CCR GROUNDWATER MONITORING SYSTEM CERTIFICATION

BOTTOM ASH POND 2

Sherburne County (Sherco) Generating Plant Becker, Minnesota Carlson McCain Project No.: 3404-19

Prepared for:

Northern States Power Company, a Minnesota Corporation

September 21, 2020



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CCR GROUNDWATER MONITORING SYSTEM CERTIFICATION Sherco Bottom Ash Pond 2 Becker, Minnesota

I hereby certify that this plan, specification, or report was prepared by or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Additionally, I certify that the groundwater monitoring system identified in this report has been designed and constructed to meet the requirements of § 257.91, Groundwater monitoring systems, as included in 40 CFR Part 257, Subpart D, Disposal of Coal Combustion Residuals from Electric Utilities.

Signature of Preparer:

Nicholas Bonow, P.E., P.G. #47510 Carlson McCain, Inc.

Date: September 21, 2020



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1. INTRODUCTION

This report presents documentation and certification of the groundwater monitoring system for Bottom Ash Pond 2 (BAP2) at the Sherburne County Generating Plant (Sherco) located in Becker, Minnesota. The Sherco plant is owned and operated by Northern States Power Company, a Minnesota Corporation (NSPM). The BAP2 location is shown on Figure 1 and an aerial photograph and site layout map for the BAP are shown on Figure 2.

The BAP2 is a new coal combustion residuals (CCR) surface impoundment and is required to comply with provisions of the U.S. Code of Federal Regulations (CFR), Title 40, Parts 257 and 261 relating to disposal of coal combustion residuals from electric utilities. In particular, this report addresses the requirements of 40 CFR §257.91, Groundwater Monitoring Systems.

As shown in Figure 2, BAP2 is situated amidst four other surface impoundments, including Scrubber Solids Ponds 1, 2, and 3 adjacent to the south of the BAP2, and Bottom Ash Pond #1 (BAP1) adjacent to the west of the BAP2. Ponds 1 and 2 ceased receiving CCR prior to October 19, 2015 and therefore not subject to regulation under 40 CFR §257. Pond 1 was closed in 1995 and Pond 2 was closed in 2014. Pond 3 and BAP1 are currently receiving CCR and have groundwater monitoring systems meeting the requirements of 40 CFR Section §257.91, as described in the CCR Groundwater Monitoring System Certification reports for the ponds (Carlson McCain 2017a, 2017b). The areas adjacent to the north and east of Pond 3 have been evaluated for potential development of future Scrubber Solids Ponds 4 and 5. To date, no construction has taken place and these ponds remain in the planning phase.

1.1 Groundwater Monitoring System §257.91(a)

According to §257.91(a), CCR units must comply with the following performance standard:

"The owner or operator of a CCR unit must install a groundwater monitoring system that consists of a sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples from the uppermost aquifer that:

- (1) Accurately represent the quality of background groundwater that has not been affected by leakage from a CCR unit. A determination of background quality may include sampling of wells that are not hydraulically upgradient of the CCR management area where:
 - *(i)* Hydrogeologic conditions do not allow the owner or operator of the CCR unit to determine what wells are hydraulically upgradient; or
 - *(ii)* Sampling at other wells will provide an indication of background groundwater quality that is as representative or more representative than that provided by the upgradient wells; and

(2) Accurately represent the quality of groundwater passing the waste boundary of the CCR unit. The down-gradient monitoring system must be installed at the waste boundary that ensures detection of groundwater contamination in the uppermost aquifer. All potential contaminant pathways must be monitored."

Additionally, §257.91 includes specific requirements in subparts (b) through (g) relating to the development and implementation of the groundwater monitoring system, which must be satisfied in order to demonstrate compliance with the performance standard listed in subpart (a).

NSPM has installed a groundwater monitoring system at the BAP2 as described in Table 1 and shown in Figure 6 that complies with the standard set forth in §257.91(a). The system includes nine monitoring wells that monitor up-gradient and down-gradient locations.

The following sections describe the system in further detail, and address the requirements of subparts (b) through (g).

2. SITE CHARACTERIZATION

The hydrogeologic setting of the BAP2 has been characterized in accordance with §257.91(b) which states *"The number, spacing, and depths of monitoring systems shall be determined based upon site specific technical information that must include thorough characterization of"*:

- (1) Aquifer thickness, groundwater flow rate, groundwater flow direction including seasonal and temporal fluctuations in groundwater flow; and
- (2) Saturated and unsaturated geologic units and fill materials overlying the uppermost aquifer, materials comprising the uppermost aquifer, and materials comprising the confining unit defining the lower boundary of the uppermost aquifer, including, but not limited to, thicknesses, stratigraphy, lithology, hydraulic conductivities, porosities and effective porosities."

Soil borings and monitoring wells have been constructed in and around the BAP2 footprint as a part of the Phase II Hydrogeologic Investigation completed in 2019 for purposes of permitting and compliance with Minnesota Pollution Control Agency (MPCA) rules. In addition, several other hydrogeologic investigations have been conducted in the vicinity of the BAP2 for Pond 3, future Ponds 4 and 5, and the Unit 3 Dry Ash Landfill. The soil borings/well installations and investigations have assisted in characterizing the hydrogeology beneath the BAP2 and the information gathered from previous work is included the following reports:

- Xcel, 2002. SHERCO Generating Plant, Scrubber Solids Pond No. 3, Hydrogeologic Investigation Report Phase II Field Investigation, May 2002;
- Northern States Power (NSP) Minnesota, 2008. Sherco Dry Ash Disposal Facility, Hydrogeologic Evaluation, Phase II – Field Investigation, prepared by Xcel Energy; March 2008;
- Carlson McCain, 2014. SHERCO Generating Plant, Scrubber Solids Ponds 4 & 5, Phase II Hydrogeologic Investigation Report and Phase III Water Monitoring System Report Work Plan, prepared for Xcel Energy, December 15, 2014;
- Carlson McCain, 2016a. SHERCO Generating Plant, Scrubber Pond 4, Supplemental Phase II Hydrogeologic Investigation Report, prepared for Xcel Energy, March 9, 2016; and
- Carlson McCain, 2016b. SHERCO Generating Plant, Bottom Ash Pond, Monitoring Well Installation Report, prepared for Xcel Energy, March 9, 2016.
- Carlson McCain, 2019a. Phase II Hydrogeologic Investigation Report and Phase III Water Monitoring System Work Plan, Bottom Ash Pond 2. April 10, 2019.

- Carlson McCain, 2019b. Phase II Hydrogeologic Investigation Report Addendum, Sherco Generating Plant, Bottom Ash Pond 2. September 19, 2019.
- Carlson McCain, 2020. CCR Monitoring Well Installation Report, Bottom Ash Pond No. 2, Sherco Generating Plant. June 5, 2020.

Carlson McCain has reviewed these reports in detail, as well as additional unpublished boring and well logs from the BAP vicinity, and the data and information contained in the reports and boring logs has been adapted for use in this report.

2.1 Compliance with §257.91(b)(2)

General notes:

- The requirements in §257.91(b)(2) will be discussed prior to §257.91(b)(1) in Sections 2.1 and
 2.2 respectively since the geology and stratigraphy requirements in §257.91(b)(2) are generally the basis for the hydrogeologic requirements in §257.91(b)(1).
- 2) Of the reports listed in the previous section, the hydrogeologic investigation reports for the BAP2 (Carlson McCain, 2019), the BAP (Carlson McCain, 2016b), Pond 3 (Xcel, 2002) and Ponds 4 and 5 (Carlson McCain, 2014, 2016a) in particular discuss the geology and stratigraphy at and near the BAP2. The reports generally agree on the distinctive textural classifications of the stratigraphic units beneath the BAP, however, Carlson McCain (2014) refined the depositional interpretations of the stratigraphic units described in the vicinity of Pond 3; and has been confirmed in more recent investigations (Carlson McCain 2016a, 2016b, 2019a, 2019b).

Site Geology

Previous investigations indicate that a succession of unconsolidated, Quaternary-age, glaciallyderived sediments overlies bedrock beneath the BAP. The unconsolidated deposits range from approximately 76 to 140 feet thick at the site and can be further divided into distinct stratigraphic members of outwash alluvium (sand, silt and clay) and glacial till. The distinct stratigraphic members are described below in Sections 2.1.1 to 2.1.4.

2.1.1 Shallow Alluvium

The uppermost stratigraphic unit in the vicinity of the BAP2 is comprised of sandy deposits of Mississippi River terrace alluvium and undifferentiated glacial outwash alluvium associated with the Grantsburg sublobe and/or the Superior lobe of the Wisconsin glaciation (Carlson McCain, 2019a).

Description/Classification

Carlson McCain, Inc.

The shallow alluvium consists primarily of fine to medium grained, non-cohesive poorly graded sand. Soils are typically classified as SP or SP-SM under the United Soil Classification System (USCS). The sand color was typically reported as brown, with reference to the Munsell color chart, hue was reported as YR. The texture and color of the material is fairly consistent across the Site.

Spatial Distribution

The shallow alluvium unit is present and laterally continuous across the BAP2 area. It includes both a thin layer of sandy topsoil ranging from 0.5 to 5 feet thick and the underlying sand deposits, the base of which typically occurs at an elevation ranging from 930 to 945 feet. This results in thickness ranging from 5 to 31 feet, depending on the ground surface elevation.

Permeability

Permeability testing of the deep alluvium unit was not conducted during the BAP2 investigation. Data from previous investigations indicates hydraulic conductivity on the order of 100 feet per day (Carlson McCain, 2014).

2.1.2 Superior Till

The next stratigraphically lower geologic unit identified at the Site is glacial till, which is interpreted to be the Superior till of Superior Lobe provenance.

Description/Classification

Superior till typically consists primarily of fine grained, medium-dense to very-dense silty sand with a little gravel (SM). Gravel clasts typically consist of sandstone, basalt and fine- to coarse-crystalline granite. Color is typically described as brown or reddish brown. Occasional, thin lenses of fine to coarse grained sand, USCS symbol SP, occur within the till but are not laterally continuous within the unit.

Spatial Distribution

The Superior till is present immediately beneath the shallow alluvium over a portion of the BAP2 area. Where present, the till has an undulating surface and thickness ranged from 2 to 10 feet thick in soil borings which encountered the unit. The discontinuous nature of the till has been observed during hydrogeologic investigations completed for Pond 3 and Ponds 4 and 5 in addition to the BAP2 investigation.

Permeability

Data from Pond 3 indicates that the average permeability for the Superior till ranges from approximately 0.001 feet per day.

2.1.3 Deep Alluvium

Deep alluvium is present below the glacial till, and exhibits similar characteristics to the shallow alluvium.

Carlson McCain, Inc.

Description/Classification

The deep alluvium typically consists of fine to very coarse-grained, non-cohesive, poorly graded sand. Occasional gravelly or siltier zones were also observed within the unit. Soils were primarily classified as SP under USCS. Color was typically reported as brown, light brown, or light yellowishborn. The texture and color of the material is fairly consistent across the Sherco plant site.

Spatial Distribution

The deep alluvium occurs immediately beneath the Superior till, and was identified in all borings at the BAP2 deep enough to penetrate the unit. It generally extends from the bottom of the till down to the bedrock surface. Average thickness of the deep alluvium in the vicinity of the BAP2 is approximately 52 feet.

Permeability

Slug testing conducted on piezometers installed during the Phase II Hydrogeologic Investigation Report Addendum indicated hydraulic conductivity values ranging from 3 to 44 feet per day (Carlson McCain, 2019b). The average of all the results is approximately 17 feet per day. This is similar to the values reported for the upper portion (i.e. water table) of the deep alluvium during the Pond 4 hydrogeologic investigation (Carlson McCain, 2014).

2.1.4 Bedrock

Middle Precambrian granitic bedrock underlies the unconsolidated sediments beneath the BAP2. The bedrock surface generally occurs at an elevation above 875 feet, with the exception of the southeast corner of the BAP2 area. The upper portion of the bedrock is weathered to various degrees. Beneath the weathered veneer, bedrock is considered impermeable.

2.2 Compliance with §257.91(b)(1)

2.2.1 Aquifer Thickness

The water table beneath the BAP2 typically occurs below the Superior till identified in Section 2.1.2. As such, the uppermost aquifer at the BAP2 is the deep alluvium discussed in Section 2.1.3, which averages 52 feet thick.

2.2.2 Groundwater Elevation and Flow Direction

Figure 3 shows a hydrograph of monitoring wells and piezometers in the vicinity of the BAP2. The water levels illustrate that the water table elevation fluctuates between one and three feet on an annual basis and by as much as five feet from a wet year to a dry year. The hydrograph also indicates that, from 2010 to the present, groundwater elevations at the BAP2 have ranged from approximately 925 to 929 feet MSL and are typically at or below the glacial till described in Section 2.1.2.

Groundwater elevations and flow direction at the BAP2 during February, 2017 and July, 2020 are shown on the water table contour elevation maps in Figures 4 and 5, respectively. The contours in Figure 4 were derived from a Sherco site-wide water level gathering effort and the contours in Figure 5 were derived from the wells included in the groundwater monitoring system described in Section 3.2. For both of the events, the flow direction was generally to the west-southwest. This flow direction is consistent with historical data from over 20 years of monitoring at the Sherco facility and is also consistent with the regional groundwater flow direction towards the Mississippi river.

Because of the relatively low permeability of the till, the potential exists for some localized perched conditions on top of the till and/or lateral flow along the water table/till contact. However, perched groundwater has not been identified beneath the BAP2 or in areas adjacent to the BAP2; and based on the relatively uniform groundwater elevation contours it does not appear that the presence of the till significantly impacts the groundwater flow direction or gradient on a large (pond-size) scale.

2.2.3 Groundwater Flow Gradients

Based on the groundwater elevation contours shown in Figure 5, the average horizontal groundwater hydraulic gradient at the BAP2 was calculated at 0.0009 (units of vertical feet per horizontal foot). This is similar to the average gradient of 0.001 reported in the BAP2 Phase II Investigation Report (Carlson McCain, 2019a). Horizontal gradients are fairly consistent across the entire Sherco plant site due to the flat terrain and permeable nature of the water table aquifer.

To investigate vertical hydraulic gradients beneath the BAP2, three sets of nested piezometers were installed within the footprint of the BAP2 during February, 2020. The piezometer nests included one shallow piezometer screened across the water table and one deep piezometer screened near the bottom of the aquifer. The piezometers were designated B20-1S, B20-1D, B20-2S, B20-2D, B20-3S and B20-3D. The piezometer nests were located in the southeast corner, southwest corner, and north-central portion of the pond bottom. Locations are illustrated on Figure A-1 in Appendix A. Groundwater elevations were measured three times in each piezometer over a three-week period, and were used to compute vertical gradients. Static water elevations and vertical gradients are summarized in Appendix A. Results show an average gradient of approximately 0.001 upward at piezometer nest B20-1S/D, approximately .0004 upward at piezometer nest B20-2S/D, and approximately 0.002 downward at piezometer nest B20-3S/D. These small-magnitude, opposing-direction gradients are not indicative of significant vertical flow, which is consistent with observations from other nested wells during previous hydrogeologic investigations at the Sherco site. Piezometers were sealed in March, 2020. Well construction and sealing records are included in Appendix A.

2.2.4 Groundwater Flow Velocity

Average linear groundwater flow velocity for the BAP2 was calculated using Darcy's equation:

$v = Kh x i / n_e$

where Kh = horizontal hydraulic conductivity (length/time) i = horizontal gradient (dimensionless) n_e = effective porosity

As discussed in Section 2.1.3, the calculated Kh values for the deep alluvium range from 3 to 44 feet per day. The value for n_e is estimated at 0.3, and Section 2.2.3 indicated the value for i is 0.001 (calculated).

The resulting calculated groundwater velocity at the BAP2 ranges from approximately 4 to 54 feet per year.

3. CONCEPTUAL MODEL AND MONITORING WELL LOCATIONS

§257.91(c) states that "*The groundwater monitoring system must include the minimum number of monitoring wells necessary to meet the performance standards specified in paragraph (a) of this section (discussed in Section 1.1 of this report), based on the site-specific information specified in paragraph (b) of this section (discussed in Section 2.0 of this report).*"

Section 3.1 below integrates the existing data into a geologic and hydrogeologic framework, or conceptual model, for the BAP2 area. The conceptual model offers a simplified representation of the geologic media and serves as the basis for identifying the primary monitoring units.

The conceptual model also facilitates a description of the fate and transport of a hypothetical release from the BAP2. It provides a rationale for predicting the most likely flow paths that a release might follow and provides the basis for an effective monitoring network that can intercept the likely release.

Sections 3.2 and 3.3 below discuss the selection of monitoring well locations based on the rule requirements and the conceptual model for the BAP2.

3.1 Conceptual Model

The conceptual model for the release of a constituent of concern (COC) from the BAP2 focuses on groundwater as the transport mechanism. As discussed above, the water table beneath the BAP2 typically occurs below the Superior till identified in Section 2.1.2. Exfiltration from BAP2 area is anticipated to move vertically downward from the base until it reaches the water table and/or till contact. If the exfiltration first contacts the till, it may flow through the till in the downgradient direction, but may also flow locally along the till contact to a zone of higher permeability within the till or a discontinuity of the till until it reaches the water table. Upon reaching the water table, the COC will likely travel mainly horizontally toward the south and/or southwest and to the Mississippi River.

Based on this conceptual model, the groundwater monitoring network should target the water table as the primary monitoring zone; and down-gradient wells should be located on the south and/or west sides of the pond in order to detect a potential release.

3.2 Groundwater Monitoring System

As discussed in Section 1.1, NSPM has installed a groundwater monitoring system at the BAP that complies with the standard set forth in §257.91(a). The system includes nine water table monitoring wells that include up-gradient and down-gradient wells as follows:

Up-Gradient	Down-Gradient
P-17, P-152a, P-158, P-177, P-178a	P-173, P-174, P-175, P-176

Well locations relative to the BAP2 are shown in Figure 6; and well construction data, including unique well number and installation date, are summarized in Table 1.

3.2.1 Compliance with §257.91(c)(1)

As described above in Section 3.2, five monitoring wells are located up-gradient and four monitoring wells are located down-gradient of the BAP2. This exceeds the minimums of one up-gradient and three down-gradient monitoring wells required in §257.91(c)(1).

3.2.2 Compliance with §257.91(c)(2)

Based on the rule requirements and the conceptual model for the Site, monitoring wells P-173, P-174, P-175, P-176, P-177 and P-178a were installed at the facility in 2019 as described in Carlson McCain (2020). These wells were installed to provide additional monitoring locations that are downgradient and up-gradient of the BAP2. Wells P-173, P-174, P-175 and P-176 are evenly spaced along the downgradient edge of the BAP2 and are well-situated to detect a potential release from the BAP2. The remainder of the groundwater monitoring system wells have been located in up-gradient locations to accurately represent the background groundwater quality at the BAP2.

4. GROUNDWATER MONITORING SYSTEM PERFORMANCE

The BAP2 is not a multi-unit facility and, therefore, compliance with §257.91(d) is not required. Given that, Section 4.1 below discusses compliance with §257.91(e) which states that "Monitoring wells must be cased in a manner that maintains the integrity of the monitoring well borehole. This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of groundwater samples. The annular space (i.e., the space between the borehole and well casing) above the sampling depth must be sealed to prevent contamination of samples and the groundwater."

4.1 Compliance with §257.91(e)

Monitoring well completion information for each of the wells in the monitoring system indicates that the wells have casings that are screened and packed with sand to enable collection of groundwater samples. Additionally, monitoring well completion logs indicate that in eight of the nine wells the annular space above the sand pack in the monitoring wells has been sealed with grout or cement. The monitoring well completion log for well P-17 indicates that the annular space in this wells is filled with coarse to fine sand backfill, as opposed to being sealed with grout or cement. Although this is inconsistent with the wording of §257.91(e) regarding sealing of the annular space, the well's integrity and ability to provide representative groundwater samples are not compromised by this type of construction because of the highly permeable nature of the sand which comprises unsaturated zone. Due to the similarity of the annular backfill material to the surrounding formation, it is akin to allowing the borehole to naturally cave in around the well casing, and does not provide a preferential pathway from the surface to the well screen, as would be the case with a similarly constructed well in a lower-permeability formation. As such, well P-17 is acceptable for use in the monitoring system, and previous sampling at all of the monitoring system wells has proven that the wells are sampleable and provide acceptable and consistent results.

4.1.1 Compliance with §257.91(e)(1)

As required in §257.91(e)(1):

- 1. The design, installation, development and decommissioning of any monitoring wells, piezometers, and any other measurement, sampling and analytical devices that are part of groundwater monitoring system will be kept as part of the operating record;
- 2. The operating record for the facility consists of electronic reports found on the NSPM's data network; and
- 3. Access to the operating record was provided for the completion of this groundwater monitoring system certification.

4.1.2 Compliance with §257.91(e)(2)

As required in §257.91(e)(2), monitoring wells, piezometers, and any other measurement, sampling and analytical devices that are part of the groundwater monitoring system will be operated and

maintained so that they perform to the design specifications throughout the life of the monitoring program.

4.1.3 Groundwater Sampling and Analysis Plan

A Groundwater Sampling and Analysis Plan (GW SAP) and Statistical Methods Certification have been completed for the wells in the CCR groundwater monitoring network for the BAP2 (NSPM, 2020). The GW SAP provides the methods and procedures that will be used to collect, ship, analyze, and report groundwater monitoring data from the facility is intended to comply the requirements of §257.93.

5.0 **REFERENCES**

Carlson McCain, 2014. Phase II Hydrogeologic Investigation Report and Phase III Water Monitoring System Report Work Plan, Scrubber Solids Ponds 4 & 5, Sherco Generating Plant, prepared for Xcel Energy, December 15, 2014.

Carlson McCain, 2016a. Supplemental Phase II Hydrogeologic Investigation Report, Scrubber Pond 4, Sherco Generating Plant, prepared for Xcel Energy, March 9, 2016.

Carlson McCain, 2016b. Monitoring Well Installation Report, Bottom Ash Pond, Sherco Generating Plant, prepared for Xcel Energy, March 9, 2016.

Carlson McCain, 2017a. CCR Groundwater Monitoring System Certification; Scrubber Solids Pond No. 3. Sherburne County (Sherco) Generating Plant; Becker, Minnesota. Prepared for Northern States Power Company, a Minnesota Corporation. October, 2017.

Carlson McCain, 2017b. CCR Groundwater Monitoring System Certification; Bottom Ash Pond. Sherburne County (Sherco) Generating Plant; Becker, Minnesota. Prepared for Northern States Power Company, a Minnesota Corporation. October, 2017.

Carlson McCain, 2020. CCR Groundwater Sampling and Analysis Plan, Sherco Bottom Ash Pond 2, Prepared for Northern States Power Company, a Minnesota Corporation. September 21, 2020.

Northern States Power (NSP) - Minnesota, 2008. Sherco Dry Ash Disposal Facility, Hydrogeologic Evaluation, Phase II – Field Investigation, prepared by Xcel Energy; March 2008;

EPA, 2015. 40 CFR Parts 257 and 261; Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule, Federal Register vol. 80, no. 74. Environmental Protection Agency. April 17, 2015.

Xcel, 2002. SHERCO Generating Plant, Scrubber Solids Pond No. 3, Hydrogeologic Evaluation – Field Investigation, May 2002.

Tables

TABLE 1CCR GROUNDWATER MONITORING SYSTEM

Bottom Ash Pond 2

	Minnesota	Data	Loca Site Coord	ition linates (ft)	Elevation Top of	Screen Longth	Elevation Top of	Elevation Bottom of		Hydrologic
Well ID	Well ID	Installed	Easting	Northing	Riser Pipe	(ft)	Screen	Screen	Monitoring Status	Location
P-17	NA	8/26/81	2030284	866284	964.34	20	923	903	Routine Semi-annual	Up-Gradient
P-152A	806318	10/10/14	2031472	866696	965.87	10	933.6	923.6	Routine Semi-annual	Up-Gradient
P-158	812967	9/23/15	2029122	866410	966.55	10	927	917	Routine Semi-annual	Up-Gradient
P-173	844707	11/3/19	2029805	865402	998.49	10	928.4	918.4	Routine Semi-annual	Down-Gradient
P-174	844706	11/5/19	2029311	865400	1000.67	10	928.5	918.5	Routine Semi-annual	Down-Gradient
P-175	844705	11/2/19	2029018	865613	1002.92	10	928.8	918.8	Routine Semi-annual	Down-Gradient
P-176	844703	11/5/19	2029019	865941	1002.65	10	928.5	918.5	Routine Semi-annual	Down-Gradient
P-177	844704	11/4/19	2029568	866324	966.26	10	929.8	919.8	Routine Semi-annual	Up-Gradient
P-178a	844708	11/5/19	2030540	865533	966.46	10	929.2	919.2	Routine Semi-annual	Up-Gradient

*Notes:

Elevation is feet above mean sea level

Figures













Appendix A

Nested Piezometer Data



Table A-1SOIL BORING AND PIEZOMETER CONSTRUCTION INFORMATION

Sherco Bottom Ash Pond 2 Supplemental Investigation

			Loca Site Coord	tion - dinates (ft)							
	Piezometer	MDH Unique			Ground Elevation	TOR Elevation	Well Diameter	Screen	Screen	Well Depth	Screen Elevation
Boring No.	Number	Well Number	Northing	Easting	(Ft above NAVD88)	(Ft above NAVD88)	(inches)	Length (ft)	Туре	(feet bTOR)	(ft above NAVD88)
B20-1 Shallow	B20-1S	847666	865657.34	2029911.90	942.7	944.70	2"	5	PVC	20.56	929.14 - 924.14
B20-1 Deep	B20-1D	847665	865654.53	2029905.25	942.1	944.07	2"	2	PVC	65.9	880.17 - 878.17
B20-2 Shallow	B20-2S	847662	865863.58	2029530.32	936.5	938.37	2"	5	PVC	13.94	929.43 - 924.43
B20-2 Deep	B20-2D	847661	865859.19	2029522.56	936.7	938.70	2"	2	PVC	52.51	888.19 - 886.19
B20-3 Shallow	B20-3S	847664	865637.96	2029253.47	942.8	944.97	2"	5	PVC	18.61	931.36 - 926.36
B20-3 Deep	B20-3D	847663	865634.00	2029248.81	942.7	944.75	2"	2	PVC	62.74	884.01 - 882.01

Notes:

Ft = feet

bgs = below ground surface

TOR = Top of innermost riser pipe

PVC = Polyvinyl Chloride

NAVD88 = North American Vertical Datum of 1988

Table A-2 PIEZOMETER VERTICAL HYDRAULIC GRADIENTS SUMMARY

Sherco Bottom Ash Pond 2 Supplemental Investigation

	B20-1S/B20-1D Well Nest									
			Mid Point	Mid Point						
Static Water Elevations		B20-1S Screen	B20-1D Screen	B20-1S/1D Vertical						
Date	B20-1S	B20-1D	Elevation	Elevation	Hydraulic Gradient					
2/7/2020	928.56	928.63	926.35	879.17	0.0014					
2/17/2020	928.44	928.50	926.29	879.17	0.0012					
2/28/2020	928.35	928.42	926.24	879.17	0.0014					

	B20-2S/B20-2D Well Nest									
			Mid Point	Mid Point						
	Static Water Elevations		B20-2S Screen	B20-2D Screen	B20-2S/2D Vertical					
Date	B20-2S	B20-2D	Elevation	Elevation	Hydraulic Gradient					
2/7/2020	928.35	928.38	926.39	887.19	0.00077					
2/17/2020	928.26	928.28	926.35	887.19	0.00054					
2/28/2020	928.16	928.16	926.30	887.19	0.000026					

	B20-3S/B20-3D Well Nest									
			Mid Point	Mid Point						
Static Water Elevations		B20-3S Screen	B20-3D Screen	B20-3S/3D Vertical						
Date	B20-3S	B20-3D	Elevation	Elevation	Hydraulic Gradient					
2/7/2020	928.13	927.99	927.24	883.01	-0.0032					
2/17/2020	927.96	927.87	927.16	883.01	-0.0021					
2/28/2020	927.80	927.75	927.08	883.01	-0.0012					

Notes:

Positive values indicate an upward hydraulic gradient; negative values indicate a downward hydraulic gradient

Elevations are in feet above North American Vertical Datum of 1988 (NAVD88)

See Table A-1 for top of well screen and bottom of well screen elevations

C	AR	LS	ON	BORING NUMBER B20-1D PAGE 1 OF 2			
M	C		N				
el Enerc	11/			PROJECT NAME Sherco BAP2 Supplmental Investigation			
	3404	-19		PROJECT LOCATION Becker Minnesota			
TED 2	2/4/20		COMPLETED 2/4/20	GROUND ELEVATION 942.5 ft 940 HOLE SIZE 6"			
ONTRA	CTOR	Cascade	Drillina	GROUND WATER LEVELS:			
IETHOD	Rota	sonic		AT TIME OF DRILLING			
M. Li	ndstron	n	CHECKED BY M. Lindstrom	AT END OF DRILLING 13.5 ft / Elev 929.0 ft			
				AFTER DRILLING			
SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG		MATERIAL DESCRIPTION			
			Blind drill to 62' bgs. Soils wer drilling conditions at 62' bgs. In	e generally classified as brown sand and gravel with cobbles. Driller reported hard istalled B20-1 Deep in borehole.			
		CAR MCC	CARLS MCCAI MECAI UMBER <u>3404-19</u> TED <u>2/4/20</u> ONTRACTOR <u>Cascade</u> ETHOD <u>Rotasonic</u> (<u>M. Lindstrom</u> UMBRY M. Lindstrom UMBRY M. Lindstrom M. Lin	el Energy UMBER 3404-19 TED 2/4/20 COMPLETED 2/4/20 ONTRACTOR Cascade Drilling ETHOD Rotasonic r M. Lindstrom Mundstrom CHECKED BY M. Lindstrom COMPLETED CHECKED BY M. Lindstrom Mundstrom CHECKED BY M. Lindstrom COMPLETED CHECKED BY M. Lindstrom COMPLETED </td			

	<u>3404-19</u>	PROJECT NAME _Snerco BAP2 Supplmental Investigation PROJECT LOCATION _Becker, Minnesota
S DEPTH (ft) (ft) SAMPLE TYPE NUMBER	RECOVERY % GRAPHIC	MATERIAL DESCRIPTION
		Blind drill to 62' bgs. Soils were generally classified as brown sand and gravel with cobbles. Driller reported har drilling conditions at 62' bgs. Installed B20-1 Deep in borehole. <i>(continued)</i>

6		C/			SON I N	BORING NUMBER B20-1S PAGE 1 OF 1
CLI	ENT X	cel Energ	У			PROJECT NAME Sherco BAP2 Supplmental Investigation
PRC	DJECT N	IUMBER	3404	4-19		PROJECT LOCATION Becker, Minnesota
DAT	TE STAF	RTED 2	/4/20		COMPLETED <u>2/4/20</u>	GROUND ELEVATION <u>942.65 ft 940</u> HOLE SIZE <u>6"</u>
DRI	LLING C	ONTRA	CTOR	Case	ade Drilling	_ GROUND WATER LEVELS:
DRI	LLING N	IETHOD	Rota	asonic		▲ AT TIME OF DRILLING 14.0 ft / Elev 928.7 ft
	GGED B	Y <u>M. Lir</u>	ndstro	n	CHECKED BY M. Lindstrom	▲ AT END OF DRILLING 13.9 ft / Elev 928.8 ft
NO			1			_ AFTER DRILLING
FORMATION	o DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG		MATERIAL DESCRIPTION
		RS 1	100		Blind drill to 18' bgs. Soils were Shallow in borehole.	generally classified as brown sand and gravel with cobbles. Installed B20-1

TEST 3404-19 BAP2 PZS.GPJ GINT US.GDT 8/14/20

		C	AR	RLS	ON	BORING NUMBER B20-2D			
		M	cſ		N	FAGE 1 OF			
CLIE		el Energ	ау	4.40		PROJECT NAME Sherco BAP2 Supplmental Investigation			
			<u>3404</u>	4-19					
				Casada	COMPLETED				
DRILLING METHOD Rotasonic					CHECKED BY M Lindstrom	V AT FIND OF DRILLING 10.3 ft / Elev 926.4 ft			
NOT	ES ES	· <u>· · · · · · · · · · · · · · · · · · </u>	<u>naou o</u>			AFTER DRILLING			
S	-	ΥΡΕ R	% ∖.	<u>ں</u>					
AATI	EPTH (ff)	UBE T MBE	VER VER	H DO		MATERIAL DESCRIPTION			
ORN	U U U	NUN	0	GR/					
ш	0	S	R						
					Blind drill to 50.5' bgs. Soils w	vere generally classified as brown sand. Driller reported hard drilling at 50' bgs.			
ŀ					Installed B20-2 Deep in boreh	DIE.			
ł									
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ŀ	10			V					
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ł		RS ₄	100						
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			1	1.2.2.1					

6		C/			SON BORING NUMBER B20-2D PAGE 2 OF 2
CLI	ENT X	cel Energ	У		PROJECT NAME Sherco BAP2 Supplmental Investigation
PRC		NUMBER	3404	1-19	PROJECT LOCATION Becker, Minnesota
FORMATION	5 DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG	MATERIAL DESCRIPTION
	<u>30</u> <u>35</u> -				Blind drill to 50.5 bgs. Solis were generally classified as brown sand. Driller reported hard drilling at 50 bgs. Installed B20-2 Deep in borehole. <i>(continued)</i>

TEST 3404-19 BAP2 PZS.GPJ GINT US.GDT 8/14/20

(C/ M			SON I N	BORING NUMBER B20-2S PAGE 1 OF 1
CLI	IENT X	cel Energ	ay .			PROJECT NAME Sherco BAP2 Supplmental Investigation
PR	OJECT	UMBER	3404	-19		PROJECT LOCATION Becker, Minnesota
DA	TE STAI	RTED _2	/5/20		COMPLETED 2/5/20	GROUND ELEVATION <u>936.5 ft 940</u> HOLE SIZE <u>6</u> "
DR	ILLING O	CONTRA	CTOR	Casc	ade Drilling	GROUND WATER LEVELS:
DR	ILLING N	NETHOD	Rota	sonic		AT TIME OF DRILLING 8.0 ft / Elev 928.5 ft
LO	GGED B	Y <u>M. Li</u>	ndstron	n	CHECKED BY M. Lindstrom	AT END OF DRILLING 10.0 ft / Elev 926.5 ft
NO	TES					AFTER DRILLING
FORMATION	o DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG		MATERIAL DESCRIPTION
	 - 5 	RS 1	100		<u>⊽</u> ▼ 12.0	End of boring at 12.0 fact
						End of boring at 12.0 feet.

NUMBER PROJECT NUMBER 2404-10 PROJECT NUMBER			C	AR	RLS	ON	BORING NUMBER B20-3D		
CLENT Xold Energy PROJECT NAME Sheco BAP2 Supprivate Investigation PROJECT NAMER 306-19 PROJECT COACTION Berker, Minnesda DATE STARTED 28/20 COMPLETED 28/20 GROUND ELEVITION Mole Size 6* DRILLING METHOD Relation CHECKED BY GROUND WATER LEVELS: AT THE OF DRILLING			M	CC		N			
DATE FLATED 20/20 COMPLETED 20/20 GROUND ALTER LEVELS: DRLLING OFFICATOR GROUND ALTER LEVELS: GROUND ALTER LEVELS: ATTHE OF DRLLING DRLLING METHOD Rotacold Diffing GROUND ALTER LEVELS: ATTHE OF DRLLING DRLLING METHOD CHECKED BY M. Lindarom ATTHE OF DRLLING	CU		cel Energ				DDO IECT NAME Shares BAD? Supplmental Investigation		
DATE STARTED 28/20 COMPLETED 28/20 GROUND ELEVATION 94/2.11.940 HOLE SZEE 6" DRILLING CONTRACTOR Cascade Driling GROUND WATER LEVELS: AT TIME OF BRILLING				3404	4-19		PROJECT LOCATION Becker. Minnesota		
DRILING CONTRACTOR Cascade Drilling GROUND WATER LEVELS: AT THE OF DRILLING	DA	TE STAI	RTED 2	/6/20	1 10	COMPLETED 2/6/20	GROUND ELEVATION 942.7 ft 940 HOLE SIZE 6"		
DRULING METHOD Relaxonic AT TIME OF DRULING	DRI	ILLING (CTOR	Cascade	e Drilling	GROUND WATER LEVELS:		
LOGGED BY <u>M Lindsiton</u> CHECKED BY <u>M Lindsiton</u> <u>AFTER DRILING is 8 /r Easy 25.9 /r AFTER DRILING </u>	DRI	ILLING N	NETHOD	Rota	asonic	-	AT TIME OF DRILLING		
NOTE AFTER DRILLING	LO	GGED B	Y <u>M. Li</u>	ndstro	m	CHECKED BY M. Lindstrom	AT END OF DRILLING <u>16.8 ft / Elev 925.9 ft</u>		
No. Number of the second	NO.	TES					AFTER DRILLING		
0 N Blind drill to 60' bgs. Sole were generally classified as brown sand and gravel. Driller reported hard drilling at 60' bgs. Installed B20-3 Deep in borehole. - - - <t< td=""><td>FORMATION</td><td>DEPTH (ft)</td><td>SAMPLE TYPE NUMBER</td><td>RECOVERY %</td><td>GRAPHIC LOG</td><td></td><td>MATERIAL DESCRIPTION</td></t<>	FORMATION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG		MATERIAL DESCRIPTION		
30 RS 8	1 3404-19 BAPZ PZS.GPJ GINI US.GDT 8/14/20					Bind drill to 60' bgs. Soils were bgs. Installed B20-3 Deep in t	e generally classified as brown sand and gravel. Driller reported hard drilling at 60' sorehole.		
(Continued Next Dage)	<u> </u>	30	RS				(Continued Next Page)		

6		C		RLS	SON BORING NUMBER B20-3D PAGE 2 OF 2
CLI	ENT <u>X</u>	cel Energ	y C	A	PROJECT NAME _ Sherco BAP2 Supplmental Investigation
PRO		NUMBER	_3404	4-19	PROJECT LOCATION Becker, Minnesota
FORMATION	6 DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG	MATERIAL DESCRIPTION
(GDT 8/14/20					Bind drill to 60 bgs. Solis were generally classified as brown sand and gravel. Driller reported hard drilling at 60' bgs. Installed B20-3 Deep in borehole. <i>(continued)</i>
SPJ GINT L				。 。 〇	60.0
TEST 3404-19 BAP2 PZS.(<u></u>	End of boring at 60.0 feet.

6		C/			SON I N	BORING NUMBER B20-3S PAGE 1 OF 1
СГІ		cel Energ	IY			PROJECT NAME Sherco BAP2 Supplmental Investigation
PRO	OJECT N	IUMBER	3404	4-19		_ PROJECT LOCATION _Becker, Minnesota
DAT	TE STAF	RTED 2	/7/20		COMPLETED 2/7/20	GROUND ELEVATION <u>942.8 ft 940</u> HOLE SIZE <u>6"</u>
			CTOR	Casca	ade Drilling	
	GGED B	Y M Li	ndstro	m	CHECKED BY M Lindstrom	TAT FIND OF DRILLING 16.3 ft / Elev 926.5 ft
NO	TES	<u> </u>				AFTER DRILLING
FORMATION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG		MATERIAL DESCRIPTION
		RS 1	100			
					17.0	End of boring at 17.0 feet.
1501 3404-13 PARZ FZS:0FJ GIN1 00:0D1 01:470						

	Monitoring Well	Diagram
	Above Grade Cor	mpletion B20-1 Shallow
	PROJECT NAME: Xcel Sh	erco CCR Wells Supplmental Investigation
		Minnesota
rilling Method: 6" Rota-Sonic		Ground Surface Elevation: 942.65'
ompany: Cascade		MDH Unique Well No.: 847666
oreman: Lenny Rodgers		Date/Time Started: 2/4/2020 / 1615
ig Model: Mini-Sonic		Date/Time Completed: 2/6/2020 / 1800
eol/Engr: M. Lindstrom		Coordinates: 865657.3 ft N, 2029911.9 ft E
Protective Casing Stick Up		PROTECTIVE CASING
		Type: Pro-top Bumper Posts: No
Riser Stick Up 2'		Diameter: 6" Casing Elevation: 944.70'
		Length: 7'
		Locked: Yes Key Number: 1212
		CAP OR PLUG
		Type: Expansion Plug Vented: No
Ground Surface		
		Type: Concrete
		Total Volume: 4.5-80 lb bags
		Manufacturer: Quikrete
Top of Grout		
		RISER PIPE
		Type: Schedule 40 PVC
		Inner Diameter: 2"
		Joint Type: Threaded
		Total Length:15'No./Length of Sections:1/20
		Manufacturer: Cresline
		GROUT
		Type: No grout used due to shallow nature of well
		Total Volume: Mix Ratio:
		Manufacturer:



		Monitoring	g Well Diagra	m	
CARLSOI	N	Above Gra	B20-1 Deep		
		PROJECT NAM	• E: Xcel Sherco CCB W	/ells Supplmental Investigation	
		LOCATION:	Becker, Minnesota		
rilling Method: 6" Rota-So	onic		,	Ground Surface Elevation: 9	942.5
ompany: Cascade				MDH Unique Well No.: 8476	565
reman: Lenny Rodgers				Date/Time Started: 2/7/202	20 / 932
g Model: Mini-Sonic				Date/Time Completed: 2/7	/2020 / 1241
eol/Engr: M. Lindstrom				Coordinates: 865654.5 ft N,	, 2029905.3 ft E
Protective Casing Stick Up				PROTECTIVE CASING	
					Bumper Posts: No
Riser Stick Up	2'			Diameter: 6"	Casing Elevation: 944.07'
				Length: 7'	
				Locked: Yes	Key Number: 1212
				CAP OR PLUG	
Cround Surface				Type: Expansion Plug	Vented: No
Ground Surface					
				SURFACE ΒΑCKEUL ΜΑΤΕRΙΑΙ	
			_	Type: Concrete	
				Total Volume: 6-80 lb. bags	
				Manufacturer: Sakrete	
Top of Grout	5'				
				RISER PIPE	
				Type: Schedule 40 PVC	
				Inner Diameter: 2"	
				Joint Type: Spigot and Socket - S	Solvent Welded
				Total Length: 64'	No./Length of Sections: 3/20, 1/4
				Manufacturer: Cresiine	
				GROUT	
				Type: Bentonite	
				Total Volume: 2 -50 lb bags	Mix Ratio: 24 gals/1 bag
				Manufacturer: Quik-grout	



		Monitorin	g Well Diagra	am			
		Above Grade Completion B20-2 Shallow					
		PROJECT NAM	- ΛΕ: Xcel Sherco CCR V	Vells Supplmental Investigation			
		LOCATION:	Becker, Minnesot	a			
ling Method: 6" Rota-	Sonic			Ground Surface Elevation: 936.5'			
npany: Cascade				MDH Unique Well No.: 847662			
eman: Lenny Rodgers Model: Mini-Sonic				Date/Time Started: 2/5/2020 / 1430 Date/Time Completed: 2/5/2020 / 1815			
ol/Engr: M. Lindstrom				Coordinates: 865863.6 ft N, 2029530.3 ft E			
Protective Casing							
Stick Op				Type: Pro-top Bumper Posts: No			
Riser Stick Up	2'			Diameter: 6" Casing Elevation: 938.4'			
				Length: 7'			
				Locked: Yes Key Number: 1212			
				CAP OR PLUG			
				Type:Expansion PlugVented: No			
Ground Surface							
				SURFACE BACKFILL MATERIAL			
				Type: Concrete			
				Total Volume: 4-80 lb. bags			
Top of Grout	3'						
·							
				RISER PIPE			
				Type: Schedule 40 PVC			
				Inner Diameter: 2"			
				Joint Type: Threaded			
				Manufacturer: Cresline			
				CDOUT			
				Type: No grout used due to shallow nature of well			
				Total Volume: Mix Ratio:			
				Manufacturer:			
Top of Seal		-		SEAL Type/Size: 2/9" Bentenite Chine			
				Total Volume: 1 -50 lb bag bentonite			
Top of Filter Pack	6.5'			Manufacturer: Baroid Hole Plug			
T (0							
rop of Screen	7'						
				Total Volume: 1 - 50 lb. Bag			
				Manufacturer: Red Flint Sand and Gravel			
				WELL SCREEN			
				Inner Diameter: 2 "			
				Length: 5' Effective Length: 5.5'			
				Slot Size: No. 10			
Bottom of Scroop	10'			Manufacturer: Johnson			
Bottom of Filter Pack	<u>12</u> 12'						
				WATER SOURCE: Landfill garage			
		Borehole Diamete	er: <u>6"</u>				
Total Davids (D. 1				NOTES: 4" cap installed on end of well screen.			
Total Depth of Boring	<u>12'</u> 14'			NOTES: 4" cap installed on end of well screen.			
Total Depth of Boring Total Length of Well	12' 14'			NOTES: 4" cap installed on end of well screen.			

		Monitorin Above Gra	g Well Diagra ade Completio	B20-2 Deep		
		PROJECT NAM	IE: Xcel Sherco CCR W	R Wells Supplmental Investigation		
ling Method: 6" Bota-	Sonic	LOCATION:	Becker, Minnesota	Ground Surface Elevation: 936 7'		
npany: Cascade	Joine			MDH Unique Well No.: 847661		
eman: Lenny Rodgers				Date/Time Started: 2/6/2020 / 7	30	
Model: Mini-Sonic				Date/Time Completed: 2/6/2020	/ 1000	
ol/Engr: M. Lindstrom				Coordinates: 865859.2 ft N, 2029	522.6 ft E	
Protective Casing						
Stick Up				PROTECTIVE CASING		
Disor Stick Lip	21			Type: Pro-top	Bumper Posts: No	
Riser Stick Op	2			Length: 7	Casing Elevation: 938.70	
				Locked: Yes	Key Number: 1212	
					·	
				CAP OR PLUG		
Cround Surface				Type: Expansion Plug	Vented: No	
Ground Surface						
				SURFACE BACKFILL MATERIAL		
				Type: Concrete		
				Total Volume: 4 -80 lb. bags		
Top of Crout	21			Manufacturer: Quikrete		
Top of Grout	3					
				RISER PIPE		
				Type: Schedule 40 PVC		
				Initer Diameter: 2	Welded	
				Total Length: 51'	No./Length of Sections: 3/20	
				Manufacturer: Cresline		
				GROUT Type: Bentonite Total Volume: 2 -50 lb bags Manufacturer: Quik-grout	Mix Ratio: 24 gals/1 bag	
Top of Seal	41.5'			SEAL Type/Size: 3/8" Bentonite Chips Total Volume: 1 -50 lb bag bentonite		
Top of Filter Pack	46.5'			Manufacturer: Baroid Hole Plug		
Top of Screen	48.5'			FILTER PACK		
				Type/Size: #40 Red Flint Sand		
				Total Volume: 1.5-50 lb. Bag		
				Manufacturer: Red Flint Sand and Grav	vel	
				Type: PVC		
				Inner Diameter: 2 "		
				Length: 2'	Effective Length: 4'	
				Slot Size: No. 10		
				Manufacturer: Johnson		
Bottom of Screen	50.5' 50.5'					
	50.5			WATER SOURCE: Landfill garage		
		Borehole Diamete	er: 6"			
				NOTES: 4" cap installed on end of well	screen. Centralizer	
Total Depth of Boring	50.5'			installed at bottom of well.		
Total Depth of Boring Total Length of Well	50.5' 52.5'			installed at bottom of well.		

W MCCAIN		PROJECT NAI		DZU-5 SIIdIIOW
			VIL. ALEI SHEILU LLK	Wells Supplmental Investigation
		LOCATION:	Becker, Minneso	ota
Iling Method: 6" Rota-So	onic			Ground Surface Elevation: 942.8'
mpany: Cascade				MDH Unique Well No.: 847664 Date/Time Started: 2/7/2020 / 802
Model: Mini-Sonic				Date/Time Completed: 2/7/2020 / 911
ol/Engr: M. Lindstrom			_	Coordinates: 865637.9 ft N, 2029253.5 ft E
Protective Casing				
Stick Up				PROTECTIVE CASING
				Type: Pro-top Bumper Posts: No
Riser Stick Up	2'		-	Diameter: 6" Casing Elevation: 944.9'
				Locked: Yes Key Number: 1212
				CAP OR PLUG
Ground Surface				Type: Expansion Plug Vented: No
				SURFACE BACKFILL MATERIAL
				Total Volume: 4-80 lb hags
				Manufacturer: Quikrete
Top of Grout	5'			
				RISER PIPE
				Inner Diameter: 2 "
				Joint Type: Threaded
				Total Length:14'No./Length of Sections:1/20
				Manufacturer: Cresline
				GROUT Type: No grout used due to shallow nature of well
				Total Volume: Mix Ratio:
				Manufacturer:
Top of Soal				CEAL
TOP OF Seal			_	Type/Size: 3/8" Bentonite Chips
				Total Volume: 1 -50 lb bag bentonite
Top of Filter Pack	10'			Manufacturer: Baroid Hole Plug
Top of Screen	12'			FILTER PACK
			1	Type/Size: #40 Red Flint Sand
			-	Total Volume: 1.5 - 50 lb. Bag
			-	IVIanufacturer: Red Flint Sand and Gravel
			-	WELL SCREEN
			_	Туре: РVС
			-	Inner Diameter: 2"
			-	Slot Size: No. 10
		 	1	Manufacturer: Johnson
Bottom of Screen	17'			
	1/			WATER SOURCE: Landfill garage
		Borehole Diamet	er: <u>6"</u>	
				NOTES: 4" cap installed on end of well screen.
Total Depth of Boring	17'			
Total Length of Woll	19'			

	Monitorir	ng Well Diagr	am	
	Above Gr	ade Completi	B20-3 Deep	
MCCAIN	PROJECT NAI	ME: Xcel Sherco CCR	Wells Supplmental Investigation	
	LOCATION:	Becker, Minneso	ta	_
rilling Method: 6" Rota-So	nic		Ground Surface Elevation: 942.7'	
ompany: Cascade			MDH Unique Well No.: 847663	
reman: Lenny Rodgers			Date/Time Started: 2/6/2020 / 1	.614
g Model: Mini-Sonic			Date/Time Completed: 2/6/2020	/ 1730
eol/Engr: M. Lindstrom			Coordinates: 865633.9 ft N, 20292	248.8 ft E
Protective Casing Stick Up			PROTECTIVE CASING	
· · · · ·			Type: Pro-top	Bumper Posts: No
Riser Stick Up	2'		Diameter: 6 "	Casing Elevation: 944.75'
			Length: 7'	
			Locked: Yes	Key Number: 1212
			CAP OR PLUG	Vented, No.
Ground Surface			Type: Expansion Plug	vented: No
			SURFACE BACKFILL MATERIAL	
			Type: Concrete	
			Total Volume: 4 -80 lb. bags	
			Manufacturer: Quikrete	
Top of Grout	6'			
			Type: Schedule 40 PVC	
			Inner Diameter: 2"	
			Joint Type: Spigot and Socket - Solvent	Welded
			Total Length: 60'	No./Length of Sections: 3/20
			Manufacturer: Cresline	
			GROUT	
			Type: Bentonite	
			Total Volume: 3 -50 lb bags	Mix Ratio: 24 gals/1 bag
			Manufacturer: Quik-grout	



WELL OR BORING LCC. County Name	ATION	WELL	MINNESO	TA D	EPARTMENT OF HEALTH Minnesota Well and Boring Sealing No. Minnesota Unique Well No.
Sherburn	ι		Minne	sota	Statutes, Chapter 103I OF W-series No.
Township Name Townsh	ip No. Range No	. Section No. F	raction (sm.	\rightarrow ig.	Date Sealed Date Well or Boring Constructed
Becker 3	3 20	1 1 1	UMPSEL	SE	3/30/20 2/5/20
GPS Latitude	degrees	minutes	secor	nds	Depth Before Sealing 50ft. Original Depth 50 /t.
LOCATION: Longitude_	degrees	minutes	secor	nds	AQUIFER(S) STATIC WATER LEVEL
Numerical Street Address or Fi	re Number and Cit	ty of Well or Borin	g Location		
15999 11 Shaw and lagelland	ndustr	1a/ Blvo	(Deci	in	Water-Supply Well Monit. Well
in section grid with "X."	CONING	location, sh lines, roads	owing propa , and buildin	irty igs.	Env. Bore Hole Other Ot. Delow Dahove land surface
N		48455665993	5-01/7-07/07/07/07	.	Casing type(s)
		\bigcap	-	U	Steel Plastic Tile Other
w		1			WELLHEAD COMPLETION
· · · · · · · · · · · · · · · · · · ·			0		Outside: Well House At Grade Inside: Basement Offset
	/a Mile				Pitless Adapter/Unit Burled Well Pit
				J	🖬 Well Pit
⊢					Dother 6" protop Other
PROPERTY OWNER'S NAME	COMPANY NAME	Э.		-	CASING(S)
Property owner's mailing address	n States	1mer	dicated above	_	Diameter Depth US Set in oversize hole? Annular space initially grouted?
	Alicall	of 11/1	1/		in. from to ft. Yes II NoYes II No II Unknown
914	Nicolo	er roa	~ 6 '		in. from toft. 🖸 Yes 🗖 No 📮 Yes 📮 No 📮 Unknown
Minr	reapoli	smn	554	,1	In. from toft. 🖸 Yes 🗖 No 💭 Yes 🗖 No 💭 Unknown
WELL OWNER'S NAME/COMP/	ANY NAME	100			SCREEN/OPEN HOLE
Well owner's mailing address if diffe	erent than property of	wner's address inc	dicated above		Screen from <u>98</u> to <u>52</u> ft. Open Hole from toft.
	~				
	San	re			
					Type of Obstructions (Describe)
GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	то	Obstructions removed? Describe
If not known, indicate estimated	formation log fro	m nearby well or	r borling.		PUMP NA
Sand	Br	M	US	50	Removed IN Not Present ID Other
				ł	
					No Annular Space Exists Annular Space Grouted with Tremie Pipe Casing And Bothe Rote:
				-	in. fromtoft.
				_	in from to ft Restorated Resource
				_	
					Type of Perforator
					□ Other
				-	GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)
				-	Grouting Material Bentinite from 0 to 50 it. yards 1 bags
					from to ft yards baos
					from to ft varits base
				-	DTHER WELLS AND BORINGS
EMARKS, SOURCE OF DATA	, DIFFICULTIES I	N SEALING		\neg	Diher unsealed and unused well or boring on property?
				1	ICENSED OR REGISTERED CONTRACTOR CERTIFICATION
				is	his well or boring was sealed in accordance with Minnesola Rules, Chapter 4725. The information contained in this report a true to the best of my knowledge.
				5	
				6	License Business Name License or Registration No.
					thing mut
				2	Certified Representative Signature Certified Rep. No. Date
301010				-	Certified Representative Signature Certified Rep. No. Date

WELL OR BORING LOC County Name SMEY BUT M	ATION	WELL	MINNE: AND Mir	SOTA D BOF Inesota	EPARTMENT OF HEALTH ING SEALING RECORD Statutes, Chapter 1031 Minnesota Unique Well No. or W-series No. UNIQUE Well No.
Township Name Townsh	nip No. Range N	o. Section No. F	raction (sm. → Ig) Date Sealed Date Well or Boring Constructed
Becker 3	3 20	1 1 1	UNSE	556	3/30/20 2/5/20
GPS Latitude LOCATION: Longitude_	degrees_ degrees_	minutes	Se	conds	Depth Before Sealing <u>f</u> <u>t</u> . Original Depth <u>f</u> .
Numerical Street Address or F	ire Number and C	ity of Well or Borin	ng Locatio	017	AQUIFER(S) STATIC WATER LEVEL
13999 I	ndustr	Tal Blue	1 Be	chy	WELL/BORING Measured Estimated Date Measure_3/33/20
Show exact location of well of	boring	Sketch man	o of well	or boring	Env Bore Hole
N		lines, roads	, and bu	ldings.	
	H				Steel Plastic Tile Other
w	ET	1		- 1	WELLHEAD COMPLETION
│			(3)		Outside: 🗖 Well House 🔲 At Grade Inside: 🗖 Basement Offset
	Mile V		C	1	T Pitless Adapter/Unit D Burled D Well Pit
					D Well Pit
1 Mile					Dothar 6" proto) Other
PROPERTY OWNER'S NAME	COMPANY NAME	0			CASING(S)
Norther	n States	Poner	·		Diameter Depth Set in oversize hole? Annular space initially grouted?
Property owner's mailing address i	f different than well	location address in	dicated ab	ove	to ft. Yes INO Pyes INO Unknown
414	Nicoll	et Ma	.11		
Mine	reanoli	smn	έr	101	
WELL OWNER'S NAME/COMP			1 1-	001	in, iroin tott.
WELL OWNER S NAME/COMP.	San	no.			
Well owner's mailing address if diff	arent than properly	owner's address inc	ficated ab	ave	Screen from
	~				OBSTRUCTIONS
	San	re			📙 Rods/Drop Pipe 🔄 Check Valve(s) 📄 Debris 🔲 Fill 🛛 No Obstruction
		-			Type of Obstructions (Describe)
GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	то	Obstructions removed? Ves No Describe
If not known, indicate estimate	d formation log fro	om nearby well or	boring.		PUMP
Sand	Br	M	0	12	Type Not Present Other
					METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:
					No Annular Space Exists D Annular Space Grouted with Tremie Ploe Casing Perforation/Removal
			-		in. from to ft.
					Type of Perforator
					🛛 Other
					3ROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)
					Grouting Material Bentinite from 0 to 12 ft. yards 21 bags
					from to ft yards baos
					from to ft varie bore
	-				Dags
EMARKS, SOURCE OF DATA	DIFFICULTIES	IN SEALING			
10 10 10 10 100				H	ICENSED OR REGISTERED CONTRACTOR CERTIFICATION
				i.	his well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report true to the best of my knowledge.
					Ligenseg Business Name
					+ - 1 + - +
				-	Den man
					Certilled Representative Signature Certilled Rep. No. Date
MINN. DEPT OF HEALTH (COPY				Tammy Rey
					Name of Person Sealing Well of Boring

			SALE IN LCC.		
WELL OR BORING LOCA	ATION	WELL			RING SEALING BECODD Sealing No. Sul 2/2/2/2
County Name		WELL			Statutes Charter 1001 Minnesota Unique Well No.
Sherburn	ι	1	1907	mesota	Statutes, Chapter 1031 Or W-Series No. (laws blank I) for known)
Township Name Townsh	ip No, Range N	o. Section No. F	raction ((sm. → Ig	.) Date Sealed Date Well or Boring Constructed
Berlan 3	3 20	1 1 1	NARZI	ese	3/30/20 2/6/70
					14/00
GPS Latitude	degrees	minutes	S6	econds	Depth Before Sealing 66
LOCATION: Longitude_	degrees	minutes	\$6	aconds	AQUIFER(S) STATIC WATER LEVEL
Numerical Street Address or Fin	re Number and Cl	ty of Well or Borlr	ng Locati	on	Bingle Aquifer Multiaquifer
13999 II	ndustr	1al Blue	l Be	dun	WELL/BORING
Show exact location of well or	boring	Sketch map	p of well	or boring	
in section gho with X.		lines, roads	iowing pr	lldings.	Cache and surface
					CASING TYPE(S)
	1			3	Steel DPlastic Tile Other
		(1	
w	6 T	1			
		1			Outside: Weil House At Grade Inside: Basement Offset
	% Milo	0			Pittess Adapter/Unit Burled Well Pit
		0			🗖 Well Pit
1 Mila					Dother le " arotan
	1				protop
PROPERTY OWNER'S NAME/	COMPANY NAME	Dr	/		CASING(S)
Property owner's mailing address if	n states	Invertion address in	diceted of	DOVE	Diameter Depth Set in oversize hole? Annular space initially grouted?
			1 / all		in. from to ft. Yes D No Yes D No D Unknown
414	NICOLL	er Ma	11		
n. ?		< h > 10	.	<i>,</i> ,	π. U Yes L No L Yes D No D Unknown
<i>Ininn</i>	reapon	s MA	550	401	In. from to ft. 🖸 Yes 🗖 No 🗖 Yes 🗖 No 🗖 Unknown
WELL OWNER'S NAME/COMP/	ANY NAME				
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Well owner's mailing address if diffe	erent than property	owner's address in	dicated at	9400	Screen fromtott. Open Hole fromtott.
	_				OBSTRUCTIONS
	San	11			🗋 Rods/Drop Pipe 📄 Check Valve(s) 🔲 Debris 📑 Fill 🔽 No Obstruction
	00,77	~			Tuno of Observations (Decodes)
i			-		Type of Obsideadins (Describe)
GEOLOGICAL MATERIAL	COLÓR	HARDNESS OR	FROM	то	Obstructions removed? 🖸 Yes 🔲 No Describe
GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	то	Obstructions removed? Ves No Describe
GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	то	Obstructions removed? ☐ Yes ☐ No Describe PUMP Type
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GEOLOGICAL MATERIAL If not known, indicate estimated Clay S# 6	COLOR d formation log fro Br	HARDNESS OR FORMATION IM nearby well on M	FROM	то 5 60	Obstructions removed? Yes No Describe
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GEOLOGICAL MATERIAL If not known, indicate estimated Clay S\$6	COLOR 1 formation log fro B r' L	HARDNESS OR FORMATION IM nearby well or M	FROM r boring. D	то 5 60	Obstructions removed? Yes No Describe
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GEOLOGICAL MATERIAL If not known, indicate estimated Clay S\$6	COLOR 1 formation log fro B r ²	HARDNESS OR FORMATION IM nearby well or M	FROM r boring. D S	то 5 60	Obstructions removed? Yes No Describe
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GEOLOGICAL MATERIAL If not known, indicate estimated Clay S# 6	COLOR 1 formation log fro Br J DIFFICULTIES	HARDNESS OR FORMATION IM Insarby well on M L L N SEALING	FROM r boring. 0 5	то 5 60	Obstructions removed? Yes No Describe PUMP NO A Type Image: Construct of the construction o
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GEOLOGICAL MATERIAL If not known, indicate estimated CLAY S# 6	COLOR 1 formation log fro B r L , DIFFICULTIES	HARDNESS OR FORMATION IM INSERTING	FROM r boring. D S	то 5 60	Obstructions removed? Yes No Describe PUMP NO A Type Other METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE: No Annular Space Grouted with Tremie Pipe Casing Perforation/Removel In. from to ft. Perforated Removed In. from to ft. Perforated Removed Other
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GEOLOGICAL MATERIAL If not known, indicate estimated CLAY S# 6 REMARKS, SOURCE OF DATA	COLOR 1 formation log fro B r L	HARDNESS OR FORMATION IM INSERVICE IM IM IM IM IM IM IM IM IM IM IM IM IM		то 5 60	Obstructions removed? Yes No Describe PUMP Image: Structure of the s
GEOLOGICAL MATERIAL If not known, indicate estimated CLAY S# 6	COLOR 1 formation log fro B r L	HARDNESS OR FORMATION IM INSERVICE IN SEALING		то 5 60	Obstructions removed? Yes No Describe PUMP NA Type NA Removed Not Present Other METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE: Casing Perioration/Removal In. from to ft. Perforated Removed Other
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GEOLOGICAL MATERIAL If not known, indicate estimated CLAY S# 6 REMARKS, SOURCE OF DATA	COLOR 1 formation log fro B r L DIFFICULTIES	HARDNESS OR FORMATION IT nearby well or M L L N SEALING		то 5 60	Obstructions removed? Yes No Describe PUMP NA
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WELL OR BORING LOCA County Name Shev but hu		WELL	NNES AND Mini	OTA D BOR nesota	EPARTMENT OF HEALTH ING SEALING RECORD Statutes, Chapter 1031 Minnesota Unique Well No. Or W-series No. Unique Well No.
Township Name Township	No. Range No.	Section No. Fr	action (s	m.→lg. ¢SE4	Date Sealed Date Well or Boring Constructed
GPS Latitude_ LOCATION: Longitude_ Numerical Street Address or Fire 139999 In	degrees degrees Number and City	minutes minutes y at Well or Baring	see see Locatio	conds conds	Depth Before Sealing 17 ft. Original Depth 17 ft. AQUIFER(S) STATIC WATER LEVEL STATIC WATER LEVEL Measured Estimated Date Measure 3/33/20
Show exact location of well or b In section grid with "X." N	ioring	Sketch map location, sho lines, roads,	of well o wing pro and buil	r boring perly dings.	Env. Bore Hole Other
W	N intes, roads, and buildings.				Steel Defastic Tile Other
PROPERTY OWNER'S NAME/C DUY/////	OMPANY NAME States different than well to	Porcer ind	lcated ab	ove	CASING(S) Diameter Depth Set in oversize hole? Annular space initially grouted?
414	Nicoll	et Ma	11		II. IIOIII IO II. IIOIII INO Ves NO Unknown
WELL OWNER'S NAME/COMPA	NYNAME	\ /V(/)	556	101	in. from to ft.
Well owner's mailing address if differ	Score for than property of	wner's address ind	icated ab	ove	Screen from tott. Open Hole from tott.
	San	re			OBSTRUCTIONS Rods/Drop Pipe Check Valve(s) Debris Fill Type of Obstructions (Describe)
GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	то	Obstructions removed? Ves No Describe
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52'6	+	k	5	7	METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE: No Annular Space Exists Annular Space Grouted with Tremie Pipe Casing Perforation/Removal in. from to ft. Perforated Removed in. from to ft. Perforated Removed
					Type of Perforator
					Grouting Material Bun Emite_ from_6 to 17 ft, yards 61 bags
					from to tt yards bags
					OTHER WELLS AND BORINGS
REMARKS, SOURCE OF DATA,	DIFFICULTIES	IN SEALING			Other unsealed and unused well or boring on property? Yes Value No How many? LICENSED OR REGISTERED CONTRACTOR CERTIFICATION This well or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The information contained in this report is true to the best of my knowledge.
					License or Registration No.
MINN. DEPT OF HEALTH (COPY				Tammy Rey Name of Person Sealing Well of Boring

Uncluid Description Building View
Construction Marrian Construction Marrian Construction Marrian Construction Transmitting Rates Transmitting Rates Transmitting Rates Transmitting Rates Marrian Rat
Description Description <thdescription< th=""> <thdescription< th=""></thdescription<></thdescription<>
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Northurn Strates for andres indicated above Depth owner's making address indicated above Depth owner's making address indicated above Set in oversize hole? Annular space initially grouted? Well A Nicollet Mail Mimmeapolis MN 55401 In. from to trees No Ves No Ves No Ves No Unknown Well owner's making address indicated above In. from to trees No Ves No Ves No Ves No Unknown Well owner's making address indicated above Scheen Yopen Hole Scheen Yopen Hole Scheen Yopen Hole No Unknown Scheen Yopen Hole No Obstruction Type of Obstructions Topen Yopen Yop
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414 Nicollet Mall Minneapolis MN 55401
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Minneapolis MN 55401
MELL OWNER'S NAME/COMPANY NAME,
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Well owner's mailing address if different than property owner's address indicated above Screen from
Sector OBSTRUCTIONS GEOLOGICAL MATERIAL COLOR MARDNESS OR POID If not known, indicate estimated formation log from nearby well or boring. Type of Obstructions (Describe) Cobblus/Sand Byr M S ± 6 V V Bernoved Not Present In not known, indicate estimated formation log from nearby well or boring. Type Yape NA S ± 6 V V No Annular Space Exists Annular Space Grouted with Tremie Pipe Casing Portoration/Removel In n. from In In
Same Index/Drop Pipe Check Valve(s) Debris FRI No Obstruction GEOLOGICAL MATERIAL COLOR MARDNESS OR POMMATION FROM TO Obstructions removed? Yes No Describe
GEOLOGICAL MATERIAL COLOR MARDNESS OR PORMATION FROM TO Obstructions removed? Yes No Describe If not known, indicate estimated formation (bg from nearby well or boring. Type MAD Type MAD S & G Y Y Yes No Describe
Type of Obstructions (Describe)
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If not known, indicate estimated formation log from nearby well or boring. PUMP Cubblus Sand Sr M U 8 S & 6 V V 8 V Nethod used to search well or back well o
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CODBUS/Sand By M O B Removed Not Present Other
5 ± 6 + + 8 62 METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE: No Annular Space Exists Annular Space Grouted with Tremie Pipe Casing Perforation/Removal In. from to tt Perforated Removed In. from to Other Intervel Intervel Intervel Intervel GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.) Intervel
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rromtottyardsbags
OTHER WELLS AND BORINGS
EMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING Other unsealed and unused well or boring on property? I Yes I No How many?
LICENSED OR REGISTERED CONTRACTOR CERTIFICATION
is true to the best of my knowledge.
License or Registration No.
Denil and
Certilied Representative Signature Certified Rep. No. Date
Certified Representative Signature Certified Rep. No. Date
MINN. DEPT OF HEALTH COPY Tammy Rey

WELL OR BORING LOCA	ATION L	WELL	MINNE: AND Mir	SOTA D BOF Inesota	ING SEALING RECORD Statutes, Chapter 1031 Minnesota Unique Well No. Or W-series No. Minnesota Unique Well No. Or W-series No.
Township Name Townshi	p No. Range N	o. Section No. F	raction (sm. → lg) Date Sealed Date Well or Boring Constructed
Becker 3.	3 20	1 1 1	UNYSI	258	3/30/20 2/4/20
GPS Latitude LOCATION: Longitude	degrees	minutes	\$6 \$6	conds	Depth Before Sealingft. Original Depth1 %tt.
Numerical Street Address or Fir	e Number and C	ity of Well or Borin	ig Locatio	n	Adulfer(S) STATIC WATER LEVEL
13999 IN	ndustr	ial Bluo	1 Be	chu	WELL/BORING
Show exact location of well or in section grid with "X."	boring	Sketch map location, sh	o of well owing pr	or boring operty	Env. Bore Hole Other R Below above land surface
N I I I I I I I I I I I I I I I I I I I	- ⁻	lines, roads	, and bu	ldings.	CASING TYPE(S)
			-	2	
	- ()	WELLHEAD COMPLETION
W	ET \	Q		1	Outside: 🖸 Well House 🗖 At Grade Inside: 🗂 Basement Offset
	% Mile				Pittees Adapter/Unit Buried Well Plt
		1			
S1 Mile		L		_	Dother 6" protop Other
PROPERTY OWNER'S NAME/	OMPANY NAME	1			
Norther	n States	forer	/		Diameter Depth Set in oversize hole? Annular space initially crowned?
Property owner's mailing address if	different than well	location address in	dicated ab	ove	_2_ in. from _ 12 to _ 13_ it. Yes D No _ Yes D No D Unknown
414	Nicoll	et Ma	11		
Minn	eanoli	s mn	50	101	
WELL OWNER'S NAME/COMPA	ANY MALE		1 22		in. from toft. 🖸 Yes 🖸 No 🔲 Yes 🗂 No 🛄 Unknown
WELE OWNER S NAME/COMPA	Scul	ne.			SCREENVOPEN HOLE
Wall owner's mailing address if diffe	rent than property	owner's address inc	ficated ab	ove	Screen fromtott. Open Hole fromtott.
	5				OBSTRUCTIONS
	san	re			Type of Obstructions (Describe)
GEOLOGICAL MATERIAL	COLOR	HARDNESS OR	FROM	то	Obstructions removed? Ses INo Describe
If not known, indicate estimated	formation log fro	om nearby well or	boring.		PUMP
Lopples/Sand	Br	m	12	8	Туре/О/-/
5316	1		0	is	Chemoved Not Present Othor
	Q=	4	0	10	METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:
					in from to ft Perforated Berroyard
					fi. Perforated
					Type of Perforator
					□ Other
				-	GROUTING MATERIAL(S) (One bag of cament = 94 lbs, one bag of bentonite = 50 lbs.)
					Render Hand Ban Lasik A 14 14
					Grouung Wateria vards bags
					from to ft yards bags
					from to ft varies been
					DTHER WELLS AND BORINGS
REMARKS, SOURCE OF DATA,	DIFFICULTIES	IN SEALING	-		Dither unsealed and unused well or boring on property?
				Ţ	ICENSED OR REGISTERED CONTRACTOR CERTIFICATION
				1	rms were or boring was sealed in accordance with Minnesota Rules, Chapter 4725. The Information contained in this report s true to the best of my knowledge.
					a
					Licantina Rusinaes Nama
					License or Registration No.
					I benil Mut
				1	Cartillied Representative Signature Cartillied Rep. No. Date
					Tampau Ray
MINN, DEPT OF HEALTH C	OPY				Name of Person Sealing Well of Boring