 Nov 21
Lab Number: 21-W4371
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 13:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

PO #: 25411

Temp at Receipt: 0.4C ROI

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: NDCS

Sample Description: NDCS-1686

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	10 Nov 21	AC
pH	* 6.9	units	N/A	SM4500-H+-B-11	10 Nov 21 17:00	AC
Conductivity (EC)	2906	umhos/cm	N/A	SM2510B-11	10 Nov 21 17:00	AC
Total Alkalinity	504	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Bicarbonate	504	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Tot Dis Solids(Summation)	2500	mg/l	12.5	SM1030-F	18 Nov 21 14:34	Calculated
Cation Summation	40.7	meq/L	NA	SM1030-F	15 Nov 21 10:55	Calculated
Anion Summation	40.1	meq/L	NA	SM1030-F	18 Nov 21 14:34	Calculated
Percent Error	0.77	%	NA	SM1030-F	18 Nov 21 14:34	Calculated
Bromide	< 0.5 @	mg/l	0.100	EPA 300.0	15 Nov 21 20:20	RMV
Total Organic Carbon	10.7	mg/l	0.5	SM5310C-11	16 Nov 21 21:44	NAS
Dissolved Organic Carbon	10.3	mg/l	0.5	SM5310C-96	16 Nov 21 21:44	NAS
Fluoride	0.13	mg/l	0.10	SM4500-F-C	10 Nov 21 17:00	AC
Sulfate	1410	mg/l	5.00	ASTM D516-11	15 Nov 21 14:26	SD
Chloride	24.1	mg/l	2.0	SM4500-Cl-E-11	10 Nov 21 10:55	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	18 Nov 21 14:34	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	10 Nov 21 14:18	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 8:56	SD
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 10:05	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	11 Nov 21 13:07	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	11 Nov 21 14:29	MDE

RL = Method Reporting Limit

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

MVTL

MINNESOTA VALLEY TESTING LABORATORIES, INC.

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4371
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 13:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-1686

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Total Dissolved Solids	2770	mg/l	10	USGS I1750-85	12 Nov 21 9:25	RAA
Calcium - Total	410	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Magnesium - Total	147	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Sodium - Total	201	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Potassium - Total	5.8	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Lithium - Total	0.078	mg/l	0.020	6010D	16 Nov 21 9:32	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Iron - Total	5.46	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Silicon - Total	5.24	mg/l	0.10	6010D	16 Nov 21 13:55	SZ
Strontium - Total	3.50	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Zinc - Total	< 0.05	mg/l	0.05	6010D	12 Nov 21 11:33	MDE
Boron - Total	0.13	mg/l	0.10	6010D	17 Nov 21 9:08	SZ
Calcium - Dissolved	401	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Magnesium - Dissolved	142	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Sodium - Dissolved	200	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Potassium - Dissolved	5.6	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Lithium - Dissolved	0.082	mg/l	0.020	6010D	16 Nov 21 11:32	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 10:55	MDE
Iron - Dissolved	5.68	mg/l	0.10	6010D	15 Nov 21 10:55	MDE
Silicon - Dissolved	5.44	mg/l	0.10	6010D	16 Nov 21 15:55	SZ
Strontium - Dissolved	3.82	mg/l	0.10	6010D	15 Nov 21 10:55	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	15 Nov 21 10:55	MDE
Boron - Dissolved	0.13	mg/l	0.10	6010D	17 Nov 21 14:08	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	16 Nov 21 11:07	MDE

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4371
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 13:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-1686

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Barium - Total	0.0279	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Copper - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Manganese - Total	0.5380	mg/l	0.0020	6020B	17 Nov 21 14:23	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	16 Nov 21 11:07	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	16 Nov 21 14:31	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Barium - Dissolved	0.0260	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 16:48	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE

RL = Method Reporting Limit

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

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UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4371
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 13:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-1686

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Manganese - Dissolved	0.5230	mg/l	0.0020	6020B	17 Nov 21 15:06	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	16 Nov 21 14:31	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

Bromide was analyzed at MVTL, New Ulm, MN.
ND Certification #:R-040

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4372
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 15:00
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-W217

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	10 Nov 21	AC
pH	* 7.9	units	N/A	SM4500-H+-B-11	10 Nov 21 17:00	AC
Conductivity (EC)	2750	umhos/cm	N/A	SM2510B-11	10 Nov 21 17:00	AC
Total Alkalinity	1040	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Bicarbonate	1040	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Tot Dis Solids(Summation)	1630	mg/l	12.5	SM1030-F	18 Nov 21 14:34	Calculated
Cation Summation	27.2	meq/L	NA	SM1030-F	15 Nov 21 10:55	Calculated
Anion Summation	31.5	meq/L	NA	SM1030-F	18 Nov 21 14:34	Calculated
Percent Error	-7.29	%	NA	SM1030-F	18 Nov 21 14:34	Calculated
Bromide	2.90	mg/l	0.100	EPA 300.0	15 Nov 21 20:42	RMV
Total Organic Carbon	1.1	mg/l	0.5	SM5310C-11	16 Nov 21 21:44	NAS
Dissolved Organic Carbon	1.2	mg/l	0.5	SM5310C-96	16 Nov 21 21:44	NAS
Fluoride	3.27	mg/l	0.10	SM4500-F-C	10 Nov 21 17:00	AC
Sulfate	< 5	mg/l	5.00	ASTM D516-11	15 Nov 21 14:26	SD
Chloride	379	mg/l	2.0	SM4500-Cl-E-11	10 Nov 21 10:55	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	18 Nov 21 14:34	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	10 Nov 21 14:18	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 8:56	SD
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 10:05	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	11 Nov 21 13:07	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	11 Nov 21 14:29	MDE

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

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UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4372
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 15:00
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-W217

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Total Dissolved Solids	1660	mg/l	10	USGS I1750-85	12 Nov 21 9:25	RAA
Calcium - Total	4.3	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Magnesium - Total	1.1	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Sodium - Total	615	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Potassium - Total	2.7	mg/l	1.0	6010D	11 Nov 21 13:00	SZ
Lithium - Total	0.090	mg/l	0.020	6010D	16 Nov 21 9:32	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Iron - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Silicon - Total	5.32	mg/l	0.10	6010D	16 Nov 21 13:55	SZ
Strontium - Total	0.17	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Zinc - Total	0.11	mg/l	0.05	6010D	12 Nov 21 11:33	MDE
Boron - Total	2.96	mg/l	0.10	6010D	17 Nov 21 9:08	SZ
Calcium - Dissolved	4.3	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Magnesium - Dissolved	1.1	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Sodium - Dissolved	617	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Potassium - Dissolved	3.0	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Lithium - Dissolved	0.102	mg/l	0.020	6010D	16 Nov 21 11:32	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 10:55	MDE
Iron - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 10:55	MDE
Silicon - Dissolved	5.52	mg/l	0.10	6010D	16 Nov 21 15:55	SZ
Strontium - Dissolved	0.19	mg/l	0.10	6010D	15 Nov 21 10:55	MDE
Zinc - Dissolved	0.11	mg/l	0.05	6010D	15 Nov 21 10:55	MDE
Boron - Dissolved	3.06	mg/l	0.10	6010D	17 Nov 21 14:08	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	16 Nov 21 11:07	MDE

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Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4372
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 15:00
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-W217

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Barium - Total	0.1333	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Copper - Total	0.0163	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Manganese - Total	0.0050	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Molybdenum - Total	0.0053	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	16 Nov 21 11:07	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	16 Nov 21 14:31	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Barium - Dissolved	0.1295	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 16:48	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Copper - Dissolved	0.0114	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

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15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4372
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 15:00
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-W217

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Manganese - Dissolved	0.0043	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Molybdenum - Dissolved	0.0051	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	16 Nov 21 14:31	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

Bromide was analyzed at MVTL, New Ulm, MN.
ND Certification #:R-040

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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CERTIFICATION: ND # ND-00016

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15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4373
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 16:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-W395

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	10 Nov 21	AC
pH	* 8.2	units	N/A	SM4500-H+-B-11	10 Nov 21 17:00	AC
Conductivity (EC)	2904	umhos/cm	N/A	SM2510B-11	10 Nov 21 17:00	AC
Total Alkalinity	1030	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Bicarbonate	1030	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	10 Nov 21 17:00	AC
Tot Dis Solids(Summation)	1740	mg/l	12.5	SM1030-F	18 Nov 21 14:34	Calculated
Cation Summation	28.7	meq/L	NA	SM1030-F	15 Nov 21 10:55	Calculated
Anion Summation	33.1	meq/L	NA	SM1030-F	18 Nov 21 14:34	Calculated
Percent Error	-7.12	%	NA	SM1030-F	18 Nov 21 14:34	Calculated
Bromide	3.20	mg/l	0.100	EPA 300.0	15 Nov 21 21:03	RMV
Total Organic Carbon	1.2	mg/l	0.5	SM5310C-11	16 Nov 21 21:44	NAS
Dissolved Organic Carbon	1.2	mg/l	0.5	SM5310C-96	16 Nov 21 21:44	NAS
Fluoride	2.31	mg/l	0.10	SM4500-F-C	10 Nov 21 17:00	AC
Sulfate	< 5	mg/l	5.00	ASTM D516-11	15 Nov 21 14:26	SD
Chloride	442	mg/l	2.0	SM4500-Cl-E-11	10 Nov 21 10:55	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	18 Nov 21 14:34	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	10 Nov 21 14:18	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 8:56	SD
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 10:05	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	11 Nov 21 13:07	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	11 Nov 21 14:29	MDE

RL = Method Reporting Limit

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

MVTL

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4373
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 16:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-W395

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Total Dissolved Solids	1760	mg/l	10	USGS I1750-85	12 Nov 21 9:25	RAA
Calcium - Total	4.9	mg/l	1.0	6010D	11 Nov 21 14:00	SZ
Magnesium - Total	1.8	mg/l	1.0	6010D	11 Nov 21 14:00	SZ
Sodium - Total	668	mg/l	1.0	6010D	11 Nov 21 14:00	SZ
Potassium - Total	3.1	mg/l	1.0	6010D	11 Nov 21 14:00	SZ
Lithium - Total	0.099	mg/l	0.020	6010D	16 Nov 21 9:32	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Iron - Total	1.86	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Silicon - Total	5.20	mg/l	0.10	6010D	16 Nov 21 14:55	SZ
Strontium - Total	0.23	mg/l	0.10	6010D	12 Nov 21 11:33	MDE
Zinc - Total	0.60	mg/l	0.05	6010D	12 Nov 21 11:33	MDE
Boron - Total	2.79	mg/l	0.10	6010D	17 Nov 21 9:08	SZ
Calcium - Dissolved	4.9	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Magnesium - Dissolved	1.7	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Sodium - Dissolved	647	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Potassium - Dissolved	3.4	mg/l	1.0	6010D	11 Nov 21 16:00	SZ
Lithium - Dissolved	0.106	mg/l	0.020	6010D	16 Nov 21 11:32	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 10:55	MDE
Iron - Dissolved	0.35	mg/l	0.10	6010D	15 Nov 21 10:55	MDE
Silicon - Dissolved	5.25	mg/l	0.10	6010D	16 Nov 21 15:55	SZ
Strontium - Dissolved	0.25	mg/l	0.10	6010D	15 Nov 21 10:55	MDE
Zinc - Dissolved	0.09	mg/l	0.05	6010D	15 Nov 21 10:55	MDE
Boron - Dissolved	2.87	mg/l	0.10	6010D	17 Nov 21 14:08	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	16 Nov 21 11:07	MDE

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4373
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 16:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-W395

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Barium - Total	0.1742	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Copper - Total	0.0075	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Lead - Total	0.0049	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Manganese - Total	0.0167	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Molybdenum - Total	0.0045	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	16 Nov 21 11:07	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 11:07	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 11:07	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	16 Nov 21 14:31	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Barium - Dissolved	0.1580	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 16:48	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE

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

CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4373
Work Order #: 82-3114
Account #: 007033
Date Sampled: 9 Nov 21 16:30
Date Received: 10 Nov 21 7:24
Sampled By: Client

Project Name: NDCS

PO #: 25411

Sample Description: NDCS-W395

Temp at Receipt: 0.4C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Manganese - Dissolved	0.0094	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Molybdenum - Dissolved	0.0043	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	16 Nov 21 14:31	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

Bromide was analyzed at MVTL, New Ulm, MN.
ND Certification #:R-040

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4440
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 9:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W269

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	11 Nov 21	RAA
pH	* 7.7	units	N/A	SM4500-H+-B-11	11 Nov 21 18:00	RAA
Conductivity (EC)	1376	umhos/cm	N/A	SM2510B-11	11 Nov 21 18:00	RAA
Total Alkalinity	379	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Bicarbonate	379	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Tot Dis Solids(Summation)	895	mg/l	12.5	SM1030-F	19 Nov 21 15:13	Calculated
Cation Summation	16.6	meq/L	NA	SM1030-F	16 Nov 21 12:36	Calculated
Anion Summation	15.0	meq/L	NA	SM1030-F	19 Nov 21 15:13	Calculated
Percent Error	5.06	%	NA	SM1030-F	19 Nov 21 15:13	Calculated
Bromide	< 0.5 @	mg/l	0.100	EPA 300.0	15 Nov 21 23:51	RMV
Total Organic Carbon	5.3	mg/l	0.5	SM5310C-11	16 Nov 21 21:44	NAS
Dissolved Organic Carbon	5.2	mg/l	0.5	SM5310C-96	16 Nov 21 21:44	NAS
Fluoride	0.23	mg/l	0.10	SM4500-F-C	11 Nov 21 18:00	RAA
Sulfate	347	mg/l	5.00	ASTM D516-11	19 Nov 21 15:13	SD
Chloride	5.6	mg/l	2.0	SM4500-Cl-E-11	17 Nov 21 13:30	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	18 Nov 21 15:33	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	11 Nov 21 15:01	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 8:56	SD
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 10:05	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 12:33	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 12:33	MDE
Total Dissolved Solids	977	mg/l	10	USGS I1750-85	12 Nov 21 9:25	RAA

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4440
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 9:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W269

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Calcium - Total	107	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Magnesium - Total	42.1	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Sodium - Total	162	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Potassium - Total	4.2	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Lithium - Total	0.040	mg/l	0.020	6010D	16 Nov 21 9:32	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Iron - Total	4.55	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Silicon - Total	12.8	mg/l	0.10	6010D	16 Nov 21 14:55	SZ
Strontium - Total	1.27	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Zinc - Total	0.15	mg/l	0.05	6010D	12 Nov 21 15:33	MDE
Boron - Total	0.25	mg/l	0.10	6010D	17 Nov 21 11:08	SZ
Calcium - Dissolved	111	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Magnesium - Dissolved	43.9	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Sodium - Dissolved	164	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Potassium - Dissolved	4.8	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Lithium - Dissolved	0.043	mg/l	0.020	6010D	16 Nov 21 11:32	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 12:55	MDE
Iron - Dissolved	4.65	mg/l	0.10	6010D	15 Nov 21 12:55	MDE
Silicon - Dissolved	14.2	mg/l	0.10	6010D	16 Nov 21 15:55	SZ
Strontium - Dissolved	1.32	mg/l	0.10	6010D	15 Nov 21 12:55	MDE
Zinc - Dissolved	0.08	mg/l	0.05	6010D	15 Nov 21 12:55	MDE
Boron - Dissolved	0.26	mg/l	0.10	6010D	17 Nov 21 14:08	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	16 Nov 21 13:21	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Barium - Total	0.0323	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4440
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 9:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W269

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Copper - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Manganese - Total	0.3174	mg/l	0.0020	6020B	17 Nov 21 14:23	MDE
Molybdenum - Total	0.0035	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	16 Nov 21 13:21	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	16 Nov 21 14:31	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Barium - Dissolved	0.0388	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 16:48	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Manganese - Dissolved	0.3332	mg/l	0.0020	6020B	17 Nov 21 15:06	MDE
Molybdenum - Dissolved	0.0033	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

MINNESOTA VALLEY TESTING LABORATORIES, INC.

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MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4440
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 9:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W269

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	16 Nov 21 14:31	MDE
Silver - Dissolved	< 0.001 @	mg/l	0.0005	6020B	17 Nov 21 15:06	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4441
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 11:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W478

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	11 Nov 21	RAA
pH	* 8.2	units	N/A	SM4500-H+-B-11	11 Nov 21 18:00	RAA
Conductivity (EC)	2167	umhos/cm	N/A	SM2510B-11	11 Nov 21 18:00	RAA
Total Alkalinity	1230	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Bicarbonate	1230	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Tot Dis Solids(Summation)	1370	mg/l	12.5	SM1030-F	19 Nov 21 15:13	Calculated
Cation Summation	25.1	meq/L	NA	SM1030-F	16 Nov 21 12:36	Calculated
Anion Summation	25.9	meq/L	NA	SM1030-F	19 Nov 21 15:13	Calculated
Percent Error	-1.66	%	NA	SM1030-F	19 Nov 21 15:13	Calculated
Bromide	< 0.5 @	mg/l	0.100	EPA 300.0	16 Nov 21 0:11	RMV
Total Organic Carbon	7.1	mg/l	0.5	SM5310C-11	16 Nov 21 23:56	NAS
Dissolved Organic Carbon	7.2	mg/l	0.5	SM5310C-96	16 Nov 21 23:56	NAS
Fluoride	1.62	mg/l	0.10	SM4500-F-C	11 Nov 21 18:00	RAA
Sulfate	34.3	mg/l	5.00	ASTM D516-11	19 Nov 21 15:13	SD
Chloride	20.9	mg/l	2.0	SM4500-Cl-E-11	17 Nov 21 13:30	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	18 Nov 21 15:33	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	11 Nov 21 15:01	SD
Phosphorus as P - Total	0.23	mg/l	0.20	EPA 365.1	19 Nov 21 8:56	SD
Phosphorus as P-Dissolved	0.24	mg/l	0.20	EPA 365.1	19 Nov 21 10:05	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 12:33	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 12:33	MDE
Total Dissolved Solids	1420	mg/l	10	USGS I1750-85	12 Nov 21 9:25	RAA

RL = Method Reporting Limit

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

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4441
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 11:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W478

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Calcium - Total	2.8	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Magnesium - Total	1.5	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Sodium - Total	572	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Potassium - Total	3.0	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Lithium - Total	0.076	mg/l	0.020	6010D	16 Nov 21 9:32	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Iron - Total	0.43	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Silicon - Total	4.12	mg/l	0.10	6010D	16 Nov 21 14:55	SZ
Strontium - Total	0.14	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Zinc - Total	0.06	mg/l	0.05	6010D	12 Nov 21 15:33	MDE
Boron - Total	0.56	mg/l	0.10	6010D	17 Nov 21 12:08	SZ
Calcium - Dissolved	2.7	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Magnesium - Dissolved	1.5	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Sodium - Dissolved	568	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Potassium - Dissolved	3.5	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Lithium - Dissolved	0.076	mg/l	0.020	6010D	16 Nov 21 11:32	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 12:55	MDE
Iron - Dissolved	0.48	mg/l	0.10	6010D	15 Nov 21 12:55	MDE
Silicon - Dissolved	4.23	mg/l	0.10	6010D	16 Nov 21 15:55	SZ
Strontium - Dissolved	0.14	mg/l	0.10	6010D	15 Nov 21 12:55	MDE
Zinc - Dissolved	0.06	mg/l	0.05	6010D	15 Nov 21 12:55	MDE
Boron - Dissolved	0.58	mg/l	0.10	6010D	17 Nov 21 14:08	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	16 Nov 21 13:21	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Barium - Total	0.0912	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE

RL = Method Reporting Limit

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

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Account #: 007033
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Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W478

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Copper - Total	0.0053	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Manganese - Total	0.0048	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	16 Nov 21 13:21	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	16 Nov 21 14:31	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Barium - Dissolved	0.0913	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 16:48	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Copper - Dissolved	0.0044	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Manganese - Dissolved	0.0053	mg/l	0.0020	6020B	17 Nov 21 15:06	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

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MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4441
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Date Sampled: 10 Nov 21 11:00
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Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W478

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	16 Nov 21 14:31	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4442
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 10:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W468

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	11 Nov 21	RAA
pH	* 8.3	units	N/A	SM4500-H+-B-11	11 Nov 21 18:00	RAA
Conductivity (EC)	1650	umhos/cm	N/A	SM2510B-11	11 Nov 21 18:00	RAA
Total Alkalinity	882	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Bicarbonate	881	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Tot Dis Solids(Summation)	1100	mg/l	12.5	SM1030-F	19 Nov 21 15:13	Calculated
Cation Summation	19.1	meq/L	NA	SM1030-F	16 Nov 21 12:36	Calculated
Anion Summation	20.4	meq/L	NA	SM1030-F	19 Nov 21 15:13	Calculated
Percent Error	-3.29	%	NA	SM1030-F	19 Nov 21 15:13	Calculated
Bromide	< 0.5 @	mg/l	0.100	EPA 300.0	16 Nov 21 0:32	RMV
Total Organic Carbon	2.8	mg/l	0.5	SM5310C-11	16 Nov 21 23:56	NAS
Dissolved Organic Carbon	2.5	mg/l	0.5	SM5310C-96	16 Nov 21 23:56	NAS
Fluoride	1.71	mg/l	0.10	SM4500-F-C	11 Nov 21 18:00	RAA
Sulfate	129	mg/l	5.00	ASTM D516-11	19 Nov 21 15:13	SD
Chloride	3.6	mg/l	2.0	SM4500-Cl-E-11	17 Nov 21 13:30	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	18 Nov 21 15:33	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	11 Nov 21 15:01	SD
Phosphorus as P - Total	0.35	mg/l	0.20	EPA 365.1	19 Nov 21 8:56	SD
Phosphorus as P-Dissolved	0.34	mg/l	0.20	EPA 365.1	19 Nov 21 10:05	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 12:33	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 12:33	MDE
Total Dissolved Solids	1100	mg/l	10	USGS I1750-85	12 Nov 21 9:25	RAA

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MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4442
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 10:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W468

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Calcium - Total	2.4	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Magnesium - Total	1.2	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Sodium - Total	430	mg/l	1.0	6010D	7 Dec 21 9:07	SZ
Potassium - Total	2.4	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Lithium - Total	0.046	mg/l	0.020	6010D	16 Nov 21 9:32	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Iron - Total	0.14	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Silicon - Total	3.18	mg/l	0.10	6010D	16 Nov 21 14:55	SZ
Strontium - Total	0.10	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Zinc - Total	< 0.25	mg/l	0.05	6010D	12 Nov 21 15:33	MDE
Boron - Total	0.46	mg/l	0.10	6010D	17 Nov 21 12:08	SZ
Calcium - Dissolved	2.4	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Magnesium - Dissolved	1.3	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Sodium - Dissolved	433	mg/l	1.0	6010D	7 Dec 21 10:07	SZ
Potassium - Dissolved	2.5	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Lithium - Dissolved	0.050	mg/l	0.020	6010D	16 Nov 21 11:32	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 12:55	MDE
Iron - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 12:55	MDE
Silicon - Dissolved	3.28	mg/l	0.10	6010D	16 Nov 21 15:55	SZ
Strontium - Dissolved	0.10	mg/l	0.10	6010D	15 Nov 21 12:55	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	15 Nov 21 12:55	MDE
Boron - Dissolved	0.48	mg/l	0.10	6010D	17 Nov 21 14:08	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	16 Nov 21 13:21	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Barium - Total	0.0276	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE

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MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4442
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 10:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W468

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Chromium - Total	< 0.01 @	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Copper - Total	0.0041	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Lead - Total	0.0040	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Manganese - Total	0.0050	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Molybdenum - Total	0.0020	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Nickel - Total	< 0.01 @	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	16 Nov 21 13:21	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Vanadium - Total	0.0084	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	16 Nov 21 14:31	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Barium - Dissolved	0.0298	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 16:48	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Chromium - Dissolved	< 0.01 @	mg/l	0.0020	6020B	29 Nov 21 11:36	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Copper - Dissolved	0.0042	mg/l	0.0020	6020B	29 Nov 21 11:36	MDE
Lead - Dissolved	0.0043	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Manganese - Dissolved	0.0044	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Molybdenum - Dissolved	0.0021	mg/l	0.0020	6020B	29 Nov 21 11:36	MDE
Nickel - Dissolved	< 0.01 @	mg/l	0.0020	6020B	29 Nov 21 11:36	MDE

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

CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4442
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 10:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W468

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	16 Nov 21 14:31	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	29 Nov 21 11:36	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Vanadium - Dissolved	0.0102	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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

CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4443
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 14:30
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W424

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	11 Nov 21	RAA
pH	* 8.3	units	N/A	SM4500-H+-B-11	11 Nov 21 18:00	RAA
Conductivity (EC)	2422	umhos/cm	N/A	SM2510B-11	11 Nov 21 18:00	RAA
Total Alkalinity	1250	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Bicarbonate	1250	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Tot Dis Solids(Summation)	1500	mg/l	12.5	SM1030-F	19 Nov 21 15:13	Calculated
Cation Summation	26.8	meq/L	NA	SM1030-F	16 Nov 21 12:36	Calculated
Anion Summation	29.1	meq/L	NA	SM1030-F	19 Nov 21 15:13	Calculated
Percent Error	-4.10	%	NA	SM1030-F	19 Nov 21 15:13	Calculated
Bromide	1.03	mg/l	0.100	EPA 300.0	16 Nov 21 0:53	RMV
Total Organic Carbon	3.4	mg/l	0.5	SM5310C-11	16 Nov 21 23:56	NAS
Dissolved Organic Carbon	3.5	mg/l	0.5	SM5310C-96	16 Nov 21 23:56	NAS
Fluoride	0.83	mg/l	0.10	SM4500-F-C	11 Nov 21 18:00	RAA
Sulfate	< 5	mg/l	5.00	ASTM D516-11	19 Nov 21 15:13	SD
Chloride	144	mg/l	2.0	SM4500-Cl-E-11	17 Nov 21 13:30	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	18 Nov 21 15:33	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	11 Nov 21 15:01	SD
Phosphorus as P - Total	0.31	mg/l	0.20	EPA 365.1	19 Nov 21 9:35	SD
Phosphorus as P-Dissolved	0.20	mg/l	0.20	EPA 365.1	19 Nov 21 10:05	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 12:33	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 14:00	MDE
Total Dissolved Solids	1560	mg/l	10	USGS I1750-85	12 Nov 21 9:25	RAA

RL = Method Reporting Limit

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

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4443
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 14:30
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W424

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Calcium - Total	3.3	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Magnesium - Total	1.6	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Sodium - Total	600	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Potassium - Total	2.7	mg/l	1.0	6010D	7 Dec 21 9:07	SZ
Lithium - Total	0.090	mg/l	0.020	6010D	16 Nov 21 9:32	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Iron - Total	0.12	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Silicon - Total	4.44	mg/l	0.10	6010D	16 Nov 21 14:55	SZ
Strontium - Total	0.15	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Zinc - Total	< 0.05	mg/l	0.05	6010D	12 Nov 21 15:33	MDE
Boron - Total	1.75	mg/l	0.10	6010D	17 Nov 21 12:08	SZ
Calcium - Dissolved	3.3	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Magnesium - Dissolved	1.6	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Sodium - Dissolved	607	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Potassium - Dissolved	3.0	mg/l	1.0	6010D	7 Dec 21 10:07	SZ
Lithium - Dissolved	0.095	mg/l	0.020	6010D	16 Nov 21 11:32	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 13:55	MDE
Iron - Dissolved	0.12	mg/l	0.10	6010D	15 Nov 21 13:55	MDE
Silicon - Dissolved	4.64	mg/l	0.10	6010D	16 Nov 21 15:55	SZ
Strontium - Dissolved	0.16	mg/l	0.10	6010D	15 Nov 21 13:55	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	15 Nov 21 13:55	MDE
Boron - Dissolved	1.80	mg/l	0.10	6010D	17 Nov 21 14:08	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	16 Nov 21 13:21	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Barium - Total	0.1210	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE

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

CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4443
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 14:30
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W424

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Copper - Total	0.0155	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Manganese - Total	0.0211	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	16 Nov 21 13:21	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	16 Nov 21 14:31	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Barium - Dissolved	0.1230	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 15:06	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Copper - Dissolved	0.0089	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Manganese - Dissolved	0.0212	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

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MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4443
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 14:30
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Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W424

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	16 Nov 21 14:31	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 15:06	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4444
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 15:30
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W471

Temp at Receipt: 1.2C ROI

		As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion					EPA 200.2	11 Nov 21	RAA
pH	*	8.2	units	N/A	SM4500-H+-B-11	11 Nov 21 18:00	RAA
Conductivity (EC)		2535	umhos/cm	N/A	SM2510B-11	11 Nov 21 18:00	RAA
Total Alkalinity		1260	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Phenolphthalein Alk		< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Bicarbonate		1260	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Carbonate		< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Hydroxide		< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Tot Dis Solids(Summation)		1590	mg/l	12.5	SM1030-F	19 Nov 21 15:38	Calculated
Cation Summation		27.5	meq/L	NA	SM1030-F	2 Dec 21 16:56	Calculated
Anion Summation		30.4	meq/L	NA	SM1030-F	19 Nov 21 15:38	Calculated
Percent Error		-4.95	%	NA	SM1030-F	2 Dec 21 16:56	Calculated
Bromide		1.28	mg/l	0.100	EPA 300.0	16 Nov 21 1:14	RMV
Total Organic Carbon		3.2	mg/l	0.5	SM5310C-11	16 Nov 21 23:56	NAS
Dissolved Organic Carbon		3.1	mg/l	0.5	SM5310C-96	16 Nov 21 23:56	NAS
Fluoride		1.14	mg/l	0.10	SM4500-F-C	11 Nov 21 18:00	RAA
Sulfate		< 5	mg/l	5.00	ASTM D516-11	19 Nov 21 15:38	SD
Chloride		183	mg/l	2.0	SM4500-Cl-E-11	17 Nov 21 13:30	SD
Nitrate-Nitrite as N		< 0.2	mg/l	0.20	EPA 353.2	18 Nov 21 15:33	SD
Nitrite as N		< 0.2	mg/l	0.20	EPA 353.2	11 Nov 21 15:01	SD
Phosphorus as P - Total		0.24	mg/l	0.20	EPA 365.1	19 Nov 21 9:35	SD
Phosphorus as P-Dissolved		0.24	mg/l	0.20	EPA 365.1	19 Nov 21 10:05	SD
Mercury - Total		< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 12:33	MDE
Mercury - Dissolved		< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 14:00	MDE
Total Dissolved Solids		1740	mg/l	10	USGS I1750-85	12 Nov 21 9:25	RAA

RL = Method Reporting Limit

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MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4444
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 15:30
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W471

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Calcium - Total	3.4	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Magnesium - Total	1.5	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Sodium - Total	643	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Potassium - Total	2.9	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Lithium - Total	0.100	mg/l	0.020	6010D	16 Nov 21 10:32	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Iron - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Silicon - Total	4.83	mg/l	0.10	6010D	16 Nov 21 14:55	SZ
Strontium - Total	0.16	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Zinc - Total	< 0.05	mg/l	0.05	6010D	12 Nov 21 15:33	MDE
Boron - Total	2.42	mg/l	0.10	6010D	17 Nov 21 12:08	SZ
Calcium - Dissolved	3.3	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Magnesium - Dissolved	1.4	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Sodium - Dissolved	624	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Potassium - Dissolved	3.4	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Lithium - Dissolved	0.101	mg/l	0.020	6010D	16 Nov 21 12:32	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 13:55	MDE
Iron - Dissolved	< 0.1	mg/l	0.10	6010D	2 Dec 21 16:56	SZ
Silicon - Dissolved	4.69	mg/l	0.10	6010D	16 Nov 21 16:55	SZ
Strontium - Dissolved	0.16	mg/l	0.10	6010D	15 Nov 21 13:55	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	15 Nov 21 13:55	MDE
Boron - Dissolved	2.36	mg/l	0.10	6010D	17 Nov 21 15:08	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	16 Nov 21 13:21	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Barium - Total	0.1466	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE

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Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 7 Dec 21
Lab Number: 21-W4444
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 15:30
Date Received: 11 Nov 21 7:18
Sampled By: Client

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W471

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Copper - Total	0.0390	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Lead - Total	0.0014	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Manganese - Total	0.0112	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	16 Nov 21 13:21	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	16 Nov 21 14:31	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Barium - Dissolved	0.1431	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 15:06	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Copper - Dissolved	0.0244	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Lead - Dissolved	0.0007	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Manganese - Dissolved	0.0105	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Report Date: 7 Dec 21
Lab Number: 21-W4444
Work Order #: 82-3150
Account #: 007033
Date Sampled: 10 Nov 21 15:30
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W471

Temp at Receipt: 1.2C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	16 Nov 21 14:31	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 15:06	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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

CERTIFICATION: ND # ND-00016

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Report Date: 24 Nov 21
Lab Number: 21-W4445
Work Order #: 82-3151
Account #: 007033
Date Sampled: 11 Nov 21 10:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W510

Temp at Receipt: 1.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	11 Nov 21	RAA
pH	* 8.3	units	N/A	SM4500-H+-B-11	11 Nov 21 18:00	RAA
Conductivity (EC)	2648	umhos/cm	N/A	SM2510B-11	11 Nov 21 18:00	RAA
Total Alkalinity	1430	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Bicarbonate	1430	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Tot Dis Solids(Summation)	1640	mg/l	12.5	SM1030-F	19 Nov 21 15:38	Calculated
Cation Summation	29.0	meq/L	NA	SM1030-F	16 Nov 21 12:36	Calculated
Anion Summation	31.8	meq/L	NA	SM1030-F	19 Nov 21 15:38	Calculated
Percent Error	-4.72	%	NA	SM1030-F	19 Nov 21 15:38	Calculated
Bromide	0.770	mg/l	0.100	EPA 300.0	16 Nov 21 1:35	RMV
Total Organic Carbon	2.6	mg/l	0.5	SM5310C-11	19 Nov 21 13:57	NAS
Dissolved Organic Carbon	2.6	mg/l	0.5	SM5310C-96	19 Nov 21 13:57	NAS
Fluoride	0.82	mg/l	0.10	SM4500-F-C	11 Nov 21 18:00	RAA
Sulfate	13.7	mg/l	5.00	ASTM D516-11	19 Nov 21 15:38	SD
Chloride	104	mg/l	2.0	SM4500-Cl-E-11	17 Nov 21 13:30	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	18 Nov 21 15:33	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	11 Nov 21 15:01	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 9:35	SD
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 10:05	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 12:33	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 14:00	MDE
Total Dissolved Solids	1680	mg/l	10	USGS I1750-85	12 Nov 21 9:25	RAA

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

MVTL

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Report Date: 24 Nov 21
Lab Number: 21-W4445
Work Order #: 82-3151
Account #: 007033
Date Sampled: 11 Nov 21 10:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W510

Temp at Receipt: 1.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Calcium - Total	3.6	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Magnesium - Total	1.8	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Sodium - Total	655	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Potassium - Total	3.3	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Lithium - Total	0.096	mg/l	0.020	6010D	16 Nov 21 10:32	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Iron - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Silicon - Total	5.87	mg/l	0.10	6010D	16 Nov 21 14:55	SZ
Strontium - Total	0.18	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Zinc - Total	0.33	mg/l	0.05	6010D	12 Nov 21 15:33	MDE
Boron - Total	1.54	mg/l	0.10	6010D	17 Nov 21 12:08	SZ
Calcium - Dissolved	3.7	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Magnesium - Dissolved	1.8	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Sodium - Dissolved	656	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Potassium - Dissolved	4.0	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Lithium - Dissolved	0.103	mg/l	0.020	6010D	16 Nov 21 12:32	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 13:55	MDE
Iron - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 13:55	MDE
Silicon - Dissolved	6.14	mg/l	0.10	6010D	16 Nov 21 16:55	SZ
Strontium - Dissolved	0.19	mg/l	0.10	6010D	15 Nov 21 13:55	MDE
Zinc - Dissolved	0.33	mg/l	0.05	6010D	15 Nov 21 13:55	MDE
Boron - Dissolved	1.54	mg/l	0.10	6010D	17 Nov 21 15:08	SZ
Antimony - Total	< 0.002 ^	mg/l	0.0010	6020B	17 Nov 21 14:23	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	17 Nov 21 14:23	MDE
Barium - Total	0.1072	mg/l	0.0020	6020B	17 Nov 21 14:23	MDE

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CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 24 Nov 21
Lab Number: 21-W4445
Work Order #: 82-3151
Account #: 007033
Date Sampled: 11 Nov 21 10:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W510

Temp at Receipt: 1.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 14:23	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 14:23	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	17 Nov 21 14:23	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	17 Nov 21 14:23	MDE
Copper - Total	0.0460	mg/l	0.0020	6020B	17 Nov 21 14:23	MDE
Lead - Total	0.0032	mg/l	0.0005	6020B	17 Nov 21 14:23	MDE
Manganese - Total	0.0022	mg/l	0.0020	6020B	17 Nov 21 14:23	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	17 Nov 21 14:23	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	17 Nov 21 14:23	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	17 Nov 21 14:23	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 14:23	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 14:23	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	17 Nov 21 14:23	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	16 Nov 21 14:31	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Barium - Dissolved	0.1052	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 15:06	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Copper - Dissolved	0.0026	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Manganese - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

RL = Method Reporting Limit

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

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MEMBER ACIL

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Lab Number: 21-W4445
Work Order #: 82-3151
Account #: 007033
Date Sampled: 11 Nov 21 10:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W510

Temp at Receipt: 1.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	16 Nov 21 14:31	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 15:06	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

* Holding time exceeded

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

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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

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MEMBER ACIL

Report Date: 24 Nov 21
Lab Number: 21-W4446
Work Order #: 82-3151
Account #: 007033
Date Sampled: 11 Nov 21 10:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W510 Dup

Temp at Receipt: 1.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	11 Nov 21	RAA
pH	* 8.4	units	N/A	SM4500-H+-B-11	11 Nov 21 18:00	RAA
Conductivity (EC)	2651	umhos/cm	N/A	SM2510B-11	11 Nov 21 18:00	RAA
Total Alkalinity	1430	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Bicarbonate	1419	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	11 Nov 21 18:00	RAA
Tot Dis Solids(Summation)	1700	mg/l	12.5	SM1030-F	19 Nov 21 15:38	Calculated
Cation Summation	29.0	meq/L	NA	SM1030-F	16 Nov 21 12:36	Calculated
Anion Summation	31.8	meq/L	NA	SM1030-F	19 Nov 21 15:38	Calculated
Percent Error	-4.63	%	NA	SM1030-F	19 Nov 21 15:38	Calculated
Bromide	0.770	mg/l	0.100	EPA 300.0	16 Nov 21 1:56	RMV
Total Organic Carbon	2.6	mg/l	0.5	SM5310C-11	19 Nov 21 13:57	NAS
Dissolved Organic Carbon	2.6	mg/l	0.5	SM5310C-96	19 Nov 21 13:57	NAS
Fluoride	0.82	mg/l	0.10	SM4500-F-C	11 Nov 21 18:00	RAA
Sulfate	13.3	mg/l	5.00	ASTM D516-11	19 Nov 21 15:38	SD
Chloride	104	mg/l	2.0	SM4500-Cl-E-11	17 Nov 21 13:30	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	18 Nov 21 15:33	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	11 Nov 21 15:01	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 9:35	SD
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 10:05	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 12:33	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 14:00	MDE
Total Dissolved Solids	1680	mg/l	10	USGS I1750-85	12 Nov 21 9:25	RAA

RL = Method Reporting Limit

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

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 24 Nov 21
Lab Number: 21-W4446
Work Order #: 82-3151
Account #: 007033
Date Sampled: 11 Nov 21 10:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W510 Dup

Temp at Receipt: 1.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Calcium - Total	3.7	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Magnesium - Total	1.8	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Sodium - Total	720	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Potassium - Total	3.5	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Lithium - Total	0.100	mg/l	0.020	6010D	16 Nov 21 10:32	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Iron - Total	< 0.1	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Silicon - Total	6.07	mg/l	0.10	6010D	16 Nov 21 14:55	SZ
Strontium - Total	0.19	mg/l	0.10	6010D	12 Nov 21 15:33	MDE
Zinc - Total	0.34	mg/l	0.05	6010D	12 Nov 21 15:33	MDE
Boron - Total	1.58	mg/l	0.10	6010D	17 Nov 21 12:08	SZ
Calcium - Dissolved	3.6	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Magnesium - Dissolved	1.8	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Sodium - Dissolved	657	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Potassium - Dissolved	4.0	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Lithium - Dissolved	0.100	mg/l	0.020	6010D	16 Nov 21 12:32	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 13:55	MDE
Iron - Dissolved	< 0.1	mg/l	0.10	6010D	15 Nov 21 13:55	MDE
Silicon - Dissolved	6.24	mg/l	0.10	6010D	16 Nov 21 16:55	SZ
Strontium - Dissolved	0.18	mg/l	0.10	6010D	15 Nov 21 13:55	MDE
Zinc - Dissolved	0.32	mg/l	0.05	6010D	15 Nov 21 13:55	MDE
Boron - Dissolved	1.56	mg/l	0.10	6010D	17 Nov 21 15:08	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	16 Nov 21 13:21	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Barium - Total	0.1086	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE

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MEMBER ACIL

Report Date: 24 Nov 21
Lab Number: 21-W4446
Work Order #: 82-3151
Account #: 007033
Date Sampled: 11 Nov 21 10:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W510 Dup

Temp at Receipt: 1.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Copper - Total	0.0031	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Manganese - Total	0.0028	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	16 Nov 21 13:21	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 13:21	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	16 Nov 21 13:21	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	16 Nov 21 14:31	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Barium - Dissolved	0.1041	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 15:06	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Copper - Dissolved	0.0025	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Manganese - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Molybdenum - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

MINNESOTA VALLEY TESTING LABORATORIES, INC.

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MEMBER ACIL

Report Date: 24 Nov 21
Lab Number: 21-W4446
Work Order #: 82-3151
Account #: 007033
Date Sampled: 11 Nov 21 10:00
Date Received: 11 Nov 21 7:18
Sampled By: Client

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Project Name: North Dakota Carbon Safe
Sample Description: NDCS-W510 Dup

Temp at Receipt: 1.0C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	16 Nov 21 14:31	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 15:06	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	16 Nov 21 14:31	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	16 Nov 21 14:31	MDE

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

MINNESOTA VALLEY TESTING LABORATORIES, INC.

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MEMBER ACIL

Report Date: 5 Jan 22
Lab Number: 21-W4746
Work Order #: 82-3423
Account #: 007033
Date Sampled: 13 Dec 21 9:30
Date Received: 13 Dec 21 13:30
Sampled By: MVTL Field Service

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Sample Description: MRY

Temp at Receipt: 10.1C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	13 Dec 21	RAA
pH	* 8.4	units	N/A	SM4500-H+-B-11	14 Dec 21 17:00	RAA
Conductivity (EC)	2801	umhos/cm	N/A	SM2510B-11	13 Dec 21 17:00	RAA
pH - Field	8.15	units	NA	SM 4500 H+ B	13 Dec 21 9:30	JSM
Temperature - Field	10.8	Degrees C	NA	SM 2550B	13 Dec 21 9:30	JSM
Total Alkalinity	960	mg/l CaCO3	20	SM2320B-11	14 Dec 21 17:00	RAA
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	14 Dec 21 17:00	RAA
Bicarbonate	941	mg/l CaCO3	20	SM2320B-11	14 Dec 21 17:00	RAA
Carbonate	< 20	mg/l CaCO3	20	SM2320B-11	14 Dec 21 17:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	14 Dec 21 17:00	RAA
Conductivity - Field	2823	umhos/cm	1	EPA 120.1	13 Dec 21 9:30	JSM
Tot Dis Solids(Summation)	1570	mg/l	12.5	SM1030-F	16 Dec 21 14:31	Calculated
Cation Summation	30.3	meq/L	NA	SM1030-F	20 Dec 21 12:19	Calculated
Anion Summation	27.5	meq/L	NA	SM1030-F	16 Dec 21 14:31	Calculated
Percent Error	4.80	%	NA	SM1030-F	20 Dec 21 12:19	Calculated
Bromide	3.06	mg/l	0.100	EPA 300.0	17 Dec 21 21:11	RMV
Total Organic Carbon	1.0	mg/l	0.5	SM5310C-11	20 Dec 21 11:36	AC
Dissolved Organic Carbon	1.1	mg/l	0.5	SM5310C-96	20 Dec 21 11:36	AC
Fluoride	2.67	mg/l	0.10	SM4500-F-C	13 Dec 21 17:00	RAA
Sulfate	< 5	mg/l	5.00	ASTM D516-11	15 Dec 21 16:02	SD
Chloride	296	mg/l	2.0	SM4500-Cl-E-11	15 Dec 21 12:01	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	16 Dec 21 14:31	EV
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	14 Dec 21 10:38	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	17 Dec 21 9:24	SD
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	23 Dec 21 14:06	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	23 Dec 21 14:24	MDE

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

MVTL

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51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 5 Jan 22
Lab Number: 21-W4746
Work Order #: 82-3423
Account #: 007033
Date Sampled: 13 Dec 21 9:30
Date Received: 13 Dec 21 13:30
Sampled By: MVTL Field Service

Sample Description: MRY

Temp at Receipt: 10.1C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	23 Dec 21 12:43	MDE
Total Dissolved Solids	1720	mg/l	10	USGS I1750-85	17 Dec 21 9:00	RAA
Calcium - Total	4.0	mg/l	1.0	6010D	14 Dec 21 12:22	MDE
Magnesium - Total	< 1	mg/l	1.0	6010D	14 Dec 21 12:22	MDE
Sodium - Total	690	mg/l	1.0	6010D	14 Dec 21 12:22	MDE
Potassium - Total	3.0	mg/l	1.0	6010D	14 Dec 21 12:22	MDE
Lithium - Total	0.099	mg/l	0.020	6010D	16 Dec 21 11:47	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	20 Dec 21 10:19	SZ
Iron - Total	< 0.1	mg/l	0.10	6010D	20 Dec 21 10:19	SZ
Silicon - Total	6.73	mg/l	0.10	6010D	16 Dec 21 15:44	SZ
Strontium - Total	0.15	mg/l	0.10	6010D	20 Dec 21 10:19	SZ
Zinc - Total	< 0.05	mg/l	0.05	6010D	20 Dec 21 10:19	SZ
Boron - Total	3.68	mg/l	0.10	6010D	28 Dec 21 14:28	SZ
Calcium - Dissolved	3.9	mg/l	1.0	6010D	14 Dec 21 11:22	MDE
Magnesium - Dissolved	< 1	mg/l	1.0	6010D	14 Dec 21 11:22	MDE
Sodium - Dissolved	691	mg/l	1.0	6010D	14 Dec 21 11:22	MDE
Potassium - Dissolved	3.4	mg/l	1.0	6010D	14 Dec 21 11:22	MDE
Lithium - Dissolved	0.101	mg/l	0.020	6010D	16 Dec 21 11:47	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	20 Dec 21 12:19	SZ
Iron - Dissolved	< 0.1	mg/l	0.10	6010D	20 Dec 21 12:19	SZ
Silicon - Dissolved	6.64	mg/l	0.10	6010D	16 Dec 21 15:44	SZ
Strontium - Dissolved	0.15	mg/l	0.10	6010D	20 Dec 21 12:19	SZ
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	20 Dec 21 12:19	SZ
Boron - Dissolved	3.43	mg/l	0.10	6010D	17 Dec 21 13:53	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	15 Dec 21 12:28	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	15 Dec 21 12:28	MDE

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MEMBER ACIL

Report Date: 5 Jan 22
Lab Number: 21-W4746
Work Order #: 82-3423
Account #: 007033
Date Sampled: 13 Dec 21 9:30
Date Received: 13 Dec 21 13:30
Sampled By: MVTL Field Service

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Sample Description: MRY

Temp at Receipt: 10.1C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Barium - Total	0.1128	mg/l	0.0020	6020B	15 Dec 21 12:28	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	15 Dec 21 15:53	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	15 Dec 21 12:28	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	15 Dec 21 12:28	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	15 Dec 21 12:28	MDE
Copper - Total	< 0.002	mg/l	0.0020	6020B	15 Dec 21 15:24	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	15 Dec 21 12:28	MDE
Manganese - Total	0.0038	mg/l	0.0020	6020B	15 Dec 21 15:24	MDE
Molybdenum - Total	0.0054	mg/l	0.0020	6020B	27 Dec 21 16:15	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	15 Dec 21 12:28	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	15 Dec 21 12:28	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	15 Dec 21 12:28	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	27 Dec 21 16:15	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	15 Dec 21 12:28	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	15 Dec 21 13:56	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Dec 21 13:56	MDE
Barium - Dissolved	0.1102	mg/l	0.0020	6020B	15 Dec 21 13:56	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	15 Dec 21 15:24	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	15 Dec 21 13:56	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Dec 21 13:56	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Dec 21 13:56	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Dec 21 15:24	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	15 Dec 21 13:56	MDE
Manganese - Dissolved	0.0031	mg/l	0.0020	6020B	15 Dec 21 15:24	MDE
Molybdenum - Dissolved	0.0049	mg/l	0.0020	6020B	27 Dec 21 17:04	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Dec 21 13:56	MDE

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MEMBER ACIL

Report Date: 5 Jan 22
Lab Number: 21-W4746
Work Order #: 82-3423
Account #: 007033
Date Sampled: 13 Dec 21 9:30
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Sampled By: MVTL Field Service

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Sample Description: MRY

Temp at Receipt: 10.1C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	15 Dec 21 13:56	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	28 Dec 21 12:06	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	27 Dec 21 17:04	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Dec 21 13:56	MDE

Bromide was analyzed at MVTL, New Ulm, MN.
ND Certification #:R-040

* Holding time exceeded

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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MEMBER ACIL

June 4, 2021

EERC
Barry Botnen
15 North 23rd St
Grand Forks, ND 58202

RE: USGS Well near Center, ND

Dear Mr. Botnen,

On June 3, 2021, MVTL Laboratories' Field Services division collected a ground water sample from a USGS well near Center, ND. Well ID is 142-084-24 BBA. MVTL installed a non-dedicated 3" Grundfos pump to a depth of 300 ft to purge and sample the well. The sample collected was placed on ice and transported back to the MVTL lab in Bismarck, ND for analysis.

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

Sincerely,

Jeremy Meyer

MVTL Field Services Manager

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: EERC

Event:

Sample ID: USGS well

Sampling Personal: Jerry Hayer / Darren Nieswang

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

WELL INFORMATION

Well Locked?	YES	(NO)	
Well Labeled?	(YES)	NO	
Casing Strait?	(YES)	NO	
Grout Seal Intact?	YES	NO	(Not Visible)
Repairs Necessary?			
Casing Diameter:	2" 3"		
Water Level Before Purge:	210.36	ft	
Total Depth of Well:	1000 t	ft	
Well Volume:	~~1098.0~~	liters	1950.4
Depth to Top of Pump:	300.0	ft	
Water Level After Sample:		ft	
Measurement Method:	Electric Water Level Indicator		

SAMPLING INFORMATION

Purging Method:	Grundfoss 3"	
Sampling Method:	Grundfors 3"	
Dedicated Equipment?	YES	(NO)

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

Control Settings:		
Purge:	—	Sec.
Recover:	—	Sec.
PSI:	—	

Bottle List:

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level	Pumping Rate	Liters Removed	Appearance or Comment
Purge Date	**Time**							(ft)	L/Min		clear, slightly turbid, turbid
3 June 21	0835	Start of Well Purge 60 min									
	0935	13.78	2652	8.59	1.29	-5.1	1.62	253.96	35.0	2100.0	Clear
	1035	15.40	2621	8.45	1.44	-7.9	1.53	255.47	35.0	2100.0	Clear
	1135	15.67	2617	8.41	2.57	3.4	0.85	256.40	35.0	2100.0	Clear
	1235	15.01	2639	8.44	1.79	-3.6	2.50	257.02	35.0	2100.0	Clear

Well Stabilized? (YES) NO

Total Volume Purged: 8400.0 Liters

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH			Turbidity (NTU)				Appearance or Comment
											Clarity, Color, Odor, Ect.
3 June 21	1235	15.01	2639	8.44			2.50				Clear

Comments:	142 - 084 - 24 BBA well ID

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 21 Jun 21
Lab Number: 21-W1550
Work Order #: 82-1301
Account #: 007033
Date Sampled: 3 Jun 21 12:35
Date Received: 3 Jun 21 13:54
Sampled By: MVTL Field Services

PO #: B. Botnen

Project Name: Center USGS Well

Sample Description: USGS Well

Temp at Receipt: 14.5C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	3 Jun 21	RAA
pH - Field	8.44	units	NA	SM 4500 H+ B	3 Jun 21 12:35	JSM
Temperature - Field	15.0	Degrees C	NA	SM 2550B	3 Jun 21 12:35	JSM
Total Alkalinity	969	mg/l CaCO3	20	SM2320B-11	3 Jun 21 18:00	RAA
Phenolphthalein Alk	32	mg/l CaCO3	20	SM2320B-11	3 Jun 21 18:00	RAA
Bicarbonate	905	mg/l CaCO3	20	SM2320B-11	3 Jun 21 18:00	RAA
Carbonate	64	mg/l CaCO3	20	SM2320B-11	3 Jun 21 18:00	RAA
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	3 Jun 21 18:00	RAA
Conductivity - Field	2639	umhos/cm	1	EPA 120.1	3 Jun 21 12:35	JSM
Tot Dis Solids(Summation)	1590	mg/l	12.5	SM1030-F	10 Jun 21 14:29	Calculated
Cation Summation	26.6	meq/L	NA	SM1030-F	8 Jun 21 11:41	Calculated
Anion Summation	29.0	meq/L	NA	SM1030-F	10 Jun 21 14:29	Calculated
Percent Error	-4.43	%	NA	SM1030-F	10 Jun 21 14:29	Calculated
Bromide	2.71	mg/l	0.100	EPA 300.0	9 Jun 21 18:32	RMV
Total Organic Carbon	1.2	mg/l	0.5	SM5310C-11	4 Jun 21 23:58	NAS
Dissolved Organic Carbon	1.2	mg/l	0.5	SM5310C-96	4 Jun 21 23:58	NAS
Fluoride	3.69	mg/l	0.10	SM4500-F-C	3 Jun 21 18:00	RAA
Sulfate	< 5	mg/l	5.00	ASTM D516-11	7 Jun 21 11:16	SD
Chloride	342	mg/l	2.0	SM4500-Cl-E-11	7 Jun 21 14:59	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	10 Jun 21 14:29	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	4 Jun 21 12:20	EV
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	11 Jun 21 9:10	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	11 Jun 21 13:02	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	11 Jun 21 13:02	MDE
Total Dissolved Solids	1660	mg/l	10	USGS I1750-85	4 Jun 21 8:50	RAA
Calcium - Total	3.6	mg/l	1.0	6010D	8 Jun 21 11:41	MDE
Magnesium - Total	< 1	mg/l	1.0	6010D	8 Jun 21 11:41	MDE
Sodium - Total	660	mg/l	1.0	6010D	8 Jun 21 11:41	MDE
Potassium - Total	2.7	mg/l	1.0	6010D	8 Jun 21 11:41	MDE
Lithium - Total	0.100	mg/l	0.020	6010D	14 Jun 21 10:31	MDE
Aluminum - Total	< 0.1	mg/l	0.10	6010D	11 Jun 21 10:06	SZ
Iron - Total	0.34	mg/l	0.10	6010D	7 Jun 21 15:02	MDE
Silicon - Total	5.00	mg/l	0.10	6010D	8 Jun 21 8:50	SZ
Strontium - Total	0.14	mg/l	0.10	6010D	7 Jun 21 15:02	MDE
Zinc - Total	< 0.05	mg/l	0.05	6010D	7 Jun 21 15:02	MDE
Boron - Total	2.83	mg/l	0.10	6010D	8 Jun 21 14:13	MDE
Calcium - Dissolved	3.4	mg/l	1.0	6010D	4 Jun 21 16:32	SZ

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Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 21 Jun 21
Lab Number: 21-W1550
Work Order #: 82-1301
Account #: 007033
Date Sampled: 3 Jun 21 12:35
Date Received: 3 Jun 21 13:54
Sampled By: MVTL Field Services

Project Name: Center USGS Well

PO #: B. Botnen

Sample Description: USGS Well

Temp at Receipt: 14.5C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Magnesium - Dissolved	< 1	mg/l	1.0	6010D	4 Jun 21 16:32	SZ
Sodium - Dissolved	605	mg/l	1.0	6010D	4 Jun 21 16:32	SZ
Potassium - Dissolved	2.9	mg/l	1.0	6010D	4 Jun 21 16:32	SZ
Lithium - Dissolved	0.101	mg/l	0.020	6010D	14 Jun 21 10:31	MDE
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	4 Jun 21 13:57	MDE
Iron - Dissolved	0.17	mg/l	0.10	6010D	4 Jun 21 13:57	MDE
Silicon - Dissolved	4.79	mg/l	0.10	6010D	8 Jun 21 8:50	SZ
Strontium - Dissolved	0.15	mg/l	0.10	6010D	4 Jun 21 13:57	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	4 Jun 21 13:57	MDE
Boron - Dissolved	3.10	mg/l	0.10	6010D	8 Jun 21 14:13	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	8 Jun 21 12:11	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	8 Jun 21 12:11	MDE
Barium - Total	0.0926	mg/l	0.0020	6020B	8 Jun 21 12:11	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	8 Jun 21 12:11	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	8 Jun 21 12:11	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	8 Jun 21 12:11	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	8 Jun 21 12:11	MDE
Copper - Total	< 0.002	mg/l	0.0020	6020B	8 Jun 21 12:11	MDE
Lead - Total	0.0009	mg/l	0.0005	6020B	8 Jun 21 12:11	MDE
Manganese - Total	0.0066	mg/l	0.0020	6020B	17 Jun 21 14:51	MDE
Molybdenum - Total	0.0050	mg/l	0.0020	6020B	17 Jun 21 14:51	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	8 Jun 21 12:11	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	8 Jun 21 12:11	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	8 Jun 21 12:11	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	8 Jun 21 12:11	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	8 Jun 21 12:11	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	4 Jun 21 18:26	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	4 Jun 21 18:26	MDE
Barium - Dissolved	0.0863	mg/l	0.0020	6020B	4 Jun 21 18:26	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	4 Jun 21 18:26	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	4 Jun 21 18:26	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	4 Jun 21 18:26	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	4 Jun 21 18:26	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	4 Jun 21 18:26	MDE
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	4 Jun 21 18:26	MDE
Manganese - Dissolved	0.0044	mg/l	0.0020	6020B	17 Jun 21 15:48	MDE
Molybdenum - Dissolved	0.0048	mg/l	0.0020	6020B	17 Jun 21 15:48	MDE

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

CERTIFICATION: ND # ND-00016

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

Report Date: 21 Jun 21
Lab Number: 21-W1550
Work Order #: 82-1301
Account #: 007033
Date Sampled: 3 Jun 21 12:35
Date Received: 3 Jun 21 13:54
Sampled By: MVTL Field Services

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

PO #: B. Botnen

Project Name: Center USGS Well

Sample Description: USGS Well

Temp at Receipt: 14.5C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	4 Jun 21 18:26	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	4 Jun 21 18:26	MDE
Silver - Dissolved	< 0.002 ^	mg/l	0.0005	6020B	4 Jun 21 18:26	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	4 Jun 21 18:26	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	4 Jun 21 18:26	MDE

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

CC

Approved by: Claudette K. Carroll 21 Jun 21

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

MVTL

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

Chain of Custody Record

Project Name:	Event:	Work Order Number:
Center USGS Well		82-1301

Report To:	EERC	CC:	Collected By:
Attn:	Barry Botnen		
Address:	15 North 23rd St Grand Forks, ND 58202		
Phone:	701-777-5073		
Email:	bbotnen@undeerc.org		

Lab Number	Sample ID	Date	Time	Sample Type	1 Liter Raw	500 mL Nitric	500 mL Nitric (filtered)	250 mL Sulfuric	125mL Raw	TOC (set of 3)	DOC (set of 3)	Temp (°C)	Spec. Cond.	pH	Analysis Required
W1550	USGS Well	3 Jun 21	1235	GW	4	2	2	2	4	2	X	15.01	2639	8.44	See Attachment + TDS & TDS Calc

Comments:

Relinquished By		Sample Condition		Received By	
Name	Date/Time	Location	Temp (°C)	Name	Date/Time
1	3 Jun 21 1354	Log In Walk In #2	R01 14.5 TM562 / TM805		3 Jun 21 1354
2					

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MEMBER ACIL

November 18, 2021

EERC
Barry Botnen
15 North 23rd St
Grand Forks, ND 58202

RE: USGS Well near Center, ND

Dear Mr. Botnen,

On November 15, 2021, MVTL Laboratories' Field Services division collected a ground water sample from a USGS well near Center, ND. Well ID is 142-084-24 BBA. MVTL installed a non-dedicated 3" Grundfos pump to a depth of 300 ft to purge and sample the well. The sample collected was placed on ice and transported back to the MVTL lab in Bismarck, ND for analysis.

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

Sincerely,

Jeremy Meyer

MVTL Field Services Manager

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www.mvtl.com

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4464
Work Order #: 82-3166
Account #: 007033
Date Sampled: 15 Nov 21 13:00
Date Received: 15 Nov 21 14:25
Sampled By: MVTL Field Services

Project Name: Center USGS Well

PO #: B. Botnen

Sample Description: USGS Well

Temp at Receipt: 9.9C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	15 Nov 21	RAA
pH	* 8.4	units	N/A	SM4500-H+-B-11	16 Nov 21 17:00	AC
Conductivity (EC)	2645	umhos/cm	N/A	SM2510B-11	16 Nov 21 17:00	AC
pH - Field	8.35	units	NA	SM 4500 H+ B	15 Nov 21 13:00	JSM
Temperature - Field	13.8	Degrees C	NA	SM 2550B	15 Nov 21 13:00	JSM
Total Alkalinity	958	mg/l CaCO3	20	SM2320B-11	16 Nov 21 17:00	AC
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	16 Nov 21 17:00	AC
Bicarbonate	933	mg/l CaCO3	20	SM2320B-11	16 Nov 21 17:00	AC
Carbonate	25	mg/l CaCO3	20	SM2320B-11	16 Nov 21 17:00	AC
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	16 Nov 21 17:00	AC
Conductivity - Field	2586	umhos/cm	1	EPA 120.1	15 Nov 21 13:00	JSM
Tot Dis Solids(Summation)	1560	mg/l	12.5	SM1030-F	19 Nov 21 15:38	Calculated
Cation Summation	32.7	meq/L	NA	SM1030-F	19 Nov 21 12:52	Calculated
Anion Summation	27.5	meq/L	NA	SM1030-F	19 Nov 21 15:38	Calculated
Percent Error	8.62	%	NA	SM1030-F	19 Nov 21 15:38	Calculated
Bromide	2.62	mg/l	0.100	EPA 300.0	24 Nov 21 17:34	RMV
Total Organic Carbon	1.1	mg/l	0.5	SM5310C-11	19 Nov 21 16:46	NAS
Dissolved Organic Carbon	1.1	mg/l	0.5	SM5310C-96	19 Nov 21 16:46	NAS
Fluoride	3.78	mg/l	0.10	SM4500-F-C	16 Nov 21 17:00	AC
Sulfate	< 5	mg/l	5.00	ASTM D516-11	19 Nov 21 15:38	SD
Chloride	295	mg/l	2.0	SM4500-Cl-E-11	17 Nov 21 13:30	SD
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	18 Nov 21 15:33	SD
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	16 Nov 21 15:33	SD
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 9:35	SD
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	19 Nov 21 10:05	SD
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 12:33	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	18 Nov 21 14:00	MDE
Total Dissolved Solids	1600	mg/l	10	USGS I1750-85	17 Nov 21 11:53	AC
Calcium - Total	3.5	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Magnesium - Total	1.0	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Sodium - Total	680	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Potassium - Total	3.2	mg/l	1.0	6010D	16 Nov 21 12:36	MDE
Lithium - Total	0.091	mg/l	0.020	6010D	16 Nov 21 10:32	SZ
Aluminum - Total	< 0.1	mg/l	0.10	6010D	19 Nov 21 10:52	SZ
Iron - Total	0.26	mg/l	0.10	6010D	19 Nov 21 10:52	SZ
Silicon - Total	5.14	mg/l	0.10	6010D	16 Nov 21 14:55	SZ
Strontium - Total	0.15	mg/l	0.10	6010D	19 Nov 21 10:52	SZ

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

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MEMBER ACIL

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4464
Work Order #: 82-3166
Account #: 007033
Date Sampled: 15 Nov 21 13:00
Date Received: 15 Nov 21 14:25
Sampled By: MVTL Field Services

Project Name: Center USGS Well

PO #: B. Botnen

Sample Description: USGS Well

Temp at Receipt: 9.9C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Zinc - Total	< 0.05	mg/l	0.05	6010D	19 Nov 21 10:52	SZ
Boron - Total	2.88	mg/l	0.10	6010D	17 Nov 21 12:08	SZ
Calcium - Dissolved	3.4	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Magnesium - Dissolved	< 1	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Sodium - Dissolved	745	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Potassium - Dissolved	3.4	mg/l	1.0	6010D	16 Nov 21 10:36	MDE
Lithium - Dissolved	0.090	mg/l	0.020	6010D	16 Nov 21 12:32	SZ
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	19 Nov 21 12:52	SZ
Iron - Dissolved	0.20	mg/l	0.10	6010D	19 Nov 21 12:52	SZ
Silicon - Dissolved	5.23	mg/l	0.10	6010D	16 Nov 21 16:55	SZ
Strontium - Dissolved	0.15	mg/l	0.10	6010D	19 Nov 21 12:52	SZ
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	19 Nov 21 12:52	SZ
Boron - Dissolved	2.83	mg/l	0.10	6010D	17 Nov 21 15:08	SZ
Antimony - Total	< 0.002 ^	mg/l	0.0010	6020B	17 Nov 21 13:05	MDE
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	17 Nov 21 13:05	MDE
Barium - Total	0.0942	mg/l	0.0020	6020B	17 Nov 21 13:05	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 13:05	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 13:05	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	17 Nov 21 13:05	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	17 Nov 21 13:05	MDE
Copper - Total	< 0.002	mg/l	0.0020	6020B	17 Nov 21 13:05	MDE
Lead - Total	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 13:05	MDE
Manganese - Total	0.0053	mg/l	0.0020	6020B	17 Nov 21 13:05	MDE
Molybdenum - Total	0.0059	mg/l	0.0020	6020B	17 Nov 21 13:05	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	17 Nov 21 13:05	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	17 Nov 21 13:05	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 13:05	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 13:05	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	17 Nov 21 13:05	MDE
Antimony - Dissolved	< 0.002 ^	mg/l	0.0010	6020B	17 Nov 21 15:06	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	17 Nov 21 15:06	MDE
Barium - Dissolved	0.0910	mg/l	0.0020	6020B	17 Nov 21 15:06	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 15:06	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 15:06	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	17 Nov 21 15:06	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	17 Nov 21 15:06	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	17 Nov 21 15:06	MDE

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Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 26 Nov 21
Lab Number: 21-W4464
Work Order #: 82-3166
Account #: 007033
Date Sampled: 15 Nov 21 13:00
Date Received: 15 Nov 21 14:25
Sampled By: MVTL Field Services

Project Name: Center USGS Well

PO #: B. Botnen

Sample Description: USGS Well

Temp at Receipt: 9.9C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 15:06	MDE
Manganese - Dissolved	0.0051	mg/l	0.0020	6020B	17 Nov 21 15:06	MDE
Molybdenum - Dissolved	0.0055	mg/l	0.0020	6020B	17 Nov 21 15:06	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	17 Nov 21 15:06	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	17 Nov 21 15:06	MDE
Silver - Dissolved	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 15:06	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	17 Nov 21 15:06	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	17 Nov 21 15:06	MDE

* Holding time exceeded

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

CC

Approved by: Claudette K Carroll 29NOV21

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: EERC

Event: Condor well / USGS well

Sample ID:

Sampling Personal: Jerry Myer

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

WELL INFORMATION

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

Casing Diameter:	2"	
Water Level Before Purge:	210.60	ft
Total Depth of Well:	1000+	ft
Well Volume:	1949.8	liters
Depth to Top of Pump:	—	ft
Water Level After Sample:	—	ft
Measurement Method:	Electric Water Level Indicator	

SAMPLING INFORMATION

Purging Method:	Bail	S. Pump	D. Pump	Peristaltic	(3" Grundfoss)
Sampling Method:	Bail	S. Pump	D. Pump	Peristaltic	(3" Grundfoss)
Dedicated Equipment?	YES	(NO)			

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

Bottle List:

FIELD READINGS

Stabilization Parameters (3 Consecutive)		Temp. (°C)	Spec. Cond.	pH	DO	ORP	Turbidity (NTU)		Pumping Rate	Liters Removed	Appearance or Comment
Purge Date	Time	±0.5°	±5%	±0.1					mL/Min		clear, slightly turbid, turbid
15 Nov 21	1000	Start of Well Purge									
	1100	13.30	2555	8.35	1.94	61	1.06		35.0	2100.0	Clear
	1200	13.52	2629	8.35	2.19	56	1.08		35.0	2100.0	Clear
	1300	13.77	2586	8.35	3.08	32.9	0.52		35.0	2100.0	Clear

Well Stabilized? (YES) NO

Total Volume Purged: 6300.0 Liters

Sample Date	Time	Temp. (°C)	Spec. Cond.	pH							Appearance or Comment
											Clarity, Color, Odor, Ect.
15 Nov 21	1300	13.77	2586	8.35							Clear

Comments:	

MVTL

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

Chain of Custody Record

Project Name:	Event:	Work Order Number:
Center USGS Well		B2-3166

Report To:	**EERC**	CC:	Collected By:
Attn:	Barry Botnen		
Address:	15 North 23rd St Grand Forks, ND 58202		
Phone:	701-777-5073		
Email:	bbotnen@undeerc.org		

Lab Number	Sample ID	Date	Time	Sample Type	1 Liter Raw	500 mL Nitric	500 mL Nitric (filtered)	250 mL Sulfuric	250 mL Sulfuric (filtered)	125mL Raw	TOC (set of 3)	DOC (set of 3)	Temp (°C)	Spec. Cond.	pH	Analysis Required
W44164	**USGS Well**	15Nov21	1300	GW	**4**	**2**	**2**	**2**	**2**	**4**	**2**	**2**	13.77	2586	8.35	Same analysis as work order B2-2307

Comments:

Relinquished By		Sample Condition		Received By	
Name	Date/Time	Location	Temp (°C)	Name	Date/Time
1	15Nov21 1425	~~Log In~~ Walk In #2	R01 9.9 TM562 / ~~TM805~~		15Nov21 1425
2					

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	809443	Job #:	49367	IS-65777	Co. Job#:
Sample Name:	NDCS-MPC-WS-1				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	1 Liter Plastic Bottle				
Field/Site Name:	North Dakota CarbonSafe (NDCS)				
Location:					
Formation/Depth:					
Sampling Point:					
Date Sampled:	11/09/2021 8:30	Date Received:	11/17/2021	Date Reported:	1/24/2022

δD of water	----------	-118.2 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-14.48 ‰ relative to VSMOW
Tritium content of water	----------	2.57 ± 0.17 TU
$\delta^{13}C$ of DIC	----------	-11.5 ‰ relative to VPDB
^{14}C content of DIC	----------	62.4 ± 0.2 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	No

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	809444	Job #:	49367	IS-65777	Co. Job#:
Sample Name:	NDCS-MPC-WS-2				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	1 Liter Plastic Bottle				
Field/Site Name:	North Dakota CarbonSafe (NDCS)				
Location:					
Formation/Depth:					
Sampling Point:					
Date Sampled:	11/09/2021 10:30	Date Received:	11/17/2021	Date Reported:	1/24/2022

δD of water	----------	-123.1 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-15.42 ‰ relative to VSMOW
Tritium content of water	----------	2.93 ± 0.26 TU
$\delta^{13}C$ of DIC	----------	-10.0 ‰ relative to VPDB
^{14}C content of DIC	----------	52.9 ± 0.2 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	No

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

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Lab #:	809445	Job #:	49367	IS-65777	Co. Job#:
Sample Name:	NDCS-W1686				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	1 Liter Plastic Bottle				
Field/Site Name:	North Dakota CarbonSafe (NDCS)				
Location:					
Formation/Depth:					
Sampling Point:					
Date Sampled:	11/09/2021 13:30	Date Received:	11/17/2021	Date Reported:	1/24/2022

δD of water	----------	-120.8 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-16.08 ‰ relative to VSMOW
Tritium content of water	----------	3.74 ± 0.28 TU
$\delta^{13}C$ of DIC	----------	-11.9 ‰ relative to VPDB
^{14}C content of DIC	----------	53.3 ± 0.2 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	No

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
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Lab #:	809446	Job #:	49367	IS-65777	Co. Job#:
Sample Name:	NDCS-W217				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	1 Liter Plastic Bottle				
Field/Site Name:	North Dakota CarbonSafe (NDCS)				
Location:					
Formation/Depth:					
Sampling Point:					
Date Sampled:	11/09/2021 15:00	Date Received:	11/17/2021	Date Reported:	1/24/2022

δD of water	----------	-118.4 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-14.86 ‰ relative to VSMOW
Tritium content of water	----------	< 0.47 TU
$\delta^{13}C$ of DIC	----------	-9.0 ‰ relative to VPDB
^{14}C content of DIC	----------	1.5 ± 0.0 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	No

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
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www.isotechlabs.com

Lab #:	809447	Job #:	49367	IS-65777	Co. Job#:
Sample Name:	NDCS-MPC-WS-1 Dup				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	1 Liter Plastic Bottle				
Field/Site Name:	North Dakota CarbonSafe (NDCS)				
Location:					
Formation/Depth:					
Sampling Point:					
Date Sampled:	11/09/2021 9:30	Date Received:	11/17/2021	Date Reported:	1/24/2022

δD of water	----------	-118.4 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-14.45 ‰ relative to VSMOW
Tritium content of water	----------	2.71 ± 0.24 TU
$\delta^{13}C$ of DIC	----------	-11.5 ‰ relative to VPDB
^{14}C content of DIC	----------	62.8 ± 0.2 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	No

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	809448	Job #:	49367	IS-65777	Co. Job#:
Sample Name:	NDCS-W395				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	1 Liter Plastic Bottle				
Field/Site Name:	North Dakota CarbonSafe (NDCS)				
Location:					
Formation/Depth:					
Sampling Point:					
Date Sampled:	11/09/2021 16:00	Date Received:	11/17/2021	Date Reported:	1/24/2022

δD of water	----------	-119.7 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-15.04 ‰ relative to VSMOW
Tritium content of water	----------	< 0.43 TU
$\delta^{13}C$ of DIC	----------	-11.1 ‰ relative to VPDB
^{14}C content of DIC	----------	0.5 ± 0.0 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	No

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	809449	Job #:	49367	IS-65777	Co. Job#:
Sample Name:	NDCS-W269				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	1 Liter Plastic Bottle				
Field/Site Name:	North Dakota CarbonSafe (NDCS)				
Location:					
Formation/Depth:					
Sampling Point:					
Date Sampled:	11/10/2021 9:00	Date Received:	11/17/2021	Date Reported:	1/24/2022

δD of water	----------	-128.1 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-16.63 ‰ relative to VSMOW
Tritium content of water	----------	0.92 ± 0.21 TU
$\delta^{13}C$ of DIC	----------	-10.9 ‰ relative to VPDB
^{14}C content of DIC	----------	58.6 ± 0.2 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	No

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	809450	Job #:	49367	IS-65777	Co. Job#:
Sample Name:	NDCS-W478				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	1 Liter Plastic Bottle				
Field/Site Name:	North Dakota CarbonSafe (NDCS)				
Location:					
Formation/Depth:					
Sampling Point:					
Date Sampled:	11/10/2021 11:00	Date Received:	11/17/2021	Date Reported:	1/24/2022

δD of water	----------	-130.7 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-16.94 ‰ relative to VSMOW
Tritium content of water	----------	< 0.37 TU
$\delta^{13}C$ of DIC	----------	-8.9 ‰ relative to VPDB
^{14}C content of DIC	----------	< 0.4 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	No

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	809451	Job #:	49367	IS-65777	Co. Job#:
Sample Name:	NDCS-W468				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	1 Liter Plastic Bottle				
Field/Site Name:	North Dakota CarbonSafe (NDCS)				
Location:					
Formation/Depth:					
Sampling Point:					
Date Sampled:	11/10/2021 10:00	Date Received:	11/17/2021	Date Reported:	1/24/2022

δD of water	----------	-142.3 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-18.82 ‰ relative to VSMOW
Tritium content of water	----------	< 0.45 TU
$\delta^{13}C$ of DIC	----------	-4.3 ‰ relative to VPDB
^{14}C content of DIC	----------	9.7 ± 0.1 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	No

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	809452	Job #:	49367	IS-65777	Co. Job#:
Sample Name:	NDCS-W424				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	1 Liter Plastic Bottle				
Field/Site Name:	North Dakota CarbonSafe (NDCS)				
Location:					
Formation/Depth:					
Sampling Point:					
Date Sampled:	11/10/2021 14:30	Date Received:	11/17/2021	Date Reported:	1/24/2022

δD of water	----------	-122.0 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-15.48 ‰ relative to VSMOW
Tritium content of water	----------	< 0.45 TU
$\delta^{13}C$ of DIC	----------	-15.1 ‰ relative to VPDB
^{14}C content of DIC	----------	1.0 ± 0.0 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	No

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	809453	Job #:	49367	IS-65777	Co. Job#:
Sample Name:	NDCS-W471				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	1 Liter Plastic Bottle				
Field/Site Name:	North Dakota CarbonSafe (NDCS)				
Location:					
Formation/Depth:					
Sampling Point:					
Date Sampled:	11/10/2021 15:30	Date Received:	11/17/2021	Date Reported:	1/24/2022

δD of water	----------	-121.3 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-15.34 ‰ relative to VSMOW
Tritium content of water	----------	< 0.50 TU
$\delta^{13}C$ of DIC	----------	-12.0 ‰ relative to VPDB
^{14}C content of DIC	----------	< 0.4 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	No

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	809454	Job #:	49367	IS-65777	Co. Job#:
Sample Name:	NDCS-W510				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	1 Liter Plastic Bottle				
Field/Site Name:	North Dakota CarbonSafe (NDCS)				
Location:					
Formation/Depth:					
Sampling Point:					
Date Sampled:	11/11/2021 9:00	Date Received:	11/17/2021	Date Reported:	1/24/2022

δD of water	----------	-129.9 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-16.67 ‰ relative to VSMOW
Tritium content of water	----------	< 0.47 TU
$\delta^{13}C$ of DIC	----------	-15.6 ‰ relative to VPDB
^{14}C content of DIC	----------	< 0.4 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	No

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	809455	Job #:	49367	IS-65777	Co. Job#:
Sample Name:	Center Well				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	1 Liter Plastic Bottle				
Field/Site Name:	EERC				
Location:					
Formation/Depth:					
Sampling Point:					
Date Sampled:	11/15/2021 13:00	Date Received:	11/17/2021	Date Reported:	1/24/2022

δD of water	----------	-120.2 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-15.10 ‰ relative to VSMOW
Tritium content of water	----------	< 0.47 TU
$\delta^{13}C$ of DIC	----------	-8.1 ‰ relative to VPDB
^{14}C content of DIC	----------	< 0.4 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	No

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	802165	Job #:	48607	IS-65777	Co. Job#:
Sample Name:	MPC-WS-1				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	Plastic Bottle				
Field/Site Name:	NDCS				
Location:	Center, ND				
Formation/Depth:					
Sampling Point:					
Date Sampled:	8/11/2021 15:00	Date Received:	8/26/2021	Date Reported:	10/04/2021

δD of water	----------	-116.3 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-14.53 ‰ relative to VSMOW
Tritium content of water	----------	2.35 ± 0.23 TU
$\delta^{13}C$ of DIC	----------	-11.3 ‰ relative to VPDB
^{14}C content of DIC	----------	64.3 ± 0.2 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	Yes

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	802166	Job #:	48607	IS-65777	Co. Job#:
Sample Name:	MPC-WS-1 DUP				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	Plastic Bottle				
Field/Site Name:	NDCS				
Location:	Center, ND				
Formation/Depth:					
Sampling Point:					
Date Sampled:	8/11/2021 15:00	Date Received:	8/26/2021	Date Reported:	10/04/2021

δD of water	----------	-124.6 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-15.57 ‰ relative to VSMOW
Tritium content of water	----------	2.38 ± 0.30 TU
$\delta^{13}C$ of DIC	----------	-11.4 ‰ relative to VPDB
^{14}C content of DIC	----------	64.2 ± 0.2 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	Yes

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	802167	Job #:	48607	IS-65777	Co. Job#:
Sample Name:	W289				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	Plastic Bottle				
Field/Site Name:	NDCS				
Location:	Center, ND				
Formation/Depth:					
Sampling Point:					
Date Sampled:	8/11/2021 17:00	Date Received:	8/26/2021	Date Reported:	10/04/2021

δD of water	----------	-123.5 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-16.19 ‰ relative to VSMOW
Tritium content of water	----------	< 0.73 TU
$\delta^{13}C$ of DIC	----------	-8.6 ‰ relative to VPDB
^{14}C content of DIC	----------	11.2 ± 0.1 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	Yes

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	802168	Job #:	48607	IS-65777	Co. Job#:
Sample Name:	W510				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	Plastic Bottle				
Field/Site Name:	NDCS				
Location:	Center, ND				
Formation/Depth:					
Sampling Point:					
Date Sampled:	8/11/2021 19:00	Date Received:	8/26/2021	Date Reported:	10/04/2021

δD of water	----------	-127.9 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-16.53 ‰ relative to VSMOW
Tritium content of water	----------	< 0.45 TU
$\delta^{13}C$ of DIC	----------	-16.0 ‰ relative to VPDB
^{14}C content of DIC	----------	0.8 ± 0.0 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	Yes

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	802169	Job #:	48607	IS-65777	Co. Job#:
Sample Name:	W269				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	Plastic Bottle				
Field/Site Name:	NDCS				
Location:	Center, ND				
Formation/Depth:					
Sampling Point:					
Date Sampled:	8/12/2021 10:30	Date Received:	8/26/2021	Date Reported:	10/04/2021

δD of water	----------	-119.6 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-15.72 ‰ relative to VSMOW
Tritium content of water	----------	1.80 ± 0.23 TU
$\delta^{13}C$ of DIC	----------	-10.6 ‰ relative to VPDB
^{14}C content of DIC	----------	65.5 ± 0.2 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	Yes

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	802170	Job #:	48607	IS-65777	Co. Job#:
Sample Name:	W217				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	Plastic Bottle				
Field/Site Name:	NDCS				
Location:	Center, ND				
Formation/Depth:					
Sampling Point:					
Date Sampled:	8/12/2021 14:30	Date Received:	8/26/2021	Date Reported:	10/04/2021

δD of water	----------	-116.2 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-14.64 ‰ relative to VSMOW
Tritium content of water	----------	< 0.54 TU
$\delta^{13}C$ of DIC	----------	-8.0 ‰ relative to VPDB
^{14}C content of DIC	----------	< 0.4 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	Yes

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	802171	Job #:	48607	IS-65777	Co. Job#:
Sample Name:	W1686				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	Plastic Bottle				
Field/Site Name:	NDCS				
Location:	Center, ND				
Formation/Depth:					
Sampling Point:					
Date Sampled:	8/12/2021 15:30	Date Received:	8/26/2021	Date Reported:	10/04/2021

δD of water	----------	-120.5 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-15.99 ‰ relative to VSMOW
Tritium content of water	----------	3.59 ± 0.28 TU
$\delta^{13}C$ of DIC	----------	-11.5 ‰ relative to VPDB
^{14}C content of DIC	----------	52.9 ± 0.2 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	Yes

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	802172	Job #:	48607	IS-65777	Co. Job#:
Sample Name:	W471				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	Plastic Bottle				
Field/Site Name:	NDCS				
Location:	Center, ND				
Formation/Depth:					
Sampling Point:					
Date Sampled:	8/12/2021 17:00	Date Received:	8/26/2021	Date Reported:	10/04/2021

δD of water	----------	-119.0 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-15.20 ‰ relative to VSMOW
Tritium content of water	----------	< 0.71 TU
$\delta^{13}C$ of DIC	----------	-11.6 ‰ relative to VPDB
^{14}C content of DIC	----------	< 0.4 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	Yes

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

ISOTECH
a Stratum Reservoir brand
www.isotechlabs.com

Lab #:	802173	Job #:	48607	IS-65777	Co. Job#:
Sample Name:	MPC-WS-2				Co. Lab#:
Company:	EERC - Energy & Environmental Research				
API/Well:					
Container:	Plastic Bottle				
Field/Site Name:	NDCS				
Location:	Center, ND				
Formation/Depth:					
Sampling Point:					
Date Sampled:	8/13/2021	8:30	Date Received:	8/26/2021	Date Reported: 10/04/2021

δD of water	----------	-119.4 ‰ relative to VSMOW
$\delta^{18}O$ of water	----------	-15.01 ‰ relative to VSMOW
Tritium content of water	----------	3.57 ± 0.39 TU
$\delta^{13}C$ of DIC	----------	-10.1 ‰ relative to VPDB
^{14}C content of DIC	----------	54.8 ± 0.2 percent modern carbon
$\delta^{15}N$ of nitrate	----------	na
$\delta^{18}O$ of nitrate	----------	na
$\delta^{34}S$ of sulfate	----------	na
$\delta^{18}O$ of sulfate	----------	na
Vacuum Distilled? *	----------	Yes

Remarks:

nd = not detected. na = not analyzed.
*Indicates if vacuum distillation was utilized for hydrogen and oxygen isotopic analysis of water

WELL DRILLER'S REPORT

NORTH DAKOTA BOARD OF WATER WELL CONTRACTORS
STATE OF NORTH DAKOTA
SFN 60273 (8/2020)

ND Board of Water Well Contractors • 900 E. Boulevard Ave. - Dept. 770 • Bismarck, ND, 58505-0850
State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

WELL OWNER

Name: EERC / MinnKota Power
Address: Center ND

WELL LOCATION

Sketch map location must agree with written location.

County: Oliver | GPS:
1/4: | 1/4: SW | 1/4: NW
Township: 141 N | Range: 83 W | Section: 4

PROPOSED USE

☐ Domestic ☐ Geothermal ☐ Municipal ☐ Industrial
☐ Stock ☐ Irrigation ☒ Monitoring ☐ Test Hole

METHOD DRILLED

☐ Cable ☐ Jetted ☒ Forward Rotary ☐ Reverse Rotary
☐ Bored ☐ Auger ☐ If Other, Specify

WATER QUALITY

Was a water sample collected for
Chemical Analysis? ☒ Yes ☐ No
Bacteriological Analysis? ☐ Yes ☐ No
If So, To What Laboratory Was It Sent? MVTL

WELL CONSTRUCTION

Diameter Of Hole In Inches: 9-5/8 | Depth In Feet: 1160

Casing:
☐ Steel ☒ Plastic ☐ Concrete ☐ Other
☐ Threaded ☐ Welded ☐ If Other, Specify SPLICED

Pipe Weight	Diameter	From	To
lb/ft SCH 80	inches 5	feet 0	feet 920
lb/ft	inches	feet	feet
lb/ft	inches	feet	feet

Was A Well Screen Installed? ☒ Yes ☐ No
Was Perforated Pipe Used? ☐ Yes ☒ No
Screen Or Perforation Interval: From In Feet 920-980 & 1080-1120 | To In Feet
Was Casing Left Open End? ☐ Yes ☒ No

Material	Diameter In Inches

Slot Size	Set From In Feet	To In Feet
13	920	980
13	1080	1120

Was Packer Or Seal Used? ☐ Yes ☒ No
If So, What Material | Depth In Feet
Type Of Well ☐ Straight Screen ☐ Gravel Packed SILICA 10-20

Depth Grouted	From	To
	920	0

Grouting Material: Cement | Other: BENT GROUT
If Other, Explain: PUMPED THOUGH CASING BOTTOM UP TO
Well Head Completion: Pitless Unit: YES
12" Above Grade: YES | Other (Specify)
It Other, Specify

Was Pump Installed? ☒ Yes ☐ No
Was Well Disinfected Upon Completion? ☒ Yes ☐ No

WATER LEVEL

Static Water Level (In Feet) Below Surface: 232
If Flowing, Closed-In Pressure In PSI
GPM Flow | Through | Inch Pipe
Controlled By ☐ Valve ☐ Reducers ☐ Other ☐ If Other, Specify

WELL TEST DATA

☒ Pump ☐ Bailer ☐ Other
Pumping Level Below Land Surface

Feet After	Hrs. Pumping	GPM
302		10
Feet After	Hrs. Pumping	GPM
Feet After	Hrs. Pumping	GPM

WELL LOG

Formation	Depth (ft.) From	To
Fill	0	2
Yellow Sandy Clay	2	14
Coal	14	14.5
Gray Clay	14.5	15
Coal	15	16
Sandy Gray Clay	16	20
Gray Clay	20	40
Coal	40	43
Gray Clay	43	80
Coal	80	82
Gray Clay	82	99
Rock Ledge	99	100
Gray Clay	100	115
Sandy Gray Clay	115	120
Gray Sand	120	145
Gray Clay	145	160
Gray Sand	160	165
Gray Clay	165	170
Coal	170	173
Gray Clay	173	180

Use Separate Sheet If Necessary

DATE COMPLETED 12-3-2021

WAS WELL PLUGGED OR ABANDONED? ☐ Yes ☒ No
If So, How

REMARKS

DRILLER'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Driller's Or Firm's Name: Earth Energy + Water | Certificate Number: 153
Address: New Salem, ND
Signed By: [signature] | Date: 12-3-21

COPY FOR BOARD COPY FOR DRILLER COPY FOR CUSTOMER

NAME: EERC/Minnkota		
Center, ND		
COUNTY: Oliver		
SECTION: 4		
TOWNSHIP: 141N		
RANGE: 83W		
FORMATION	**Depth (ft.) FROM**	**Depth (ft.) TO**
Gray Sand	180	220
Gray Clay Sandy	220	240
Sandy Gray Clay	240	246
Gray Sand	246	251
Gray Clay	251	265
Rock Ledge	265	267
Gray Clay	267	277
Gray Sand	277	290
Gray Clay	290	322
Rock Ledge	322	324
Gray Clay	324	333
Rock Ledge	333	336
Gray Sandy Clay	336	340
Coal	340	345
Gray Clay Sandy	345	360
Sandy Gray Clay	360	370
Gray Clay	370	383
Rock Ledge	383	389
Gray Clay	389	496
Rock Ledge	496	497
Sandy Gray Clay	497	545
Medium Blue Sand	545	570
Gray Clay	570	615
Rock Ledge	615	617
Fine Gray Sand	617	620
Gray Clay	620	725
Medium Gray Sand	725	750
Gray Clay	750	780
Gray Sand w/Clay	780	800
Rock Ledge	800	802
Gray Clay	802	822
Coal	822	825
Gray Clay	825	840
Gray Sand	840	850
Coal	850	851
Gray Clay	851	895
Sandstone Clay	895	900
Sandy Gray Clay	900	905
Fine Sand w/Clay Stringer	905	920
Medium to Fine Sand	920	980
Fine Sand Silty Mud	980	1000
Fine Sand Silty Muddy Clay Stringers	1000	1050
Sandstone	1050	1051
Medium to Fine Sand	1051	1105
Sandstone	1105	1106
Medium to Fine Sand	1106	1115
Sandstone	1115	1117
Fine Sand	1117	1120
Fine Sand w/silt	1120	1140
Fine Silty Sand	1140	1155
Rock Ledge	1155	1157
Shale	1157	1160

STATE OF NORTH DAKOTA

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58501

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

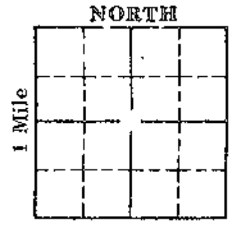
1. WELL OWNER

Name____________________

Address____________________

2. WELL LOCATION

Sketch map location must agree with written location.



Sec. (1 Mile) ______

County____________________

____¼____¼____¼ Sec.____ Twp.____ N. Rg.____W.

3. PROPOSED USE

☐ Domestic ☐ Stock ☐ Geothermal ☐ Irrigation ☐ Municipal ☐ Monitoring ☐ Industrial ☐ Test Hole

4. METHOD DRILLED

☐ Cable ☐ Forward Rotary ☐ Reverse Rotary ☐ Jetted ☐ Bored ☐ Auger

If other, specify ____________________

5. WATER QUALITY

Was a water sample collected for chemical analysis?

☐ Yes ☐ No

If so, to what laboratory was it sent____________________

6. WELL CONSTRUCTION

Diameter of hole________inches. Depth________feet.

Casing: ☐ Steel ☐ Plastic ☐ Concrete ☐ Threaded ☐ Welded ☐ Other

If other, specify____________________

Pipe Weight:	Diameter:	From:	To:
______lb/ft.	______inches	______feet	______feet
______lb/ft.	______inches	______feet	______feet
______lb/ft.	______inches	______feet	______feet

Was perforated pipe used? ☐ Yes ☐ No

Perforated pipe set from ________ft to ________feet

Was casing left open end? ☐ Yes ☐ No

Was a well screened installed? ☐ Yes ☐ No

Material________________Diameter________inches
(stainless steel, bronze, etc.)

Slot size ________set from ________feet to ________feet

Slot size ________set from ________feet to ________feet

Was a packer or seal used? ☐ Yes ☐ No

If so, what material ________Depth ________Ft.

Type of well: Straight screen ☐ Gravel packed ☐

Depth grouted: From____________To____________

Grouting Material: Cement______Other____________

If other explain: ____________________

Well head completion: Pitless unit________________

12" above grade____________ Other____________

If other, specify ____________________

Was pump installed: ☐ Yes ☐ No

Was well disinfected upon completion? ☐ Yes ☐ No

7. WATER LEVEL

Static water level____________feet below land surface

If flowing: closed-in pressure________psi

GPM flow__________through__________inch pipe

Controlled by: ☐ Valve ☐ Reducers ☐ Other

If other, specify____________________

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Pumping level below land surface:

________ft. after________hrs. pumping________gpm

________ft. after________hrs. pumping________gpm

________ft. after________hrs. pumping________gpm

9. WELL LOG

Formation	Depth (ft.)	
	From	To

(Use separate sheet if necessary.)

10. DATE COMPLETED____________________

11. WAS WELL PLUGGED OR ABANDONED?

☐ Yes ☐ No

If so, how____________________

12. REMARKS:

13. DRILLER'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

____

Driller's or Firm's Name Certificate No.

____

Address

____

Signed by Date

WHITE—DRILLER'S COPY YELLOW—BOARD'S COPY PINK—CUSTOMER'S COPY

STATE OF NORTH DAKOTA

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58501

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

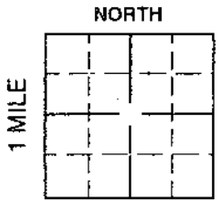
1. WELL OWNER

Name _____

Address _____

2. WELL LOCATION

Sketch map location must agree with written location.



County _____

____¼ ____¼ ____¼ Sec. _____ Twp. _____ N.Rg _____ W.

3. PROPOSED USE

☐ Domestic ☐ Geothermal ☐ Monitoring
☐ Stock ☐ Irrigation ☐ Industrial
☐ Municipal ☐ Test Hole

4. METHOD DRILLED

☐ Cable ☐ Reverse Rotary ☐ Bored
☐ Forward Rotary ☐ Jetted ☐ Auger

If other, specify _____

5. WATER QUALITY

Was a water sample collected for:
Chemcial Analysis? ☐ Yes ☐ No
Bacteriological Analysis? ☐ Yes ☐ No
If so, to what laboratory was it sent? _____

6. WELL CONSTRUCTION

Diameter of hole _____ inches. Depth _____ feet.

Casing: ☐ Steel ☐ Plastic ☐ Concrete
☐ Threaded ☐ Welded ☐ Other

If other, specify _____

Pipe Weight:	Diameter:	From:	To:
_____lb/ft	_____inches	_____feet	_____feet
_____lb/ft	_____inches	_____feet	_____feet
_____lb/ft	_____inches	_____feet	_____feet

Was perforated pipe used? ☐ Yes ☐ No

Perforated pipe set from _____ ft to _____ feet

Was casing left open end? ☐ Yes ☐ No

Was a well screened installed? ☐ Yes ☐ No

Material _____ Diameter _____ inches

Slot Size _____ set from _____ feet to _____ feet

Slot Size _____ set from _____ feet to _____ feet

Was packer or seal used? ☐ Yes ☐ No

If so, what material _____ Depth _____ ft.

(stainless steel, bronze, etc.)

Type of well: Straight screen ☐ Gravel packed ☐

Depth grouted: From _____ To _____

Grouting Material: Cement _____ Other _____

If other explain: _____

Well head completion: Pitless unit _____

12" above grade _____ Other _____

If other, specify _____

Was pump installed: ☐ Yes ☐ No

Was well disinfected upon completion? ☐ Yes ☐ No

7. WATER LEVEL

Static water level _____ feet below surface

If flowing: closed-in pressure _____ psi

GPM flow _____ through _____ inch pipe

Controlled by: ☐ Valve ☐ Reducers ☐ Other

If other, specify _____

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Pumping level below land surface:

_____ ft. after _____ hrs. pumping _____ gpm

_____ ft. after _____ hrs. pumping _____ gpm

_____ ft. after _____ hrs. pumping _____ gpm

9. WELL LOG

Formation	Depth (ft.) From	Depth (ft.) To

(Use separate sheet if necessary)

10. DATE COMPLETED 7-7-99

11. WAS WELL PLUGGED OR ABANDONED?

☐ Yes ☐ No

If so, how _____

12. REMARKS:

13. DRILLER'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Driller's or Firm's Name _____ Certificate No _____

Address _____

Signed by _____ Date _____

WHITE-DRILLER'S COPY YELLOW-BOARD'S COPY PINK-CUSTOMER'S COPY

STATE OF NORTH DAKOTA

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58501

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

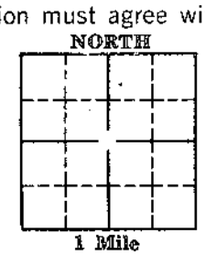
1. WELL OWNER

Name_____

Address_____

2. WELL LOCATION

Sketch map location must agree with written location.



County_____

____¼ ____¼ ____¼ Sec.____ Twp.____ N. Rg.____ W.

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Industrial
☐ Stock ☐ Municipal ☐ Test Hole

4. METHOD DRILLED

☐ Cable ☐ Reverse Rotary ☐ Bored
☐ Forward Rotary ☐ Jetted ☐ Other

If other, specify _____

5. WATER QUALITY

Was a water sample collected for chemical analysis?

☐ Yes ☐ No

If so, to what laboratory was it sent_____

6. WELL CONSTRUCTION

Diameter of hole_____inches. Depth_____feet.

Casing: ☐ Steel ☐ Plastic ☐ Concrete
☐ Threaded ☐ Welded ☐ Other

If other, specify_____

Pipe Weight:	Diameter:	From:	To:
_____lb/ft.	_____inches	_____feet	_____feet
_____lb/ft.	_____inches	_____feet	_____feet
_____lb/ft.	_____inches	_____feet	_____feet
_____lb/ft.	_____inches	_____feet	_____feet

Was perforated pipe used? ☐ Yes ☐ No

Length of pipe perforated _____feet

Was casing left open end? ☐ Yes ☐ No

Was a well screened installed? ☐ Yes ☐ No

Material_____ Diameter_____inches
(stainless steel, bronze, etc.)

Slot size_____ set from_____feet to_____feet

Slot size_____ set from_____feet to_____feet

Slot size_____ set from_____feet to_____feet

Slot size_____ set from_____feet to_____feet

Was a packer or seal used? ☐ Yes ☐ No

If so, what material_____

Type of well: Straight screen ☐ Gravel packed ☐

Was the well grouted? Yes ☐ No ☐

To what depth? _____feet

Material used in grouting_____

Well head completion: Pitless adapter_____

12" above grade_____ Other_____

If other, specify_____

Was well disinfected upon completion? ☐ Yes ☐ No

7. WATER LEVEL

Static water level_____feet below land surface

If flowing: closed-in pressure_____psi

GPM flow_____through_____inch pipe

Controlled by: ☐ Valve ☐ Reducers ☐ Other

If other, specify_____

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Pumping level below land surface:

_____ft. after_____hrs. pumping_____gpm

_____ft. after_____hrs. pumping_____gpm

_____ft. after_____hrs. pumping_____gpm

9. WELL LOG

Formation	Depth (ft.) From	Depth (ft.) To

(Use separate sheet if necessary.)

10. DATE COMPLETED_____

11. WAS WELL PLUGGED OR ABANDONED?

☐ Yes ☐ No

If so, how_____

12. REMARKS:

13. DRILLER'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Driller's or Firm's Name Certificate No.

Address

Signed by Date

WHITE—DRILLER'S COPY YELLOW—BOARD'S COPY PINK—CUSTOMER'S COPY

STATE OF NORTH DAKOTA

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58501

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

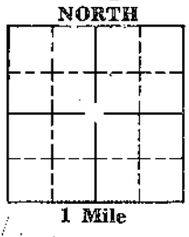
1. WELL OWNER

Name_____

Address_____

2. WELL LOCATION

Sketch map location must agree with written location.



County_____

___ ¼ ___ ¼ ___ ¼ Sec. ___ Twp. ___ N. Rg. ___ W.

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Industrial
☐ Stock ☐ Municipal ☐ Test Hole

4. METHOD DRILLED

☐ Cable ☐ Reverse Rotary ☐ Bored
☐ Forward Rotary ☐ Jetted ☐ Other

If other, specify _____

5. WATER QUALITY

Was a water sample collected for chemical analysis?

☐ Yes ☐ No

If so, to what laboratory was it sent_____

6. WELL CONSTRUCTION

Diameter of hole___ inches. Depth___ feet.

Casing: ☐ Steel ☐ Plastic ☐ Concrete
☐ Threaded ☐ Welded ☐ Other

If other, specify_____

Pipe Weight:	Diameter:	From:	To:
___ lb/ft.	___ inches	___ feet	___ feet
___ lb/ft.	___ inches	___ feet	___ feet
___ lb/ft.	___ inches	___ feet	___ feet
___ lb/ft.	___ inches	___ feet	___ feet

Was perforated pipe used? ☐ Yes ☐ No

Length of pipe perforated ___ feet

Was casing left open end? ☐ Yes ☐ No

Was a well screened installed? ☐ Yes ☐ No

Material___ Diameter___ inches
(stainless steel, bronze, etc.)

Slot size___ set from___ feet to___ feet

Slot size___ set from___ feet to___ feet

Slot size___ set from___ feet to___ feet

Slot size___ set from___ feet to___ feet

Was a packer or seal used? ☐ Yes ☐ No

If so, what material_____

Type of well: Straight screen ☐ Gravel packed ☐

Was the well grouted? Yes ☐ No ☐

To what depth? ___ feet

Material used in grouting_____

Well head completion: Pitless adapter ☐

12" above grade___ Other___

If other, specify_____

Was well disinfected upon completion? ☐ Yes ☐ No

7. WATER LEVEL

Static water level___ feet below land surface

If flowing: closed-in pressure___ psi

GPM flow___ through___ inch pipe

Controlled by: ☐ Valve ☐ Reducers ☐ Other

If other, specify_____

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Pumping level below land surface:

___ ft. after___ hrs. pumping___ gpm

___ ft. after___ hrs. pumping___ gpm

___ ft. after___ hrs. pumping___ gpm

9. WELL LOG

Formation	Depth (ft.) From	Depth (ft.) To

(Use separate sheet if necessary.)

10. DATE COMPLETED_____

11. WAS WELL PLUGGED OR ABANDONED?

☐ Yes ☐ No

If so, how_____

12. REMARKS:

13. DRILLER'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Driller's or Firm's Name — Certificate No.

Address

Signed by — Date

DUPLICATE — BOARD'S COPY

STATE OF NORTH DAKOTA
BOARD OF WATER WELL CONTRACTORS
900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58501

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name______________________________

Address______________________________

2. WELL LOCATION

Sketch map location must agree with written location.

NORTH

1 Mile

County______________________________

_____¼_____¼_____¼ Sec._____ Twp._____ N. Rg._____W.

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Industrial
☐ Stock ☐ Municipal ☐ Test Hole

4. METHOD DRILLED

☐ Cable ☐ Reverse Rotary ☐ Bored
☐ Forward Rotary ☐ Jetted ☐ Other
If other, specify ______________________________

5. WATER QUALITY

Was a water sample collected for chemical analysis?
☐ Yes ☐ No
If so, to what laboratory was it sent____________________

6. WELL CONSTRUCTION

Diameter of hole________inches. Depth ________feet.
Casing: ☐ Steel ☐ Plastic ☐ Concrete
☐ Threaded ☐ Welded ☐ Other
If other, specify______________________________

Pipe Weight: Diameter: From: To:
________lb/ft. ________inches ________feet ________feet
________lb/ft. ________inches ________feet ________feet
________lb/ft. ________inches ________feet ________feet
________lb/ft. ________inches ________feet ________feet

Was perforated pipe used? ☐ Yes ☐ No
Length of pipe perforated ________________feet
Was casing left open end? ☐ Yes ☐ No
Was a well screened installed? ☐ Yes ☐ No
Material____________________ Diameter ______ inches
(stainless steel, bronze, etc.)
Slot size__________ set from________feet to________feet
Slot size__________ set from________feet to________feet
Slot size__________ set from________feet to________feet
Slot size__________ set from________feet to________feet
Was a packer or seal used? ☐ Yes ☐ No
If so, what material______________________________
Type of well: Straight screen ☐ Gravel packed ☐
Was the well grouted? Yes ☐ No ☐
To what depth? ____________________feet
Material used in grouting______________________________
Well head completion: Pitless adapter____________________
12" above grade______________ Other______________
If other, specify______________________________
Was well disinfected upon completion? ☐ Yes ☐ No

7. WATER LEVEL

Static water level______________feet below land surface
If flowing: closed-in pressure__________psi
GPM flow____________through____________inch pipe
Controlled by: ☐ Valve ☐ Reducers ☐ Other
If other, specify______________________________

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other
Pumping level below land surface:
__________ft. after__________hrs. pumping__________gpm
__________ft. after__________hrs. pumping__________gpm
__________ft. after__________hrs. pumping__________gpm

9. WELL LOG

Formation	Depth (ft.) From	To

(Use separate sheet if necessary.)

10. DATE COMPLETED______________________________

11. WAS WELL PLUGGED OR ABANDONED?

☐ Yes ☐ No
If so, how______________________________

12. REMARKS:

13. DRILLER'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Driller's or Firm's Name Certificate No.

Address

Signed by Date

STATE OF NORTH DAKOTA

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD AVE., DEPT. 770 • BISMARCK, NORTH DAKOTA 58505-0850

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name Mike Keller

Address 2012 Division

Mandan 58!

2. WELL LOCATION

Sketch map location must agree with written location.

NORTH

1 MILE

Sec. (1 mile) 7

County Oliver

SE 1/4 NW 1/4 NW 1/4 Sec. 7 Twp. 141 N.Rg 82 W.

3. PROPOSED USE

- [X] Domestic
- [ ] Stock
- [ ] Geothermal
- [ ] Irrigation
- [ ] Municipal
- [ ] Monitoring
- [ ] Industrial
- [ ] Test Hole

4. METHOD DRILLED

- [ ] Cable
- [X] Forward Rotary
- [ ] Reverse Rotary
- [ ] Jetted
- [ ] Bored
- [ ] Auger

If other, specify

5. WATER QUALITY

Was a water sample collected for:

Chemical Analysis? [ ] Yes [X] No

Bacteriological Analysis? [ ] Yes [X] No

If so, to what laboratory was it sent? Owner discretion

6. WELL CONSTRUCTION

Diameter of hole 8 inches. Depth 470 feet.

Casing: [ ] Steel [X] Plastic [ ] Concrete [ ] Threaded [ ] Welded [ ] Other

If other, specify

Pipe Weight:	Diameter:	From:	To:
200 lb/ft	4 inches	0 feet	470 feet
____ lb/ft	____ inches	____ feet	____ feet
____ lb/ft	____ inches	____ feet	____ feet

Was perforated pipe used? [X] Yes [ ] No

Perforated pipe set from 430 ft. to 470 feet

Was casing left open end? [ ] Yes [X] No

Was a well screen installed? [X] Yes [ ] No

Material PVC Diameter 4 inches

Slot Size .016 set from 430 feet to 470 feet

Slot Size ____ set from ____ feet to ____ feet

Was packer or seal used? [X] Yes [ ] No

If so, what material chips Depth 425-400 ft.

Type of well: Straight screen [ ] Gravel packed [X]

Depth grouted: From 7-42 and 140 To 165 - 400-425

Grouting Material: Cement ~ Other chips

If other, explain: hydrated chips

Well head completion: Pitless unit not yet

12" above grade 14" Other it will

If other, specify have a pitless unit

Was pump installed? [ ] Yes [X] No

Was well disinfected upon completion? [X] Yes [ ] No

7. WATER LEVEL

Static water level 145 feet below surface

If flowing: closed-in pressure ~ psi

GPM flow ~ through ~ inch pipe

Controlled by: [ ] Valve [ ] Reducers [ ] Other

If other, specify

8. WELL TEST DATA

[X] Pump [ ] Bailer [ ] Other

Pumping level below land surface:

270 ft. after 3 hrs. pumping 10 gpm

____ ft. after ____ hrs. pumping ____ gpm

____ ft. after ____ hrs. pumping ____ gpm

9. WELL LOG

Formation	Depth (ft.) From	Depth (ft.) To
gravel	0	20
gray clay	20	70
coal	70	72
gray clay	72	96
gray sandy clay seepage.	96	122
shale rock	122	123
gray sandy clay seepage	123	134
hard coal	134	137
gray clay	137	160
hard coal	160	160½
gray clay	160½	162
hard coal	162	165
gray sandy clay seepage	165	204
lime stone	204	205½
hard gray sandy clay	205½	243
gray clay	243	396
shale rock	396	396½
gray [redacted] clay	396½	415

(Use separate sheet if necessary)

next Page.

10. DATE COMPLETED 7-20-03

11. WAS WELL PLUGGED OR ABANDONED?

[ ] Yes [X] No

If so, how

12. REMARKS:

future house well 1 yr or so- well only at this time

13. DRILLER'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Schaffs Repair Inc. 14

Driller's or Firm's Name — Certificate No.

618 Rose NE Mandan

Address

Bill Schaff 3-14-04

Signed by — Date

WHITE-DRILLER'S COPY YELLOW-BOARD'S COPY PINK-CUSTOMER'S COPY

Mike Keller

hard sandy clay (dry)	415-	425
fine sandy clay seepage	425-	433
hard rock	433-	437
fine gray sandy clay	437-	442
rock	442-	443
+Nacholate med blue sand	443-	456
Lt Red soft rock	456-	457
fine sand	457-	470
gray clay	470-	480

STATE OF NORTH DAKOTA

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD AVE., DEPT. 770 • BISMARCK, NORTH DAKOTA 58505-0850

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

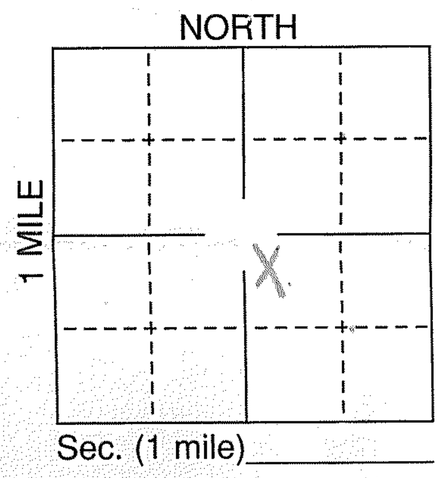
Name Jale Nilton

Address 3195 - 27th St.

Center ND 58530

2. WELL LOCATION

Sketch map location must agree with written location.



Sec. (1 mile)_____

County Oliver

NW 1/4 NW 1/4 SE 1/4 Sec. 14 Twp. 141 N. Rg 83 W.

3. PROPOSED USE

☐ Domestic ☒ Stock ☐ Geothermal ☐ Irrigation ☐ Municipal ☐ Monitoring ☐ Industrial ☐ Test Hole

4. METHOD DRILLED

☐ Cable ☒ Forward Rotary ☐ Reverse Rotary ☐ Jetted ☐ Bored ☐ Auger

If other, specify _____

5. WATER QUALITY

Was a water sample collected for:

Chemical Analysis? ☐ Yes ☒ No

Bacteriological Analysis? ☐ Yes ☒ No

If so, to what laboratory was it sent? _____

6. WELL CONSTRUCTION

Diameter of hole 7 7/8 inches. Depth 320 feet.

Casing: ☐ Steel ☒ Plastic ☐ Concrete ☐ Threaded ☐ Welded ☐ Other

If other, specify _____

Pipe Weight:	Diameter:	From:	To:
SDR 21 lb/ft	4 inches	0 feet	250 feet
_____ lb/ft	_____ inches	_____ feet	_____ feet
_____ lb/ft	_____ inches	_____ feet	_____ feet

Was perforated pipe used? ☒ Yes ☐ No

Perforated pipe set from 250 ft. to 320 feet

Was casing left open end? ☐ Yes ☒ No

Was a well screen installed? ☒ Yes ☐ No

Material PVC Diameter 4 inches

Slot Size 110 set from 250 feet to 320 feet

Slot Size _____ set from _____ feet to _____ feet

Was packer or seal used? ☐ Yes ☒ No

If so, what material _____ Depth _____ ft.

Type of well: Straight screen ☐ Gravel packed ☒ Silica

Depth grouted: From 240-230 To 20-0

Grouting Material: Cement _____ Other Bent. Chips

If other, explain: _____

Well head completion: Pitless unit yes

12" above grade yes Other _____

If other, specify _____

Was pump installed? ☒ Yes ☐ No

Was well disinfected upon completion? ☒ Yes ☐ No

7. WATER LEVEL

Static water level 162 feet below surface

If flowing: closed-in pressure _____ psi

GPM flow _____ through ____ inch pipe

Controlled by: ☐ Valve ☐ Reducers ☐ Other

If other, specify _____

8. WELL TEST DATA

☒ Pump ☐ Bailer ☐ Other

Pumping level below land surface:

225 ft. after 2 hrs. pumping 10 gpm

_____ ft. after _____ hrs. pumping _____ gpm

_____ ft. after _____ hrs. pumping _____ gpm

9. WELL LOG

Formation	Depth (ft.) From	To
Top	0	2
Gray Till	2	5
Gravels	5	8
Yellow Clay	8	20
Rock	20	20 1/2
Sandy - Yellow	20 1/2	37
Sand - Rock, hard	37	40
med. Brown Sand	40	48
Gray Sandstone	48	50
Br. Sand & Gray	50	75
Gray Sand	75	87
Gray Clay	87	90
Coal	90	92
Gray Clay	92	119
Coal	119	120
Clay - Gray	120	145
Coal	145	152
fine Clay Sandy	152	160

(Use separate sheet if necessary)

10. DATE COMPLETED 9.14.07

11. WAS WELL PLUGGED OR ABANDONED?

☐ Yes ☒ No

If so, how _____

12. REMARKS:

13. DRILLER'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Earth Energy & Water Systems, Inc #153

Driller's or Firm's Name Certificate No.

989D Judson St. New Salem ND 58563

Address

Signed by Date 9/14/2007

WHITE-DRILLER'S COPY YELLOW-BOARD'S COPY PINK-CUSTOMER'S COPY

Earth Energy & Water Systems, Inc.
3890 Judson Street
New Salem ND 58563

Well Log for:
Dale Hilton
3195 – 27th St
Center ND 58530

Oliver County
NW1/4NW1/4SE1/4
Sec 14, Twn 141N, Rge 83W

Gray Clay	160 – 170
Coal & Clay	170 – 175
Gray Clay	175 – 240
Coal & Dark Clay	240 – 253
Med Sand	253 – 272
Sand with Clay	272 – 280
Sandy Clay	280 – 290
Med Fine Sand	290 – 310
Sandy Clay	310 – 320

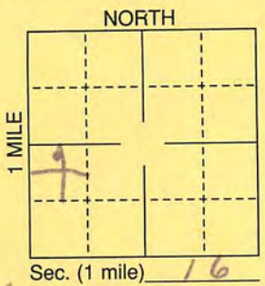
STATE OF NORTH DAKOTA
BOARD OF WATER WELL CONTRACTORS
900 E. BOULEVARD AVE., DEPT. 770 • BISMARCK, NORTH DAKOTA 58505-0850

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER
Name: Dan Haag
Address: PO Box 1263
center ND 58530

2. WELL LOCATION
Sketch map location must agree with written location.



County: Olives
NW 1/4 NW 1/4 SW 1/4 Sec. 16 Twp. 141 N. Rg. 82 W.

3. PROPOSED USE
☒ Domestic ☐ Stock ☐ Geothermal ☐ Irrigation ☐ Municipal ☐ Monitoring ☐ Industrial ☐ Test Hole

4. METHOD DRILLED
☐ Cable ☒ Forward Rotary ☐ Reverse Rotary ☐ Jetted ☐ Bored ☐ Auger
If other, specify:

5. WATER QUALITY
Was a water sample collected for:
Chemical Analysis? ☐ Yes ☒ No
Bacteriological Analysis? ☐ Yes ☒ No
If so, to what laboratory was it sent? at owners discretion

6. WELL CONSTRUCTION
Diameter of hole 8½ inches. Depth 420 feet.
Casing: ☐ Steel ☒ Plastic ☐ Concrete ☐ Threaded ☐ Welded ☐ Other
If other, specify:

Pipe Weight	Diameter	From	To
250 lb/ft	4.5 inches	0 feet	420 feet
____ lb/ft	____ inches	____ feet	____ feet
____ lb/ft	____ inches	____ feet	____ feet

Was perforated pipe used? ☒ Yes ☐ No
Perforated pipe set from 380 ft. to 420 feet
Was casing left open end? ☐ Yes ☒ No
Was a well screen installed? ☒ Yes ☐ No
Material PVC Diameter 4.5 inches
Slot Size .016 set from 380 feet to 420 feet
Slot Size ____ set from ____ feet to ____ feet
Was packer or seal used? ☒ Yes ☐ No
If so, what material cement + chips Depth 8'-375 ft.
Type of well: Straight screen ☐ Gravel packed ☒
Depth grouted: From 8' To 375
Grouting Material: Cement ✓ Other ____
If other, explain: Both cement + Hydrated chips
Well head completion: Pitless unit Monitor
12" above grade 14" Other ____
If other, specify:
Was pump installed? ☒ Yes ☐ No
Was well disinfected upon completion? ☒ Yes ☐ No

7. WATER LEVEL
Static water level 160 feet below surface
If flowing: closed-in pressure — psi
GPM flow — through — inch pipe
Controlled by: ☐ Valve ☐ Reducers ☐ Other
If other, specify:

8. WELL TEST DATA
☒ Pump ☐ Bailer ☐ Other
Pumping level below land surface:
180 ft. after ½ hrs. pumping 4 gpm
200 ft. after ½ hrs. pumping 9 gpm
240 ft. after 8 hrs. pumping 15 gpm

9. WELL LOG

Formation	Depth (ft.) From	To
Brown sandy clay	0	27
gray sandy clay	27	119
soft sandstone	119	120
gray clay	120	159
hard rock	159	164
gray clay	164	244
med hard rock	244	245
gray clay	245	274
fine silt + shale layers.	274	308
gray clay	308	312
fine gray sand	312	314
gray clay	314	377
soft shale + silt layers.	377	384
soft Brown shale rock	384	385
fine gray silty sand	385	413
gray clay	413	420

(Use separate sheet if necessary)

10. DATE COMPLETED 5-15-2010

11. WAS WELL PLUGGED OR ABANDONED?
☐ Yes ☒ No
If so, how:

12. REMARKS:
New house well
N West of House

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

Schaff + Sons Repair Inc 14
Driller's or Firm's Name Certificate No.
PO Box 339 Mandan N.D
Address
Bill Schaff 2-24-11
Signed by Date

STATE-DRILLER'S COPY YELLOW-BOARD'S COPY

STATE OF NORTH DAKOTA

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58501

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

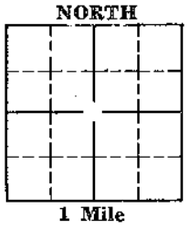
1. WELL OWNER

Name_____

Address_____

2. WELL LOCATION

Sketch map location must agree with written location.



County_____

____¼ ____¼ ____¼ Sec.____ Twp.____ N. Rg.____W.

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Industrial
☐ Stock ☐ Municipal ☐ Test Hole

4. METHOD DRILLED

☐ Cable ☐ Reverse Rotary ☐ Bored
☐ Forward Rotary ☐ Jetted ☐ Other
If other, specify _____

5. WATER QUALITY

Was a water sample collected for chemical analysis?
☐ Yes ☐ No
If so, to what laboratory was it sent_____

6. WELL CONSTRUCTION

Diameter of hole_____inches. Depth_____feet.
Casing: ☐ Steel ☐ Plastic ☐ Concrete
☐ Threaded ☐ Welded ☐ Other
If other, specify_____

Pipe Weight:	Diameter:	From:	To:
_____lb/ft.	_____inches	_____feet	_____feet
_____lb/ft.	_____inches	_____feet	_____feet
_____lb/ft.	_____inches	_____feet	_____feet
_____lb/ft.	_____inches	_____feet	_____feet

Was perforated pipe used? ☐ Yes ☐ No
Length of pipe perforated _____ feet
Was casing left open end? ☐ Yes ☐ No
Was a well screened installed? ☐ Yes ☐ No
Material_____ Diameter_____inches
(stainless steel, bronze, etc.)
Slot size_____ set from_____feet to_____feet
Slot size_____ set from_____feet to_____feet
Slot size_____ set from_____feet to_____feet
Slot size_____ set from_____feet to_____feet
Was a packer or seal used? ☐ Yes ☐ No
If so, what material_____
Type of well: Straight screen ☐ Gravel packed ☐
Was the well grouted? Yes ☐ No ☐
To what depth? _____feet
Material used in grouting_____
Well head completion: Pitless adapter_____
12" above grade_____ Other_____
If other, specify_____
Was well disinfected upon completion? ☐ Yes ☐ No

7. WATER LEVEL

Static water level_____feet below land surface
If flowing: closed-in pressure_____psi
GPM flow_____through_____inch pipe
Controlled by: ☐ Valve ☐ Reducers ☐ Other
If other, specify_____

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other
Pumping level below land surface:
_____ft. after_____hrs. pumping_____gpm
_____ft. after_____hrs. pumping_____gpm
_____ft. after_____hrs. pumping_____gpm

9. WELL LOG

Formation	Depth (ft.) From	Depth (ft.) To

(Use separate sheet if necessary.)

10. DATE COMPLETED_____

11. WAS WELL PLUGGED OR ABANDONED?

☐ Yes ☐ No
If so, how_____

12. REMARKS:

13. DRILLER'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

ZACHMEIER WELL DRILLING, INC. _____
Driller's or Firm's Name Certificate No.
CENTER ROUTE
Address
MAXEAN, NO. DAK. 58554

Signed by _____ Date

DUPLICATE — BOARD'S COPY

STATE OF NORTH DAKOTA

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD • BISMARCK, NORTH DAKOTA 58501

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

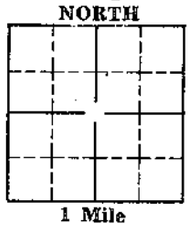
1. WELL OWNER

Name_____

Address_____

2. WELL LOCATION

Sketch map location must agree with written location.



County_____

____¼____¼____¼ Sec._____ Twp._____ N. Rg._____W.

3. PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Industrial
☐ Stock ☐ Municipal ☐ Test Hole

4. METHOD DRILLED

☐ Cable ☐ Reverse Rotary ☐ Bored
☐ Forward Rotary ☐ Jetted ☐ Other

If other, specify _____

5. WATER QUALITY

Was a water sample collected for chemical analysis?

☐ Yes ☐ No

If so, to what laboratory was it sent_____

6. WELL CONSTRUCTION

Diameter of hole_____inches. Depth_____feet.

Casing: ☐ Steel ☐ Plastic ☐ Concrete
☐ Threaded ☐ Welded ☐ Other

If other, specify_____

Pipe Weight:	Diameter:	From:	To:
_____lb/ft.	_____inches	_____feet	_____feet
_____lb/ft.	_____inches	_____feet	_____feet
_____lb/ft.	_____inches	_____feet	_____feet
_____lb/ft.	_____inches	_____feet	_____feet

Was perforated pipe used? ☐ Yes ☐ No

Length of pipe perforated _____feet

Was casing left open end? ☐ Yes ☐ No

Was a well screened installed? ☐ Yes ☐ No

Material_____ Diameter_____inches
(stainless steel, bronze, etc.)

Slot size_____ set from_____feet to_____feet

Slot size_____ set from_____feet to_____feet

Slot size_____ set from_____feet to_____feet

Slot size_____ set from_____feet to_____feet

Was a packer or seal used? ☐ Yes ☐ No

If so, what material_____

Type of well: Straight screen ☐ Gravel packed ☐

Was the well grouted? Yes ☐ No ☐

To what depth? _____feet

Material used in grouting_____

Well head completion: Pitless adapter_____

12" above grade_____ Other_____

If other, specify_____

Was well disinfected upon completion? ☐ Yes ☐ No

7. WATER LEVEL

Static water level_____feet below land surface

If flowing: closed-in pressure_____psi

GPM flow_____through_____inch pipe

Controlled by: ☐ Valve ☐ Reducers ☐ Other

If other, specify_____

8. WELL TEST DATA

☐ Pump ☐ Bailer ☐ Other

Pumping level below land surface:

_____ft. after_____hrs. pumping_____gpm

_____ft. after_____hrs. pumping_____gpm

_____ft. after_____hrs. pumping_____gpm

9. WELL LOG

Formation	Depth (ft.) From	Depth (ft.) To

(Use separate sheet if necessary.)

10. DATE COMPLETED_____

11. WAS WELL PLUGGED OR ABANDONED?

☐ Yes ☐ No

If so, how_____

12. REMARKS:

13. DRILLER'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Driller's or Firm's Name Certificate No.

Address

Signed by Date

DUPLICATE — BOARD'S COPY

DEAN A. CORRELL
2504 5th N.W.
Minot, N.D. 58701
PH. 701 839-6187

778 –	780	green sand
780 –	781	sand stone
781 –	810	green fine sand
810 –	812	lime stone
812 –	816	sandy clay
816 –	820	lime stone
820 –	880	gry green sand
880 –	900	Clay.

STATE OF NORTH DAKOTA

BOARD OF WATER WELL CONTRACTORS

900 E. BOULEVARD AVE., DEPT. 770 • BISMARCK, NORTH DAKOTA 58505-0850

WELL DRILLER'S REPORT

State law requires that this report be filed with the State Board of Water Well Contractors within 30 days after completion or abandonment of the well.

1. WELL OWNER

Name: Wyman Schootz

Address: 2546 16th St SW

Center ND 58530

2. WELL LOCATION

Sketch map location must agree with written location.

NORTH

1 MILE

Sec. (1 mile)_____

County: Oliver

_____1/4_____1/4_____1/4 Sec 28 Twp 143 N. Rg 82 W.

3. PROPOSED USE

☒ Domestic ☒ Stock ☐ Geothermal ☐ Irrigation ☐ Municipal ☐ Monitoring ☐ Industrial ☐ Test Hole

4. METHOD DRILLED

☐ Cable ☒ Forward Rotary ☐ Reverse Rotary ☐ Jetted ☐ Bored ☐ Auger

If other, specify _____

5. WATER QUALITY

Was a water sample collected for:

Chemical Analysis? ☐ Yes ☐ No

Bacteriological Analysis? ☐ Yes ☐ No

If so, to what laboratory was it sent? By Owner

6. WELL CONSTRUCTION

Diameter of hole 8¾ inches. Depth 116' feet.

Casing: ☐ Steel ☒ Plastic ☐ Concrete ☐ Threaded ☐ Welded ☐ Other

If other, specify _____

Pipe Weight:	Diameter:	From:	To:
____lb/ft	4 inches	42 feet	96 feet
____lb/ft	____inches	____feet	____feet
____lb/ft	____inches	____feet	____feet

Was perforated pipe used? ☐ Yes ☒ No

Perforated pipe set from _____ft. to _____feet

Was casing left open end? ☐ Yes ☒ No

Was a well screen installed? ☒ Yes ☐ No

Material PVC Diameter 4 inches

Slot Size 20 set from 96 feet to 116 feet

Slot Size _____ set from _____ feet to _____ feet

Was packer or seal used? ☐ Yes ☒ No

If so, what material _____ Depth _____ ft.

Type of well: Straight screen ☐ Gravel packed ☒

Depth grouted: From 92 To 10

Grouting Material: Cement _____ Other Bentonite

If other, explain: _____

Well head completion: Pitless unit _____

12" above grade X Other _____

If other, specify _____

Was pump installed? ☐ Yes ☒ No

Was well disinfected upon completion? ☒ Yes ☐ No

7. WATER LEVEL

Static water level 85 feet below surface

If flowing: closed-in pressure _____ psi

GPM flow _____ through ____ inch pipe

Controlled by: ☐ Valve ☐ Reducers ☐ Other

If other, specify _____

8. WELL TEST DATA Rig Air Compressor

☐ Pump ☐ Bailer ☒ Other

Pumping level below land surface:

96 ft. after 2 hrs. pumping 7. gpm

_____ft. after _____hrs. pumping _____gpm

_____ft. after _____hrs. pumping _____gpm

9. WELL LOG

Formation	Depth (ft.) From	To
Glacial Till	0	14
Sandstone	14	17
Brown Clay	17	28
Gray Clay	28	31
Coal	34	36
Gray Clay	36	52
Coal	52	56
Gray Clay	56	60
Very Fine Sand	60	100
Fine Sand	100	108
Coal	108	110
Gray Silty Clay	110	116

(Use separate sheet if necessary)

10. DATE COMPLETED 04-20-2011

11. WAS WELL PLUGGED OR ABANDONED?

☐ Yes ☒ No

If so, how _____

12. REMARKS:

13. DRILLER'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge.

Mohl Drilling, Inc 105

Driller's or Firm's Name Certificate No.

1710 Arikara Dr. Beulah ND

Address

John Mohl 4/25/11

Signed by Date

WHITE-DRILLER'S COPY YELLOW-BOARD'S COPY PINK-CUSTOMER'S COPY

Back

142-084-24 BBA

Data Source	ND State Water Commission	**Well Index**	9442
County	Oliver	**Date Drilled**	1967-11-29
Aquifer	Fox Hills	**Purpose**	Observation Well
Basin	Lake Oahe	**Casing Type**	Steel
MP Elevation (ft)	2009.23	**Diameter (in.)**	4.00
Surface Elev. (ft)	2005.81	**Screened Interval (ft)**	966 - 966
Elevation Source (Datum)	GPS (NAVD88)	**Coord (Long,Lat)**	-101.276007, 47.110619
Total Depth (ft)	1295.00	**USGS ID**	470642101162701
Bedrock Depth (ft)	0.00		

Lithologic Log

Interval (ft)	Unit	Description
0 - 484	SILTSTONE	Interbedded with claystone, at times lignitic, sandier 160-215, 340-418, 422-484 (Tongue River Formation). (An interpretation of the county study interpretation).
484 - 707	SILTSTONE	Sand between 517-520, 595-620, 696-707, fine grained (Cannonball-Ludlow Formations, undifferentiated)
707 - 945	SILTSTONE	Similar to above, maybe more argillaceous, sand zones 762-776, 895-930 (Hell Creek Formation)
945 - 1202	SANDSTONE	Fine to medium sand between 945-1000 feet, (Colgate Member), underlain by siltstone and claystone (Fox Hills Formation)
1202 - 1295	SHALE	Silty, olive gray (Pierre Formation)

[Hydrograph] [Water Levels] [Water Chemistry]

MINNESOTA VALLEY TESTING LABORATORIES, INC.

MVTL

1126 N. Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 E. Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Amended 2Feb21 (TDS)

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 28 Jan 21
Lab Number: 21-W40
Work Order #: 82-0072
Account #: 007033
Date Sampled: 12 Jan 21 12:45
Date Received: 12 Jan 21 14:35
Sampled By: MVTL Field Services

Project Name: Center USGS Well

PO #: B. Botnen

Sample Description: USGS Well

Temp at Receipt: 8.9C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	12 Jan 21	HT
pH - Field	8.42	units	NA	SM 4500 H+ B	12 Jan 21 12:45	JSM
Temperature - Field	11.8	Degrees C	NA	SM 2550B	12 Jan 21 12:45	JSM
Total Alkalinity	938	mg/l CaCO3	20	SM2320B-11	12 Jan 21 17:00	HT
Phenolphthalein Alk	< 20	mg/l CaCO3	20	SM2320B-11	12 Jan 21 17:00	HT
Bicarbonate	912	mg/l CaCO3	20	SM2320B-11	12 Jan 21 17:00	HT
Carbonate	26	mg/l CaCO3	20	SM2320B-11	12 Jan 21 17:00	HT
Hydroxide	< 20	mg/l CaCO3	20	SM2320B-11	12 Jan 21 17:00	HT
Conductivity - Field	2641	umhos/cm	1	EPA 120.1	12 Jan 21 12:45	JSM
Tot Dis Solids(Summation)	1520	mg/l	12.5	SM1030-F	15 Jan 21 11:45	Calculated
Nitrate as N	< 0.2	mg/l	NA	EPA 353.2	14 Jan 21 9:17	Calculated
Bromide	2.83	mg/l	0.100	EPA 300.0	14 Jan 21 22:24	RMV
Total Organic Carbon	1.7	mg/l	0.5	SM5310C-11	22 Jan 21 17:28	NAS
Dissolved Organic Carbon	1.7	mg/l	0.5	SM5310C-96	22 Jan 21 17:28	NAS
Fluoride	3.54	mg/l	0.10	SM4500-F-C	12 Jan 21 17:00	HT
Sulfate	< 5	mg/l	10.0	ASTM D516-11	15 Jan 21 8:50	EV
Chloride	323	mg/l	2.0	SM4500-Cl-E-11	13 Jan 21 11:25	EV
Nitrate-Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	14 Jan 21 9:17	EV
Nitrite as N	< 0.2	mg/l	0.20	EPA 353.2	14 Jan 21 7:59	EV
Phosphorus as P - Total	< 0.2	mg/l	0.20	EPA 365.1	15 Jan 21 8:17	EV
Phosphorus as P-Dissolved	< 0.2	mg/l	0.20	EPA 365.1	15 Jan 21 8:17	EV
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	13 Jan 21 11:16	MDE
Mercury - Dissolved	< 0.0002	mg/l	0.0002	EPA 245.1	13 Jan 21 11:16	MDE

RL = Method Reporting Limit

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

CERTIFICATION: ND # ND-00016

MVTL

MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 N. Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 E. Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Amended 2Feb21 (TDS)

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 28 Jan 21
Lab Number: 21-W40
Work Order #: 82-0072
Account #: 007033
Date Sampled: 12 Jan 21 12:45
Date Received: 12 Jan 21 14:35
Sampled By: MVTL Field Services

Project Name: Center USGS Well

PO #: B. Botnen

Sample Description: USGS Well

Temp at Receipt: 8.9C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Calcium - Total	4.0	mg/l	1.0	6010D	15 Jan 21 11:45	MDE
Magnesium - Total	< 1	mg/l	1.0	6010D	15 Jan 21 11:45	MDE
Sodium - Total	630	mg/l	1.0	6010D	15 Jan 21 11:45	MDE
Potassium - Total	2.8	mg/l	1.0	6010D	15 Jan 21 11:45	MDE
Lithium - Total	0.186	mg/l	0.020	6010D	21 Jan 21 15:22	MDE
Aluminum - Total	< 0.1	mg/l	0.10	6010D	20 Jan 21 10:36	MDE
Iron - Total	0.40	mg/l	0.10	6010D	20 Jan 21 10:36	MDE
Silicon - Total	5.04	mg/l	0.10	6010D	26 Jan 21 9:37	MDE
Strontium - Total	0.16	mg/l	0.10	6010D	20 Jan 21 10:36	MDE
Zinc - Total	< 0.05	mg/l	0.05	6010D	20 Jan 21 10:36	MDE
Boron - Total	2.87	mg/l	0.10	6010D	26 Jan 21 10:46	MDE
Calcium - Dissolved	3.7	mg/l	1.0	6010D	15 Jan 21 9:45	MDE
Magnesium - Dissolved	< 1	mg/l	1.0	6010D	15 Jan 21 9:45	MDE
Sodium - Dissolved	670	mg/l	1.0	6010D	15 Jan 21 9:45	MDE
Potassium - Dissolved	3.2	mg/l	1.0	6010D	15 Jan 21 9:45	MDE
Lithium - Dissolved	0.102	mg/l	0.020	6010D	21 Jan 21 15:22	MDE
Aluminum - Dissolved	< 0.1	mg/l	0.10	6010D	20 Jan 21 9:36	MDE
Iron - Dissolved	0.25	mg/l	0.10	6010D	20 Jan 21 9:36	MDE
Silicon - Dissolved	5.12	mg/l	0.10	6010D	26 Jan 21 9:37	MDE
Strontium - Dissolved	0.15	mg/l	0.10	6010D	20 Jan 21 9:36	MDE
Zinc - Dissolved	< 0.05	mg/l	0.05	6010D	20 Jan 21 9:36	MDE
Boron - Dissolved	2.85	mg/l	0.10	6010D	26 Jan 21 10:46	MDE
Antimony - Total	< 0.001	mg/l	0.0010	6020B	14 Jan 21 19:47	MDE

RL = Method Reporting Limit

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CERTIFICATION: ND # ND-00016

MVTL

MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 N. Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 E. Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
51 W. Lincoln Way ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885

MEMBER ACIL

Amended 2Feb21 (TDS)

Barry Botnen
UND-Energy & Environmental
15 N. 23rd St.
Grand Forks ND 58201

Report Date: 28 Jan 21
Lab Number: 21-W40
Work Order #: 82-0072
Account #: 007033
Date Sampled: 12 Jan 21 12:45
Date Received: 12 Jan 21 14:35
Sampled By: MVTL Field Services

Project Name: Center USGS Well

PO #: B. Botnen

Sample Description: USGS Well

Temp at Receipt: 8.9C ROI

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Arsenic - Total	< 0.002	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Barium - Total	0.0966	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	14 Jan 21 19:47	MDE
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	14 Jan 21 19:47	MDE
Chromium - Total	< 0.002	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Cobalt - Total	< 0.002	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Copper - Total	< 0.002	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Lead - Total	0.0006	mg/l	0.0005	6020B	14 Jan 21 19:47	MDE
Manganese - Total	0.0088	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Molybdenum - Total	0.0058	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Nickel - Total	< 0.002	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Selenium - Total	< 0.005	mg/l	0.0050	6020B	14 Jan 21 19:47	MDE
Silver - Total	< 0.0005	mg/l	0.0005	6020B	14 Jan 21 19:47	MDE
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	14 Jan 21 19:47	MDE
Vanadium - Total	< 0.002	mg/l	0.0020	6020B	14 Jan 21 19:47	MDE
Antimony - Dissolved	< 0.001	mg/l	0.0010	6020B	15 Jan 21 14:56	MDE
Arsenic - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE
Barium - Dissolved	0.0954	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE
Beryllium - Dissolved	< 0.0005	mg/l	0.0005	6020B	15 Jan 21 14:56	MDE
Cadmium - Dissolved	< 0.0005	mg/l	0.0005	6020B	15 Jan 21 14:56	MDE
Chromium - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE
Cobalt - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE
Copper - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE

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Sampled By: MVTL Field Services

PO #: B. Botnen

Temp at Receipt: 8.9C ROI

Project Name: Center USGS Well

Sample Description: USGS Well

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Lead - Dissolved	< 0.0005	mg/l	0.0005	6020B	15 Jan 21 14:56	MDE
Manganese - Dissolved	0.0081	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE
Molybdenum - Dissolved	0.0058	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE
Nickel - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE
Selenium - Dissolved	< 0.005	mg/l	0.0050	6020B	15 Jan 21 14:56	MDE
Silver - Dissolved	< 0.001 ^	mg/l	0.0005	6020B	15 Jan 21 14:56	MDE
Thallium - Dissolved	< 0.0005	mg/l	0.0005	6020B	15 Jan 21 14:56	MDE
Vanadium - Dissolved	< 0.002	mg/l	0.0020	6020B	15 Jan 21 14:56	MDE

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

Approved by: Claudette K Carroll

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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CERTIFICATION: ND # ND-00016