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

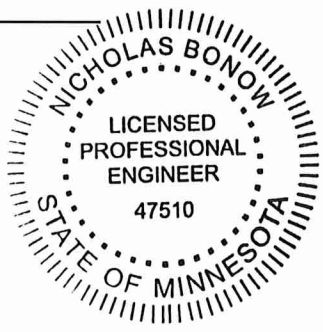
I hereby certify that this plan, specification, or report was prepared by or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

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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APPENDICES

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:

1) 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, glacially-derived 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

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.

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 yellowish-born. 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:

$$v = Kh \times i / n_e$$

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 down-gradient 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

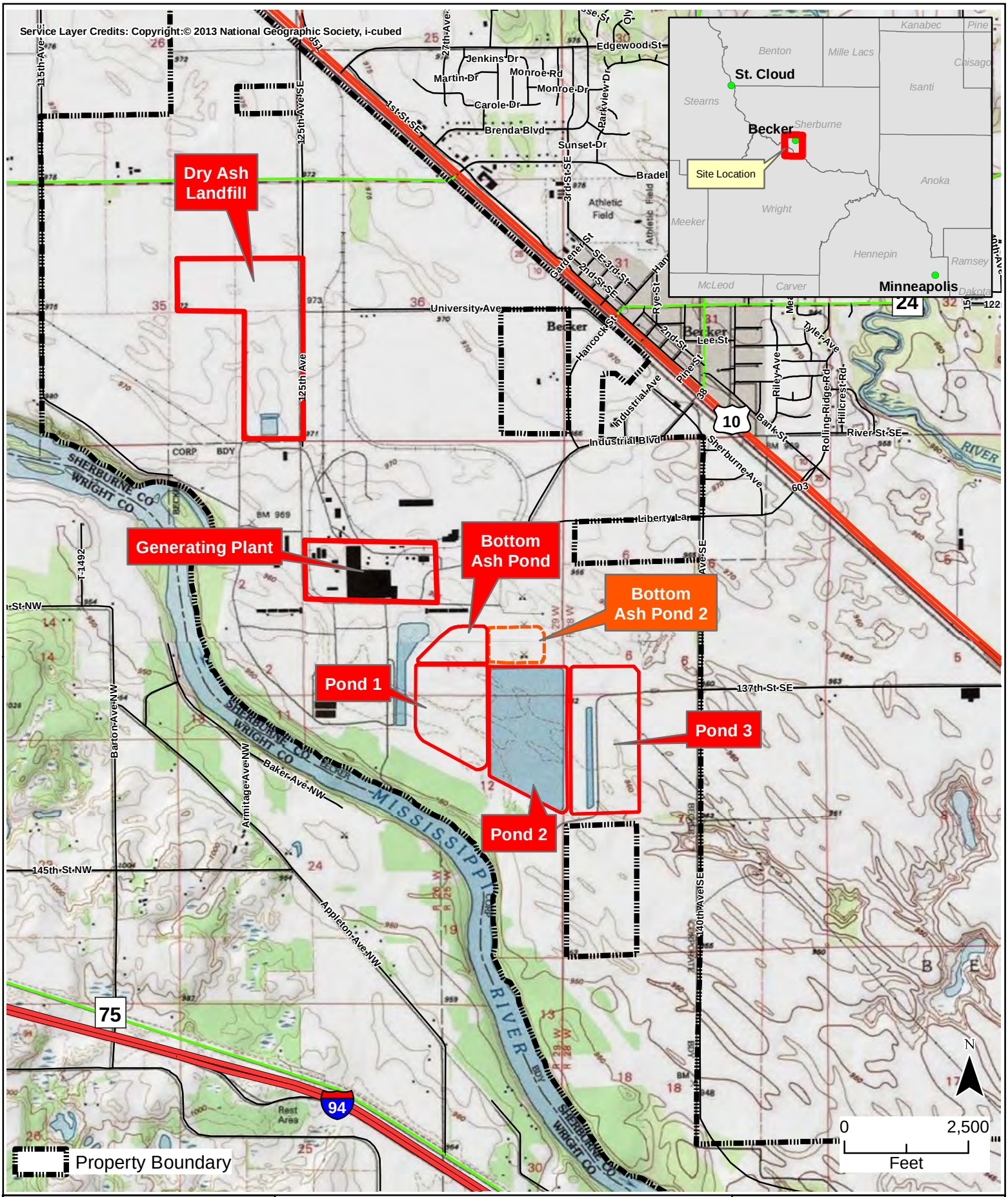
TABLE 1
CCR GROUNDWATER MONITORING SYSTEM
Bottom Ash Pond 2

Well ID	Minnesota Unique Well ID	Date Installed	Location Site Coordinates (ft)		Elevation Top of Riser Pipe	Screen Length (ft)	Elevation Top of Screen	Elevation Bottom of Screen	Monitoring Status	Hydrologic Location
			Easting	Northing						
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



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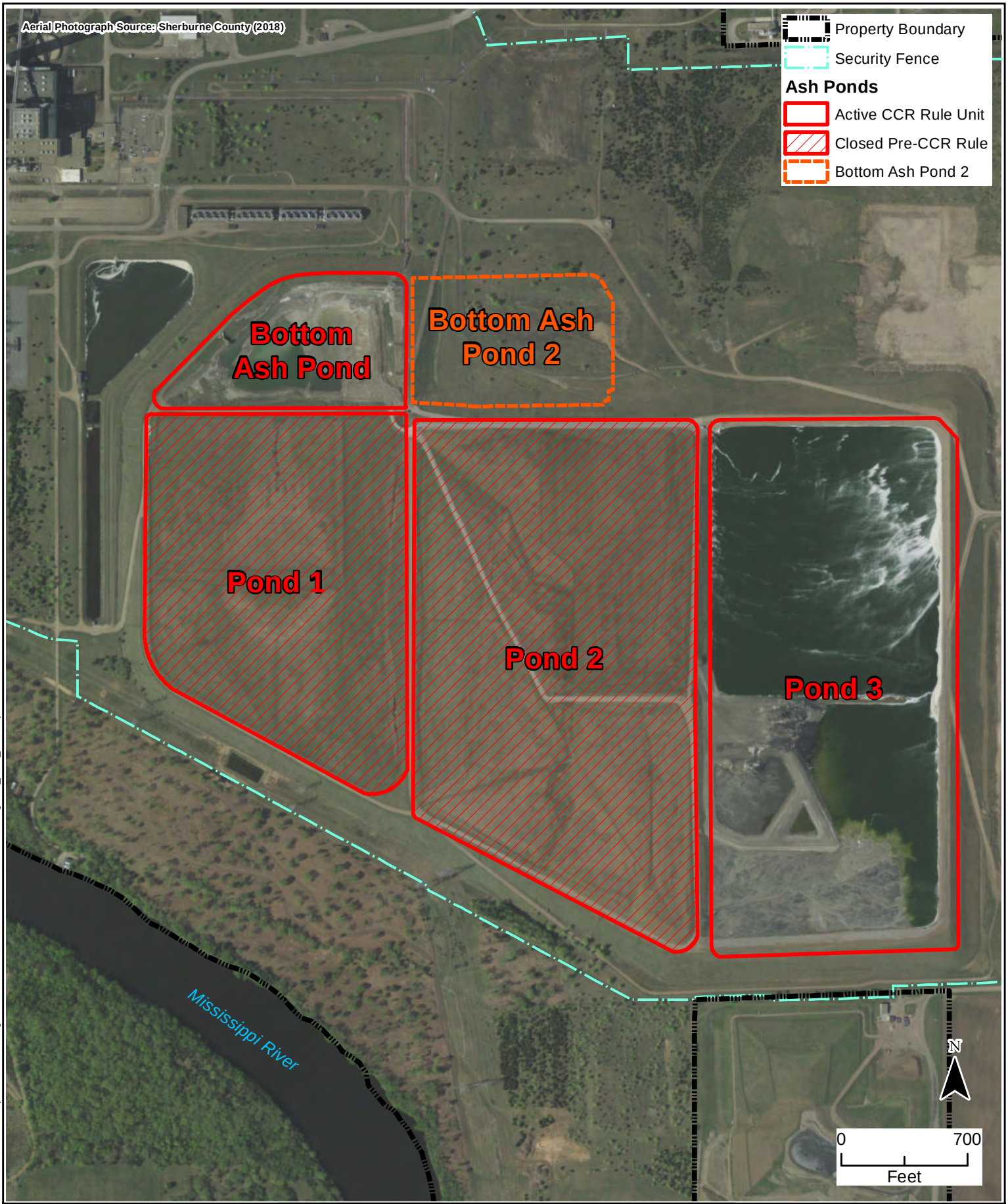
Bottom Ash Pond 2

Sherburne County Generating Plant
Becker, Minnesota

FIGURE 1

SITE LOCATION MAP



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Bottom Ash Pond 2
Sherburne County Generating Plant
Becker, Minnesota

FIGURE 2
SITE LAYOUT

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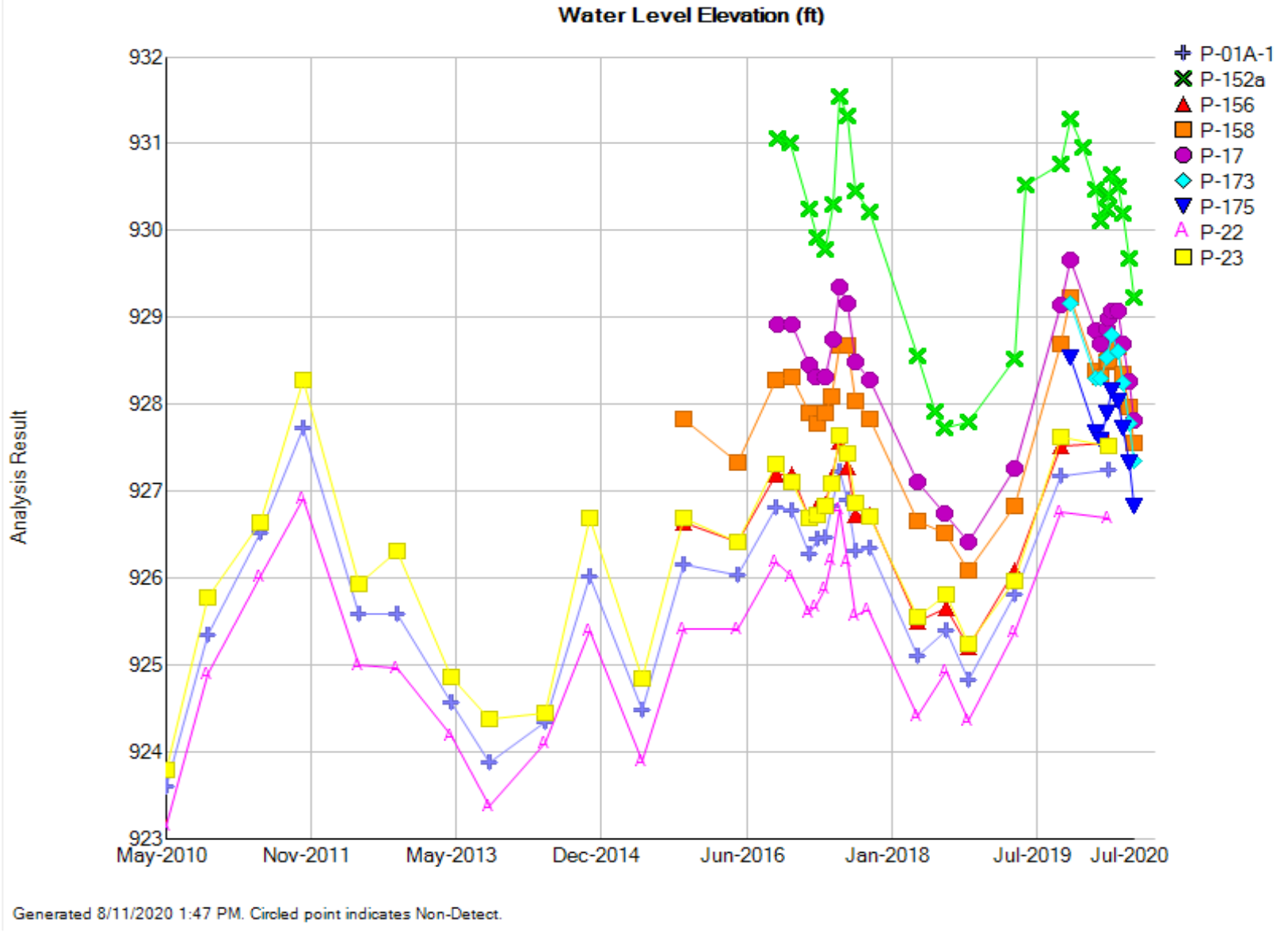

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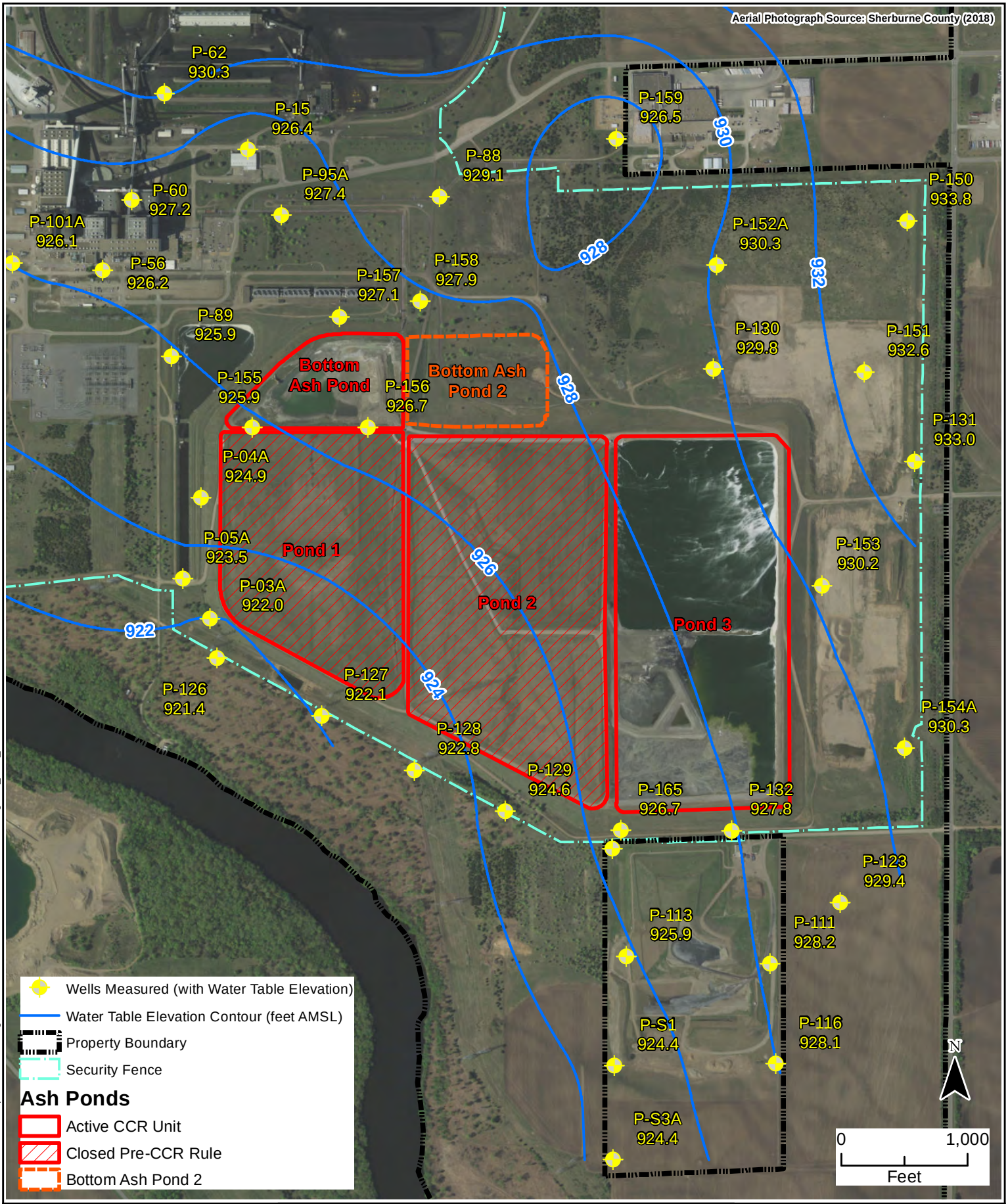
Bottom Ash Pond 2
Sherburne County Generating Plant
Becker, Minnesota

FIGURE 3
HYDROGRAPH (2010 to Present)



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Bottom Ash Pond 2
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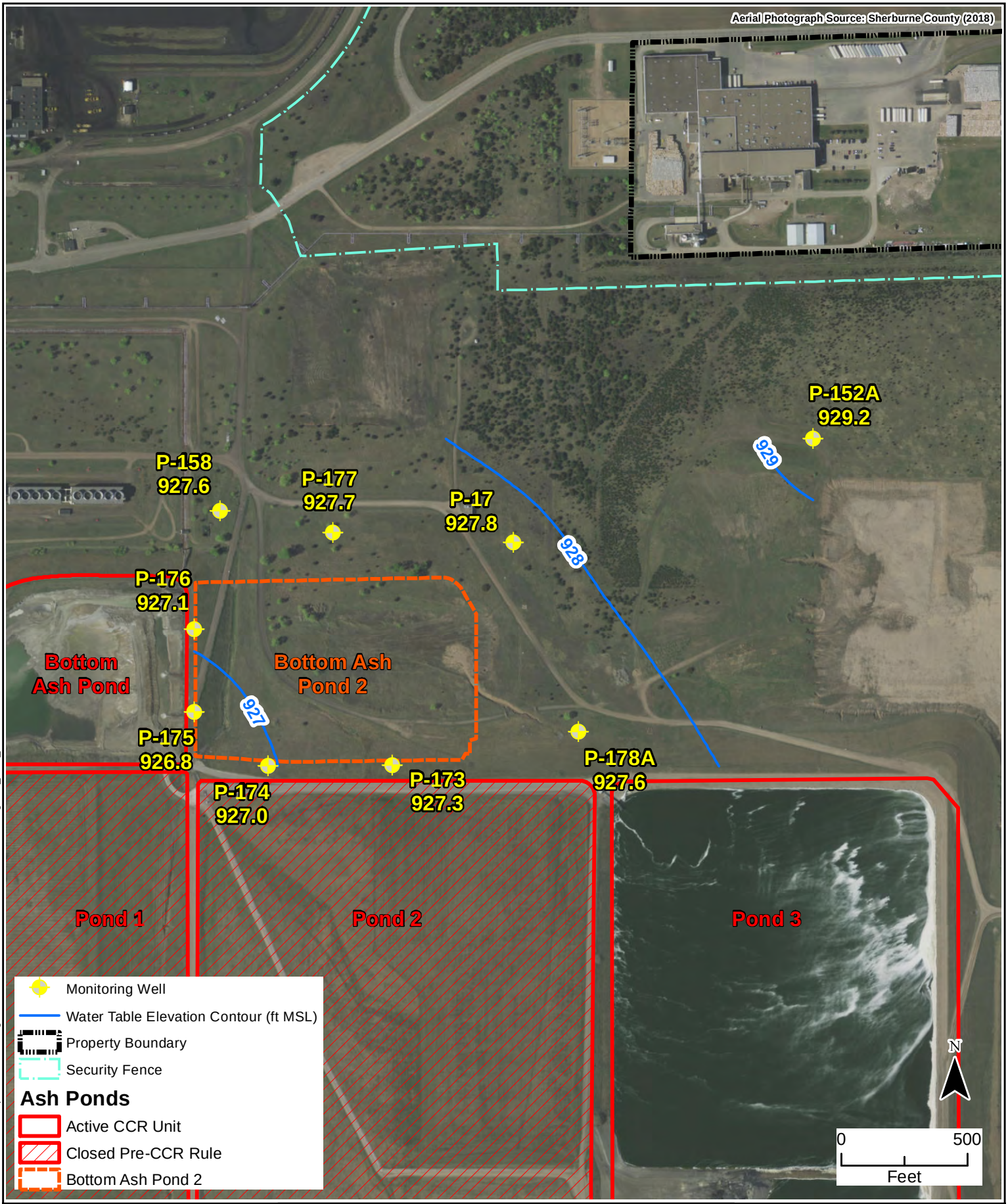
FIGURE 4
WATER TABLE ELEVATION CONTOUR MAP (2/20-23/2017)



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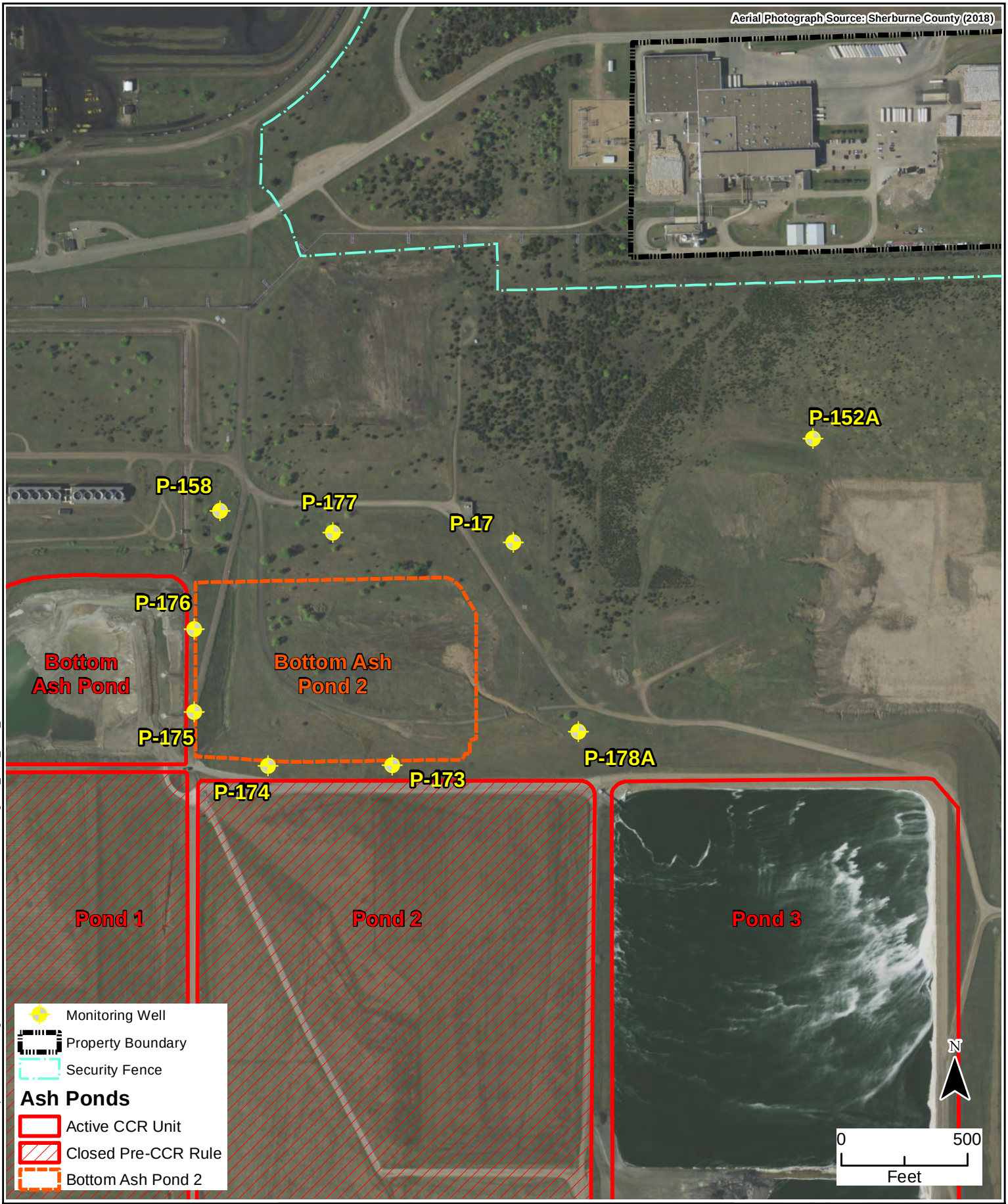
CCR GROUNDWATER MONITORING SYSTEM CERTIFICATION
Bottom Ash Pond 2
Sherburne County Generating Plant
Becker, Minnesota

FIGURE 5
WATER TABLE ELEVATION CONTOUR MAP (7/29-30/2020)



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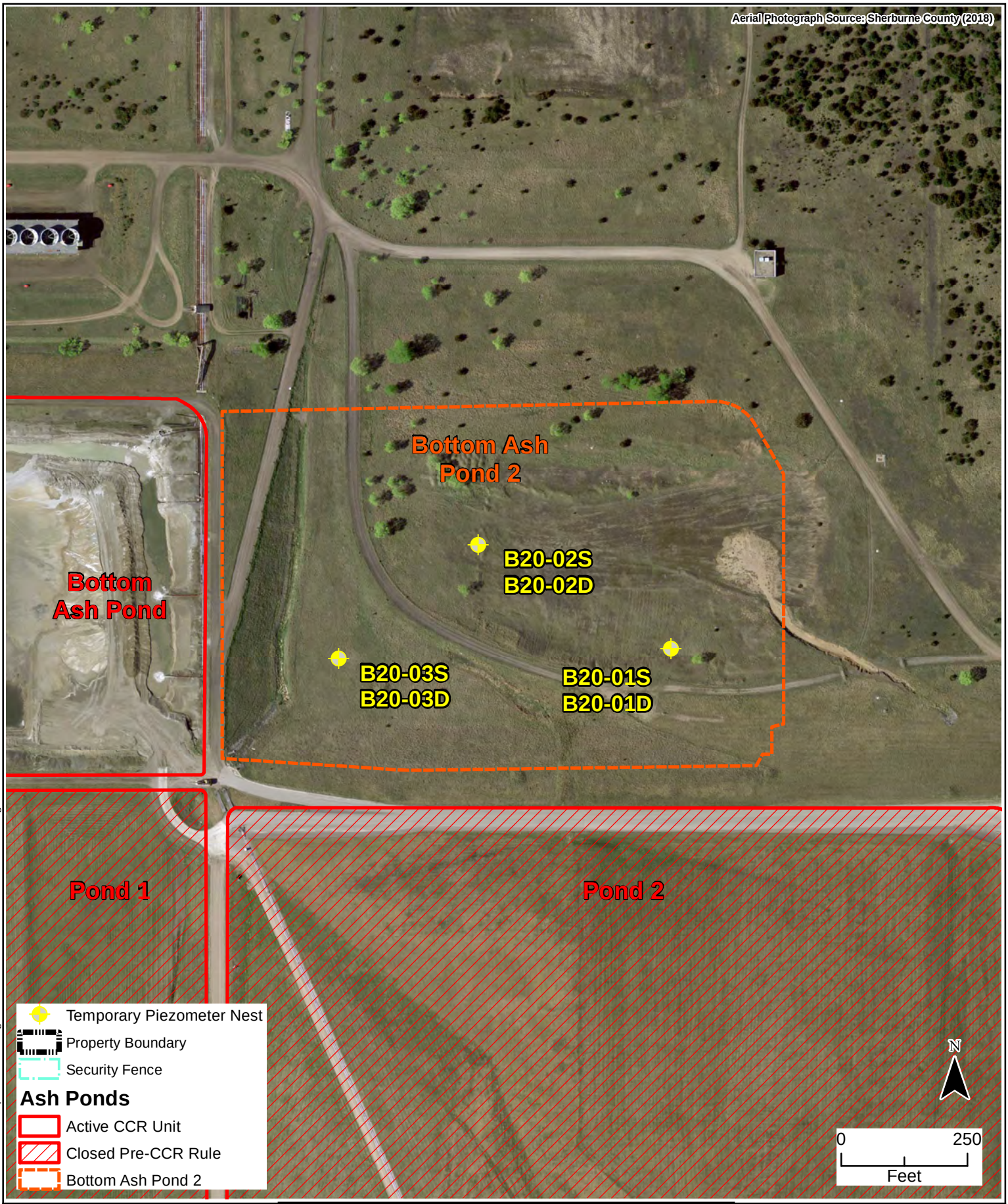
CARLSON McCAIN

CCR GROUNDWATER MONITORING SYSTEM CERTIFICATION
Bottom Ash Pond 2
Sherburne County Generating Plant
Becker, Minnesota

FIGURE 6
CCR GROUNDWATER MONITORING SYSTEM

Appendix A

Nested Piezometer Data



Document Path: P:\Projects\XCEL\6559 Ash Operations and Mgmt\Sherco\2020 BAP2 CCR EMS Cert\GIS\Figure A-1 - Piezometers.mxd

CARLSON McCAIN

CCR GROUNDWATER MONITORING SYSTEM CERTIFICATION
Bottom Ash Pond 2
Sherburne County Generating Plant
Becker, Minnesota

FIGURE A-1
BOTTOM ASH POND 2 PIEZOMETERS

Table A-1

SOIL BORING AND PIEZOMETER CONSTRUCTION INFORMATION

Sherco Bottom Ash Pond 2 Supplemental Investigation

Boring No.	Piezometer Number	MDH Unique Well Number	Location - Site Coordinates (ft)		Ground Elevation (Ft above NAVD88)	TOR Elevation (Ft above NAVD88)	Well Diameter (inches)	Screen Length (ft)	Screen Type	Well Depth (feet bTOR)	Screen Elevation (ft above NAVD88)
			Northing	Easting							
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					
	Static Water Elevations		Mid Point B20-1S Screen	Mid Point 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					
	Static Water Elevations		Mid Point B20-2S Screen	Mid Point 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					
	Static Water Elevations		Mid Point B20-3S Screen	Mid Point 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

BORING NUMBER B20-1D

CARLSON McCAIN

CLIENT Xcel Energy
PROJECT NAME Sherco BAP2 Supplmental Investigation
PROJECT NUMBER 3404-19
PROJECT LOCATION Becker, Minnesota
DATE STARTED 2/4/20 **COMPLETED** 2/4/20
GROUND ELEVATION 942.5 ft 940 **HOLE SIZE** 6"
DRILLING CONTRACTOR Cascade Drilling
GROUND WATER LEVELS:
DRILLING METHOD Rotasonic
AT TIME OF DRILLING ---
LOGGED BY M. Lindstrom **CHECKED BY** M. Lindstrom
AT END OF DRILLING 13.5 ft / Elev 929.0 ft
NOTES
AFTER DRILLING ---

FORMATION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG	MATERIAL DESCRIPTION
	0				Blind drill to 62' bgs. Soils were generally classified as brown sand and gravel with cobbles. Driller reported hard drilling conditions at 62' bgs. Installed B20-1 Deep in borehole.
	5				
	10				
	15				
	20				
	25				
	30				

(Continued Next Page)

BORING NUMBER B20-1D

CLIENT Xcel Energy **PROJECT NAME** Sherco BAP2 Supplmental Investigation

PROJECT NUMBER 3404-19 **PROJECT LOCATION** Becker, Minnesota

FORMATION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG	MATERIAL DESCRIPTION
	30	RS 1	100		Blind drill to 62' bgs. Soils were generally classified as brown sand and gravel with cobbles. Driller reported hard drilling conditions at 62' bgs. Installed B20-1 Deep in borehole. *(continued)*
	35				
	40				
	45				
	50				
	55				
	60				
					62.0 End of boring at 62.0 feet.

BORING NUMBER B20-1S

CLIENT Xcel Energy
PROJECT NAME Sherco BAP2 Supplmental Investigation
PROJECT NUMBER 3404-19
PROJECT LOCATION Becker, Minnesota
DATE STARTED 2/4/20 **COMPLETED** 2/4/20
GROUND ELEVATION 942.65 ft 940 **HOLE SIZE** 6"
DRILLING CONTRACTOR Cascade Drilling
GROUND WATER LEVELS:
DRILLING METHOD Rotasonic
AT TIME OF DRILLING 14.0 ft / Elev 928.7 ft
LOGGED BY M. Lindstrom **CHECKED BY** M. Lindstrom
AT END OF DRILLING 13.9 ft / Elev 928.8 ft
NOTES
AFTER DRILLING ---

FORMATION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG	MATERIAL DESCRIPTION
	0	RS 1	100		Blind drill to 18' bgs. Soils were generally classified as brown sand and gravel with cobbles. Installed B20-1 Shallow in borehole.
	5				
	10				
	15				
	18.0				End of boring at 18.0 feet.

BORING NUMBER B20-2D

CARLSON McCAIN

CLIENT Xcel Energy
PROJECT NAME Sherco BAP2 Supplmental Investigation
PROJECT NUMBER 3404-19
PROJECT LOCATION Becker, Minnesota
DATE STARTED 2/5/20 **COMPLETED** 2/5/20
GROUND ELEVATION 936.7 ft 940 **HOLE SIZE** 6"
DRILLING CONTRACTOR Cascade Drilling
GROUND WATER LEVELS:
DRILLING METHOD Rotasonic
AT TIME OF DRILLING ---
LOGGED BY M. Lindstrom **CHECKED BY** M. Lindstrom
AT END OF DRILLING 10.3 ft / Elev 926.4 ft
NOTES
AFTER DRILLING ---

FORMATION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG	MATERIAL DESCRIPTION
	0				Blind drill to 50.5' bgs. Soils were generally classified as brown sand. Driller reported hard drilling at 50' bgs. Installed B20-2 Deep in borehole.
	5				
	10				
	15				
	20				
	25	RS 1	100		
	30				

(Continued Next Page)

CARLSON McCAIN

BORING NUMBER B20-2D

CLIENT Xcel Energy **PROJECT NAME** Sherco BAP2 Supplmental Investigation

PROJECT NUMBER 3404-19 **PROJECT LOCATION** Becker, Minnesota

FORMATION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG	MATERIAL DESCRIPTION
	30				Blind drill to 50.5' bgs. Soils were generally classified as brown sand. Driller reported hard drilling at 50' bgs. Installed B20-2 Deep in borehole. *(continued)*
	35				
	40				
	45				
	50				
					50.5 End of boring at 50.5 feet.

BORING NUMBER B20-2S

CLIENT Xcel Energy
PROJECT NAME Sherco BAP2 Supplmental Investigation
PROJECT NUMBER 3404-19
PROJECT LOCATION Becker, Minnesota
DATE STARTED 2/5/20 **COMPLETED** 2/5/20
GROUND ELEVATION 936.5 ft 940 **HOLE SIZE** 6"
DRILLING CONTRACTOR Cascade Drilling
GROUND WATER LEVELS:
DRILLING METHOD Rotasonic
AT TIME OF DRILLING 8.0 ft / Elev 928.5 ft
LOGGED BY M. Lindstrom **CHECKED BY** M. Lindstrom
AT END OF DRILLING 10.0 ft / Elev 926.5 ft
NOTES
AFTER DRILLING ---

FORMATION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG	MATERIAL DESCRIPTION
	0				Blind drill to 12' bgs. Soils were generally classified as brown sand. Installed B20-2 Shallow in borehole.
	5	RS 1	100		
	10				
					12.0
					End of boring at 12.0 feet.

BORING NUMBER B20-3D

CARLSON McCAIN

CLIENT Xcel Energy
PROJECT NAME Sherco BAP2 Supplmental Investigation
PROJECT NUMBER 3404-19
PROJECT LOCATION Becker, Minnesota
DATE STARTED 2/6/20 **COMPLETED** 2/6/20
GROUND ELEVATION 942.7 ft 940 **HOLE SIZE** 6"
DRILLING CONTRACTOR Cascade Drilling
GROUND WATER LEVELS:
DRILLING METHOD Rotasonic
AT TIME OF DRILLING ---
LOGGED BY M. Lindstrom **CHECKED BY** M. Lindstrom
AT END OF DRILLING 16.8 ft / Elev 925.9 ft
NOTES
AFTER DRILLING ---

FORMATION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG	MATERIAL DESCRIPTION
	0				Blind drill to 60' bgs. Soils were generally classified as brown sand and gravel. Driller reported hard drilling at 60' bgs. Installed B20-3 Deep in borehole.
	5				
	10				
	15				
	20				
	25				
	30	RS			

(Continued Next Page)

BORING NUMBER B20-3D

CLIENT Xcel Energy **PROJECT NAME** Sherco BAP2 Supplmental Investigation

PROJECT NUMBER 3404-19 **PROJECT LOCATION** Becker, Minnesota

FORMATION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG	MATERIAL DESCRIPTION
	30	1	100		Blind drill to 60' bgs. Soils were generally classified as brown sand and gravel. Driller reported hard drilling at 60' bgs. Installed B20-3 Deep in borehole. *(continued)*
	35				
	40				
	45				
	50				
	55				
	60				60.0
					End of boring at 60.0 feet.

BORING NUMBER B20-3S

CARLSON McCAIN

CLIENT Xcel Energy
PROJECT NAME Sherco BAP2 Supplmental Investigation
PROJECT NUMBER 3404-19
PROJECT LOCATION Becker, Minnesota
DATE STARTED 2/7/20 **COMPLETED** 2/7/20
GROUND ELEVATION 942.8 ft 940 **HOLE SIZE** 6"
DRILLING CONTRACTOR Cascade Drilling
GROUND WATER LEVELS:
DRILLING METHOD Rotasonic
AT TIME OF DRILLING ---
LOGGED BY M. Lindstrom **CHECKED BY** M. Lindstrom
AT END OF DRILLING 16.3 ft / Elev 926.5 ft
NOTES
AFTER DRILLING ---

FORMATION	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY %	GRAPHIC LOG	MATERIAL DESCRIPTION
	0	RS 1	100		Blind drill to 17' bgs. Installed B20-3 Shallow in borehole. Soils generally classified as brown sand and gravel.
	5				
	10				
	15				
					17.0
					End of boring at 17.0 feet.

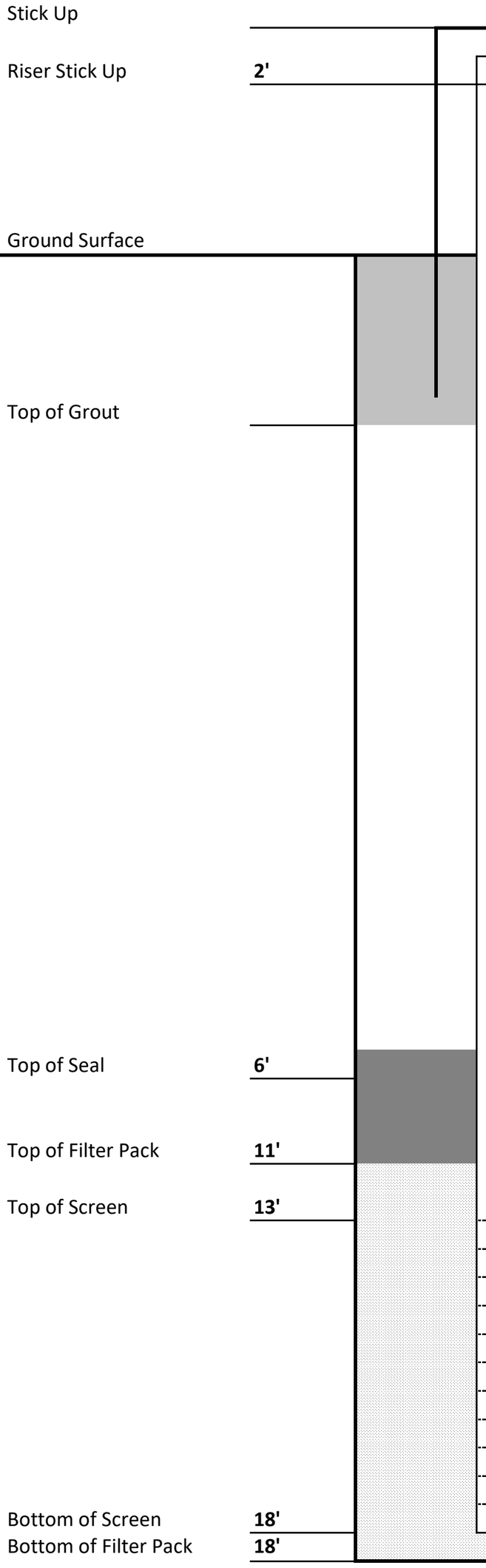
Monitoring Well Diagram
Above Grade Completion

B20-1 Shallow

PROJECT NAME: Xcel Sherco CCR Wells Supplmental Investigation

LOCATION: Becker, Minnesota

Drilling Method: 6" Rota-Sonic	**Ground Surface Elevation: 942.65'**
Company: Cascade	**MDH Unique Well No.: 847666**
Foreman: Lenny Rodgers	**Date/Time Started: 2/4/2020 / 1615**
Rig Model: Mini-Sonic	**Date/Time Completed: 2/6/2020 / 1800**
Geol/Engr: M. Lindstrom	**Coordinates: 865657.3 ft N, 2029911.9 ft E**



Borehole Diameter: **6"**

Total Depth of Boring **18'**

Total Length of Well **20'**

PROTECTIVE CASING
Type: **Pro-top** Bumper Posts: **No**
Diameter: **6"** Casing Elevation: **944.70'**
Length: **7'**
Locked: **Yes** Key Number: **1212**

CAP OR PLUG
Type: **Expansion Plug** Vented: **No**

SURFACE BACKFILL MATERIAL
Type: **Concrete**
Total Volume: **4.5 -80 lb. bags**
Manufacturer: **Quikrete**

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:

SEAL
Type/Size: **3/8" Bentonite Chips**
Total Volume: **2 -50 lb bag bentonite**
Manufacturer: **Baroid Hole Plug**

FILTER PACK
Type/Size: **#40 Red Flint Sand**
Total Volume: **1- 50 lb. Bag**
Manufacturer: **Red Flint Sand and Gravel**

WELL SCREEN
Type: **PVC**
Inner Diameter: **2"**
Length: **5'** Effective Length: **7'**
Slot Size: **No. 10**
Manufacturer: **Johnson**

WATER SOURCE: **Landfill garage**

NOTES: **4" cap installed on end of well screen.**

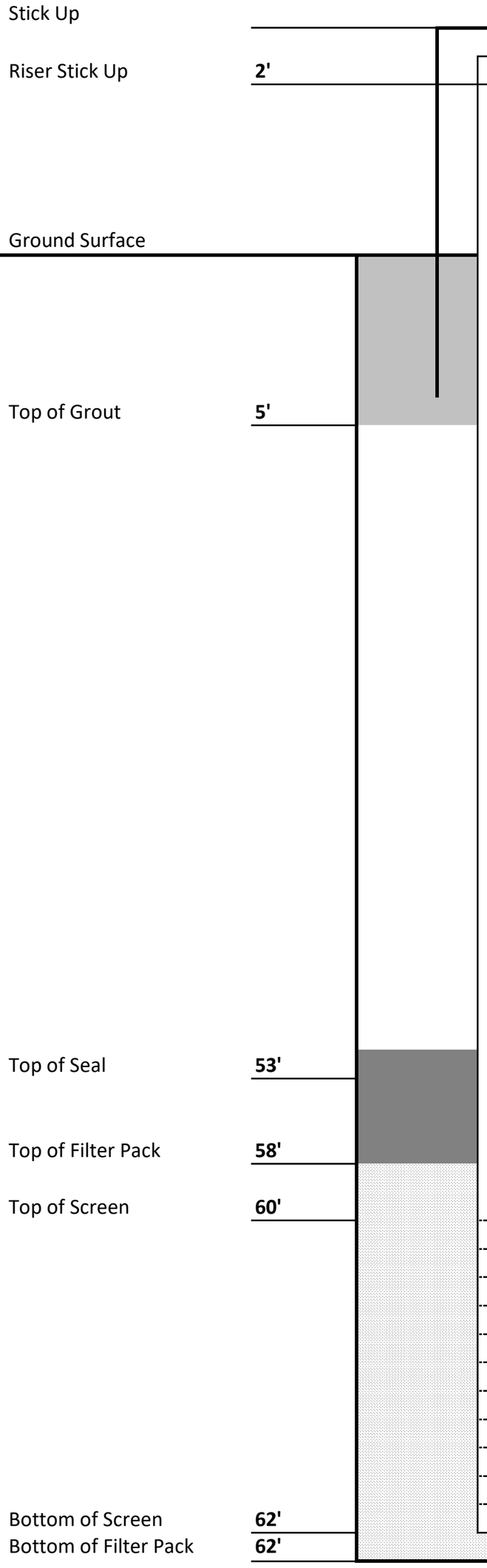
Monitoring Well Diagram
Above Grade Completion

B20-1 Deep

PROJECT NAME: Xcel Sherco CCR Wells Supplmental Investigation

LOCATION: Becker, Minnesota

Drilling Method: 6" Rota-Sonic	**Ground Surface Elevation: 942.5**
Company: Cascade	**MDH Unique Well No.: 847665**
Foreman: Lenny Rodgers	**Date/Time Started: 2/7/2020 / 932**
Rig Model: Mini-Sonic	**Date/Time Completed: 2/7/2020 / 1241**
Geol/Engr: M. Lindstrom	**Coordinates: 865654.5 ft N, 2029905.3 ft E**



Borehole Diameter: **6"**

Total Depth of Boring **62'**

Total Length of Well **64'**

PROTECTIVE CASING
Type: **Pro-top** Bumper Posts: **No**
Diameter: **6"** Casing Elevation: **944.07'**
Length: **7'**
Locked: **Yes** Key Number: **1212**

CAP OR PLUG
Type: **Expansion Plug** Vented: **No**

SURFACE BACKFILL MATERIAL
Type: **Concrete**
Total Volume: **6 -80 lb. bags**
Manufacturer: **Sakrete**

RISER PIPE
Type: **Schedule 40 PVC**
Inner Diameter: **2"**
Joint Type: **Spigot and Socket - Solvent Welded**
Total Length: **64'** No./Length of Sections: **3/20, 1/4**
Manufacturer: **Cresline**

GROUT
Type: **Bentonite**
Total Volume: **2 -50 lb bags** Mix Ratio: **24 gals/1 bag**
Manufacturer: **Quik-grout**

SEAL
Type/Size: **2' of #15 Fine Sand with 2' of 3/8" Bentonite Chips**
Total Volume: **1 -50 lb bag of sand and 1/2 -50 lb bag bentonite**
Manufacturer: **Red Flint Sand and Gravel and Baroid Hole Plug**

FILTER PACK
Type/Size: **#40 Red Flint Sand**
Total Volume: **1 - 50 lb. Bag**
Manufacturer: **Red Flint Sand and Gravel**

WELL SCREEN
Type: **PVC**
Inner Diameter: **2"**
Length: **2'** Effective Length: **4'**
Slot Size: **No. 10**
Manufacturer: **Johnson**

WATER SOURCE: **Landfill garage**

NOTES: **Well initally installed on 2/4/2020, however casing broke during pro-top installation. Well re-installed on 2/7/2020. 4" cap installed on end of well screen. Centralizer installed at bottom of well.**

CARLSON McCAIN

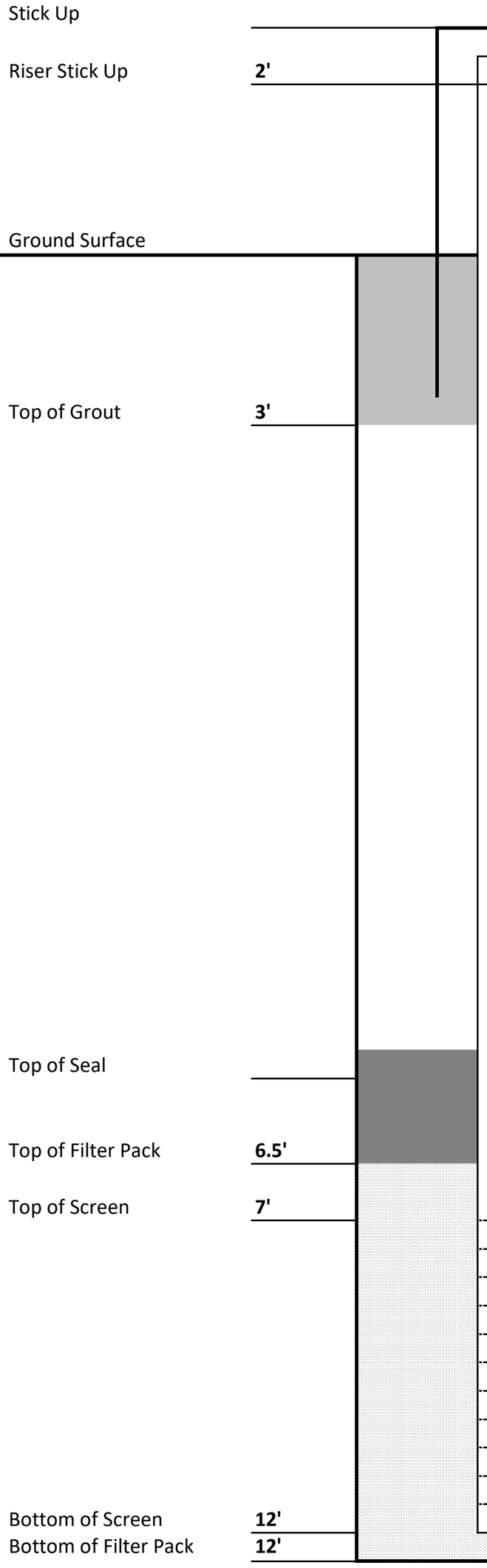
Monitoring Well Diagram
Above Grade Completion

B20-2 Shallow

PROJECT NAME: Xcel Sherco CCR Wells Supplmental Investigation

LOCATION: Becker, Minnesota

Drilling Method: 6" Rota-Sonic	**Ground Surface Elevation: 936.5'**
Company: Cascade	**MDH Unique Well No.: 847662**
Foreman: Lenny Rodgers	**Date/Time Started: 2/5/2020 / 1430**
Rig Model: Mini-Sonic	**Date/Time Completed: 2/5/2020 / 1815**
Geol/Engr: M. Lindstrom	**Coordinates: 865863.6 ft N, 2029530.3 ft E**



Borehole Diameter: **6"**

Total Depth of Boring **12'**

Total Length of Well **14'**

PROTECTIVE CASING
Type: **Pro-top** Bumper Posts: **No**
Diameter: **6"** Casing Elevation: **938.4'**
Length: **7'**
Locked: **Yes** Key Number: **1212**

CAP OR PLUG
Type: **Expansion Plug** Vented: **No**

SURFACE BACKFILL MATERIAL
Type: **Concrete**
Total Volume: **4 -80 lb. bags**
Manufacturer: **Quikrete**

RISER PIPE
Type: **Schedule 40 PVC**
Inner Diameter: **2"**
Joint Type: **Threaded**
Total Length: **9'** No./Length of Sections: **1/10**
Manufacturer: **Cresline**

GROUT
Type: **No grout used due to shallow nature of well**
Total Volume: Mix Ratio:
Manufacturer:

SEAL
Type/Size: **3/8" Bentonite Chips**
Total Volume: **1 -50 lb bag bentonite**
Manufacturer: **Baroid Hole Plug**

FILTER PACK
Type/Size: **#40 Red Flint Sand**
Total Volume: **1 - 50 lb. Bag**
Manufacturer: **Red Flint Sand and Gravel**

WELL SCREEN
Type: **PVC**
Inner Diameter: **2"**
Length: **5'** Effective Length: **5.5'**
Slot Size: **No. 10**
Manufacturer: **Johnson**

WATER SOURCE: **Landfill garage**

NOTES: **4" cap installed on end of well screen.**

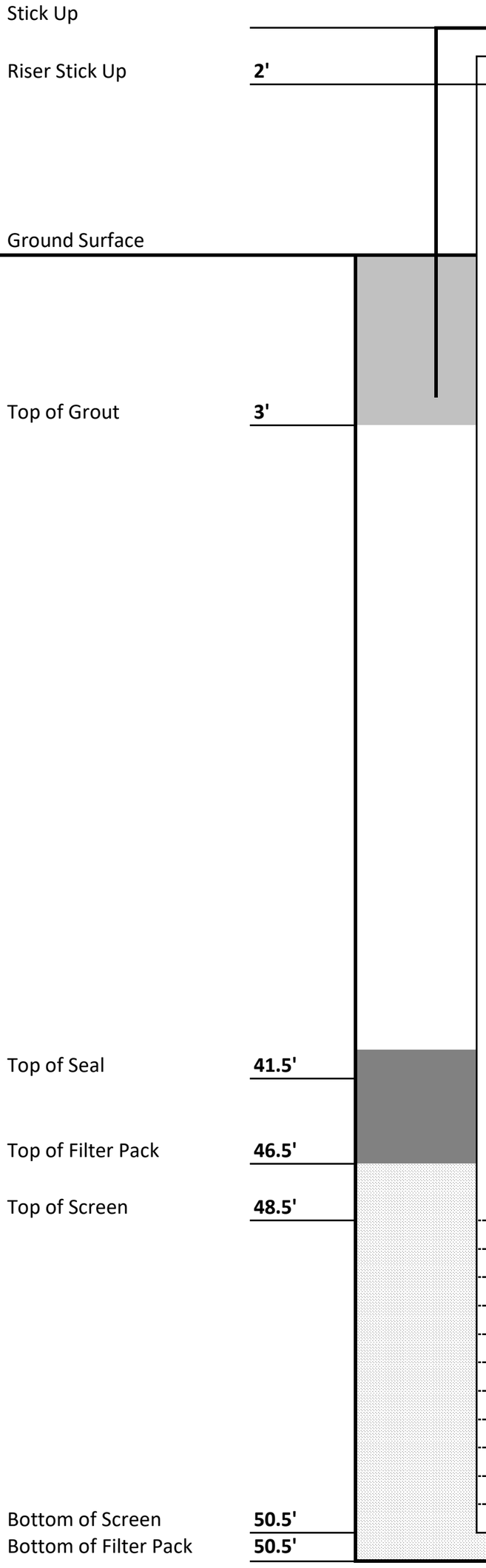
Monitoring Well Diagram
Above Grade Completion

B20-2 Deep

PROJECT NAME: Xcel Sherco CCR Wells Supplmental Investigation

LOCATION: Becker, Minnesota

Drilling Method: 6" Rota-Sonic	**Ground Surface Elevation: 936.7'**
Company: Cascade	**MDH Unique Well No.: 847661**
Foreman: Lenny Rodgers	**Date/Time Started: 2/6/2020 / 730**
Rig Model: Mini-Sonic	**Date/Time Completed: 2/6/2020 / 1000**
Geol/Engr: M. Lindstrom	**Coordinates: 865859.2 ft N, 2029522.6 ft E**



Borehole Diameter: **6"**

Total Depth of Boring **50.5'**

Total Length of Well **52.5'**

PROTECTIVE CASING
Type: **Pro-top** Bumper Posts: **No**
Diameter: **6"** Casing Elevation: **938.70'**
Length: **7'**
Locked: **Yes** Key Number: **1212**

CAP OR PLUG
Type: **Expansion Plug** Vented: **No**

SURFACE BACKFILL MATERIAL
Type: **Concrete**
Total Volume: **4 -80 lb. bags**
Manufacturer: **Quikrete**

RISER PIPE
Type: **Schedule 40 PVC**
Inner Diameter: **2"**
Joint Type: **Spigot and Socket - Solvent Welded**
Total Length: **51'** No./Length of Sections: **3/20**
Manufacturer: **Cresline**

GROUT
Type: **Bentonite**
Total Volume: **2 -50 lb bags** Mix Ratio: **24 gals/1 bag**
Manufacturer: **Quik-grout**

SEAL
Type/Size: **3/8" Bentonite Chips**
Total Volume: **1 -50 lb bag bentonite**
Manufacturer: **Baroid Hole Plug**

FILTER PACK
Type/Size: **#40 Red Flint Sand**
Total Volume: **1 .5 -50 lb. Bag**
Manufacturer: **Red Flint Sand and Gravel**

WELL SCREEN
Type: **PVC**
Inner Diameter: **2"**
Length: **2'** Effective Length: **4'**
Slot Size: **No. 10**
Manufacturer: **Johnson**

WATER SOURCE: **Landfill garage**

NOTES: **4" cap installed on end of well screen. Centralizer installed at bottom of well.**

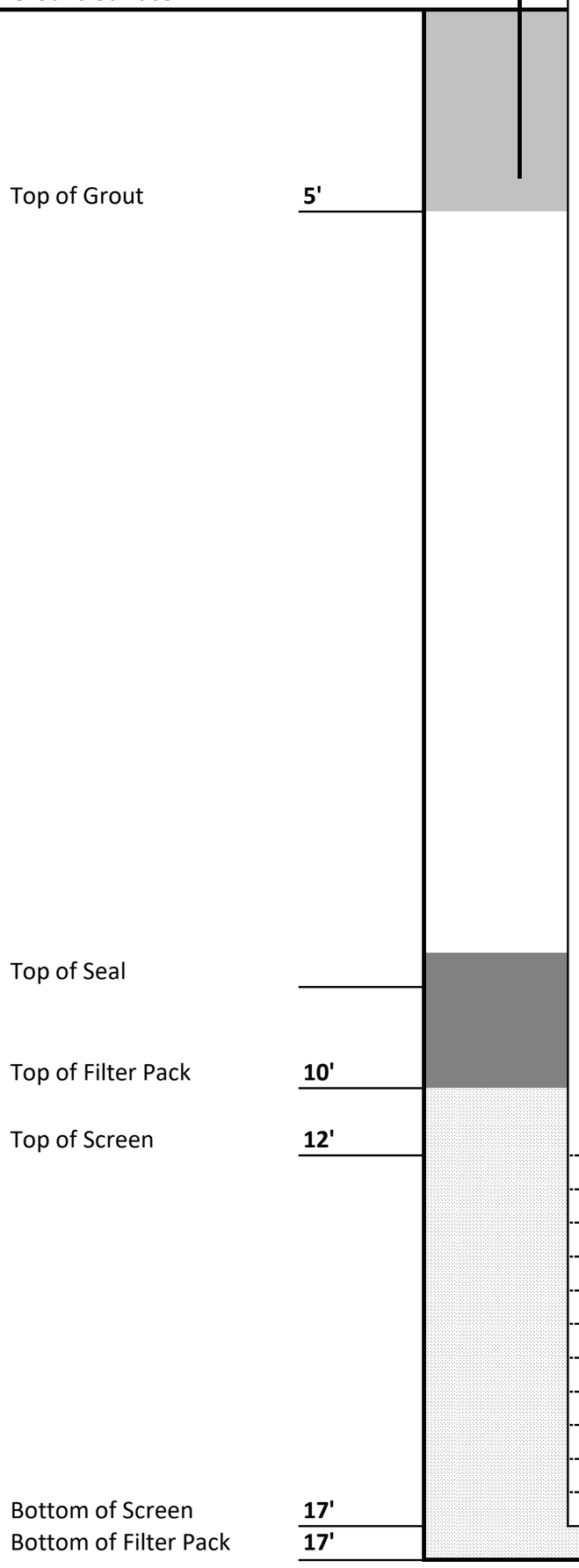
Monitoring Well Diagram
Above Grade Completion

B20-3 Shallow

PROJECT NAME: Xcel Sherco CCR Wells Supplmental Investigation

LOCATION: Becker, Minnesota

Drilling Method: 6" Rota-Sonic	**Ground Surface Elevation: 942.8'**
Company: Cascade	**MDH Unique Well No.: 847664**
Foreman: Lenny Rodgers	**Date/Time Started: 2/7/2020 / 802**
Rig Model: Mini-Sonic	**Date/Time Completed: 2/7/2020 / 911**
Geol/Engr: M. Lindstrom	**Coordinates: 865637.9 ft N, 2029253.5 ft E**



Borehole Diameter: **6"**

Total Depth of Boring **17'**

Total Length of Well **19'**

PROTECTIVE CASING
Type: **Pro-top** Bumper Posts: **No**
Diameter: **6"** Casing Elevation: **944.9'**
Length: **7'**
Locked: **Yes** Key Number: **1212**

CAP OR PLUG
Type: **Expansion Plug** Vented: **No**

SURFACE BACKFILL MATERIAL
Type: **Concrete**
Total Volume: **4 -80 lb. bags**
Manufacturer: **Quikrete**

RISER PIPE
Type: **Schedule 40 PVC**
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:

SEAL
Type/Size: **3/8" Bentonite Chips**
Total Volume: **1 -50 lb bag bentonite**
Manufacturer: **Baroid Hole Plug**

FILTER PACK
Type/Size: **#40 Red Flint Sand**
Total Volume: **1.5 - 50 lb. Bag**
Manufacturer: **Red Flint Sand and Gravel**

WELL SCREEN
Type: **PVC**
Inner Diameter: **2"**
Length: **5'** Effective Length: **7'**
Slot Size: **No. 10**
Manufacturer: **Johnson**

WATER SOURCE: **Landfill garage**

NOTES: **4" cap installed on end of well screen.**

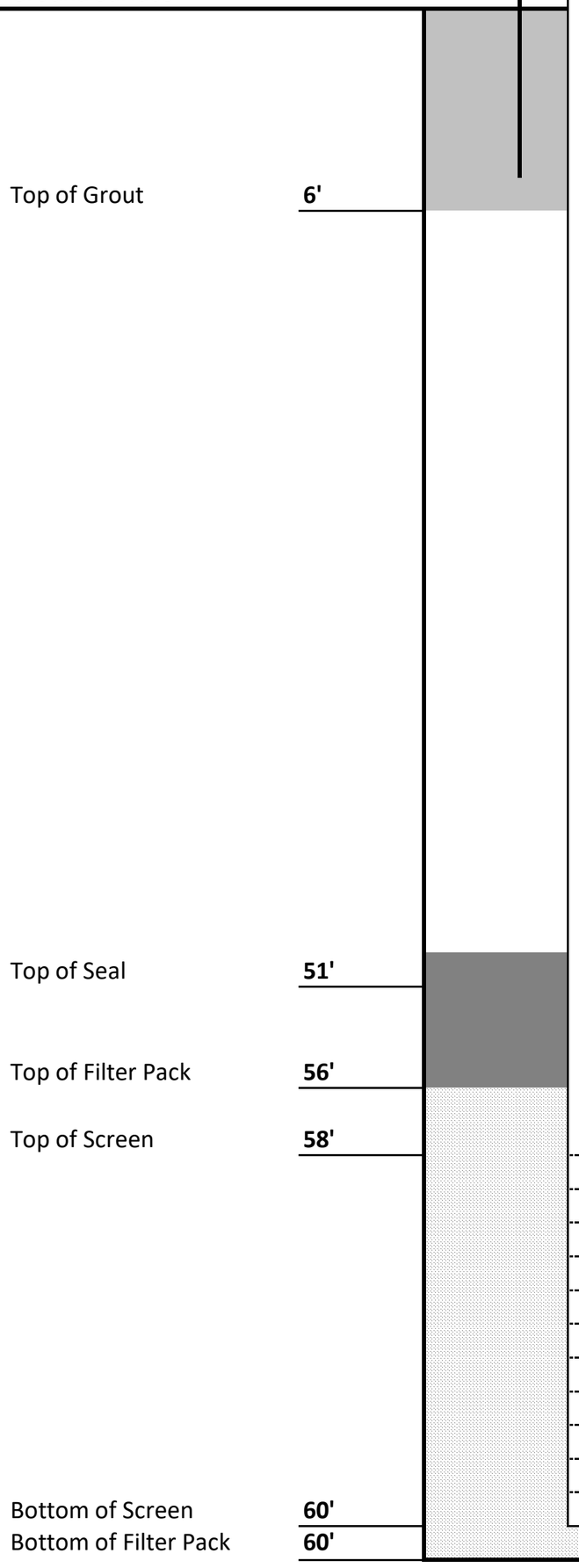
Monitoring Well Diagram
Above Grade Completion

B20-3 Deep

PROJECT NAME: Xcel Sherco CCR Wells Supplmental Investigation

LOCATION: Becker, Minnesota

Drilling Method: 6" Rota-Sonic	**Ground Surface Elevation: 942.7'**
Company: Cascade	**MDH Unique Well No.: 847663**
Foreman: Lenny Rodgers	**Date/Time Started: 2/6/2020 / 1614**
Rig Model: Mini-Sonic	**Date/Time Completed: 2/6/2020 / 1730**
Geol/Engr: M. Lindstrom	**Coordinates: 865633.9 ft N, 2029248.8 ft E**



Borehole Diameter: **6"**

Total Depth of Boring **60'**

Total Length of Well **62'**

PROTECTIVE CASING
Type: **Pro-top** Bumper Posts: **No**
Diameter: **6"** Casing Elevation: **944.75'**
Length: **7'**
Locked: **Yes** Key Number: **1212**

CAP OR PLUG
Type: **Expansion Plug** Vented: **No**

SURFACE BACKFILL MATERIAL
Type: **Concrete**
Total Volume: **4 -80 lb. bags**
Manufacturer: **Quikrete**

RISER PIPE
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**

SEAL
Type/Size: **3/8" Bentonite Chips**
Total Volume: **1 -50 lb bag bentonite**
Manufacturer: **Baroid Hole Plug**

FILTER PACK
Type/Size: **#40 Red Flint Sand**
Total Volume: **1 - 50 lb. Bag**
Manufacturer: **Red Flint Sand and Gravel**

WELL SCREEN
Type: **PVC**
Inner Diameter: **2"**
Length: **2'** Effective Length: **4'**
Slot Size: **No. 10**
Manufacturer: **Johnson**

WATER SOURCE: **Landfill garage**

NOTES: **4" cap installed on end of well screen. Centralizer installed at bottom of well.**

BANN FORMS TECHNOLOGY • 651-224-5135

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD

Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No. / Minnesota Unique Well No. or W-series No. (Leave blank if not known): 847661

WELL OR BORING LOCATION

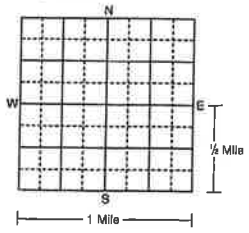
County Name: Sherburne

Township Name	Township No.	Range No.	Section No.	Fraction (sm. → lg.)
Becker	33	29	1	NW SE SE

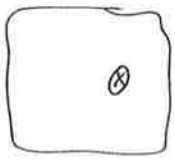
GPS LOCATION: Latitude_____ degrees_____ minutes_____ seconds; Longitude_____ degrees_____ minutes_____ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 13999 Industrial Blvd Becker

Show exact location of well or boring in section grid with "X."



Sketch map of well or boring location, showing property lines, roads, and buildings.



PROPERTY OWNER'S NAME/COMPANY NAME: Northern States Power

Property owner's mailing address if different than well location address indicated above: 414 Nicollet Mall, Minneapolis MN 55401

WELL OWNER'S NAME/COMPANY NAME: Same

Well owner's mailing address if different than property owner's address indicated above: Same

Date Sealed: 3/30/20 | Date Well or Boring Constructed: 2/5/20

Depth Before Sealing: 50 ft. | Original Depth: 50 ft.

AQUIFER(S): [X] Single Aquifer [ ] Multiaquifer

WELL/BORING: [ ] Water-Supply Well [X] Monit. Well [ ] Env. Bore Hole [ ] Other_____

STATIC WATER LEVEL: [ ] Measured [ ] Estimated Date Measure 3/33/20 — 8 ft. [X] below [ ] above land surface

CASING TYPE(S): [ ] Steel [X] Plastic [ ] Tile [ ] Other_____

WELLHEAD COMPLETION

Outside: [ ] Well House [ ] At Grade [ ] Pitless Adapter/Unit [ ] Buried [ ] Well Pit [X] Other 6" protop

Inside: [ ] Basement Offset [ ] Well Pit [ ] Buried [ ] Other_____

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
2 in. from 0	to 48 ft.	[X] Yes [ ] No	[X] Yes [ ] No [ ] Unknown
_____ in. from_____	to_____ ft.	[ ] Yes [ ] No	[ ] Yes [ ] No [ ] Unknown
_____ in. from_____	to_____ ft.	[ ] Yes [ ] No	[ ] Yes [ ] No [ ] Unknown

SCREEN/OPEN HOLE: Screen from 48 to 50 ft. Open Hole from_____ to_____ ft.

OBSTRUCTIONS: [ ] Rods/Drop Pipe [ ] Check Valve(s) [ ] Debris [ ] Fill [X] No Obstruction

Type of Obstructions (Describe)_____

Obstructions removed? [ ] Yes [ ] No Describe_____

PUMP: Type NA

[ ] Removed [ ] Not Present [ ] Other_____

METHOD USED TO SEAL ANNULAR SPACE BETWEEN 2 CASINGS, OR CASING AND BORE HOLE:

[ ] No Annular Space Exists [X] Annular Space Grouted with Tremie Pipe [ ] Casing Perforation/Removal

_____ in. from_____ to_____ ft. [ ] Perforated [ ] Removed

_____ in. from_____ to_____ ft. [ ] Perforated [ ] Removed

Type of Perforator_____

[ ] Other_____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material Bentonite from 0 to 50 ft. _____ yards 1 bags

_____ from_____ to_____ ft._____ yards_____ bags

_____ from_____ to_____ ft._____ yards_____ bags

OTHER WELLS AND BORINGS

Other unsealed and unused well or boring on property? [ ] Yes [X] No How many?_____

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Sand	Br	M	0	50

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

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.

Licensee Business Name: David Trust — License or Registration No.

Certified Representative Signature — Certified Rep. No. — Date

Name of Person Sealing Well or Boring: Tammy Roy

MINN. DEPT OF HEALTH COPY

BANN FORMS TECHNOLOGY • 651-224-5135

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD

Minnesota Statutes, Chapter 1031

Minnesota Well and Boring Sealing No. 847662
Minnesota Unique Well No. or W-series No. (Leave blank if not known)

WELL OR BORING LOCATION

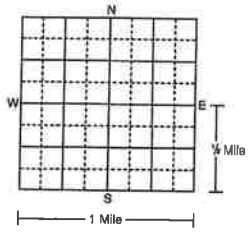
County Name: Sherburne

Township Name	Township No.	Range No.	Section No.	Fraction (sm. → lg.)
Becker	33	29	1	NW SE SE

GPS LOCATION: Latitude____ degrees____ minutes____ seconds
Longitude____ degrees____ minutes____ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 13999 Industrial Blvd Becker

Show exact location of well or boring in section grid with "X."



Sketch map of well or boring location, showing property lines, roads, and buildings.

Date Sealed: 3/30/20
Date Well or Boring Constructed: 2/5/20

Depth Before Sealing: 12 ft.
Original Depth: 12 ft.

AQUIFER(S): ☒ Single Aquifer ☐ Multiaquifer

WELL/BORING: ☐ Water-Supply Well ☒ Monit. Well ☐ Env. Bore Hole ☐ Other____

STATIC WATER LEVEL: ☐ Measured ☐ Estimated Date Measure: 3/33/20
8 ft. ☒ below ☐ above land surface

CASING TYPE(S): ☐ Steel ☒ Plastic ☐ Tile ☐ Other____

WELLHEAD COMPLETION
Outside: ☐ Well House ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☒ Other 6" protop
Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other____

PROPERTY OWNER'S NAME/COMPANY NAME: Northern States Power

Property owner's mailing address if different than well location address indicated above:
414 Nicollet Mall
Minneapolis MN 55401

WELL OWNER'S NAME/COMPANY NAME: Same

Well owner's mailing address if different than property owner's address indicated above:
Same

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
2 in. from 0	to 7 ft.	☒ Yes ☐ No	☒ Yes ☐ No ☐ Unknown
____ in. from____	to____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
____ in. from____	to____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: Screen from 7 to 12 ft. Open Hole from____ to____ ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☑ No Obstruction
Type of Obstructions (Describe)____
Obstructions removed? ☐ Yes ☐ No Describe____

PUMP: Type NA
☐ Removed ☐ Not Present ☐ Other____

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____
☐ Other____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)
Grouting Material Bentonite from 0 to 12 ft. ____ yards 4 bags
____ from____ to____ ft. ____ yards____ bags
____ from____ to____ ft. ____ yards____ bags

OTHER WELLS AND BORINGS
Other unsealed and unused well or boring on property? ☐ Yes ☒ No How many?____

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Sand	Br	M	0	12

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

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.

Licensee Business Name: David Trout — License or Registration No.
Certified Representative Signature — Certified Rep. No. — Date
Name of Person Sealing Well or Boring: Tammy Roy

MINN. DEPT OF HEALTH COPY

BANN FORMS TECHNOLOGY • 651-224-5135

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD

Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No. / Minnesota Unique Well No. or W-series No. (Leave blank if not known): 847663

WELL OR BORING LOCATION

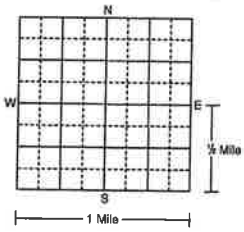
County Name: Sherburne

Township Name	Township No.	Range No.	Section No.	Fraction (sm. → lg.)
Becker	33	29	1	NW SE SE

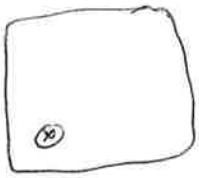
GPS LOCATION: Latitude_____ degrees_____ minutes_____ seconds; Longitude_____ degrees_____ minutes_____ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 13999 Industrial Blvd Becker

Show exact location of well or boring in section grid with "X."



Sketch map of well or boring location, showing property lines, roads, and buildings.



PROPERTY OWNER'S NAME/COMPANY NAME: Northern States Power

Property owner's mailing address if different than well location address indicated above: 414 Nicollet Mall, Minneapolis MN 55401

WELL OWNER'S NAME/COMPANY NAME: Same

Well owner's mailing address if different than property owner's address indicated above: Same

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Clay	Br	M	0	5
Sd	+	+	5	60

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

MINN. DEPT OF HEALTH COPY

Date Sealed: 3/30/20

Date Well or Boring Constructed: 2/6/20

Depth Before Sealing: 60 ft. Original Depth: 60 ft.

AQUIFER(S): ☒ Single Aquifer ☐ Multiaquifer

WELL/BORING: ☐ Water-Supply Well ☒ Monit. Well ☐ Env. Bore Hole ☐ Other_____

STATIC WATER LEVEL: ☐ Measured ☐ Estimated Date Measured: 3/33/20

8 ft. ☒ below ☐ above land surface

CASING TYPE(S): ☐ Steel ☒ Plastic ☐ Tile ☐ Other_____

WELLHEAD COMPLETION

Outside: ☐ Well House ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☒ Other 6" protop

Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other_____

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
2 in. from 0	to 58 ft.	☒ Yes ☐ No	☒ Yes ☐ No ☐ Unknown
_____ in. from_____	to_____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
_____ in. from_____	to_____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: Screen from 58 to 60 ft. Open Hole from_____ to_____ ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction

Type of Obstructions (Describe)_____

Obstructions removed? ☐ Yes ☐ No Describe_____

PUMP: Type NA

☐ Removed ☐ Not Present ☐ Other_____

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_____

☐ Other_____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material Bentonite from 0 to 60 ft. _____ yards 1 bags

_____ from_____ to_____ ft._____ yards_____ bags

_____ from_____ to_____ ft._____ yards_____ bags

OTHER WELLS AND BORINGS

Other unsealed and unused well or boring on property? ☐ Yes ☒ 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.

Licensee Business Name: David Trust — License or Registration No.

Certified Representative Signature — Certified Rep. No. — Date

Name of Person Sealing Well or Boring: Tammy Roy

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD

Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No. / Minnesota Unique Well No. or W-series No. (Leave blank if not known): 847664

WELL OR BORING LOCATION

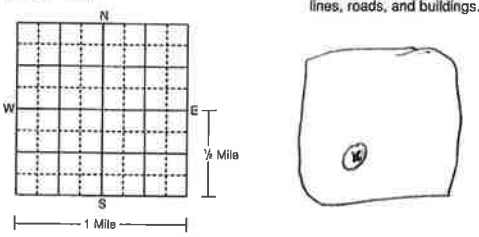
County Name: Sherburne

Township Name	Township No.	Range No.	Section No.	Fraction (sm. → lg.)
Becker	33	29	1	NW SE SE

GPS LOCATION: Latitude_____ degrees_____ minutes_____ seconds; Longitude_____ degrees_____ minutes_____ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 13999 Industrial Blvd Becker

Show exact location of well or boring in section grid with "X." Sketch map of well or boring location, showing property lines, roads, and buildings.



PROPERTY OWNER'S NAME/COMPANY NAME: Northern States Power

Property owner's mailing address if different than well location address indicated above: 414 Nicollet Mall, Minneapolis MN 55401

WELL OWNER'S NAME/COMPANY NAME: Same

Well owner's mailing address if different than property owner's address indicated above: Same

Date Sealed: 3/30/20 — Date Well or Boring Constructed: 2/7/20

Depth Before Sealing: 17 ft. — Original Depth: 17 ft.

AQUIFER(S): ☒ Single Aquifer ☐ Multiaquifer

WELL/BORING: ☐ Water-Supply Well ☒ Monit. Well ☐ Env. Bore Hole ☐ Other_____

STATIC WATER LEVEL: ☐ Measured ☐ Estimated Date Measure: 3/33/20 — 8 ft. ☒ below ☐ above land surface

CASING TYPE(S): ☐ Steel ☒ Plastic ☐ Tile ☐ Other_____

WELLHEAD COMPLETION

Outside: ☐ Well House ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☒ Other 6" protop

Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other_____

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
2 in.	from 0 to 12 ft.	☒ Yes ☐ No	☒ Yes ☐ No ☐ Unknown
_____ in.	from_____ to_____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
_____ in.	from_____ to_____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: Screen from 12 to 17 ft. Open Hole from_____ to_____ ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☑ No Obstruction

Type of Obstructions (Describe)_____

Obstructions removed? ☐ Yes ☐ No Describe_____

PUMP: Type NA — ☐ Removed ☐ Not Present ☐ Other_____

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_____

☐ Other_____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material Bentonite from 0 to 17 ft. _____ yards 41 bags

_____ from_____ to_____ ft._____ yards_____ bags

_____ from_____ to_____ ft._____ yards_____ bags

OTHER WELLS AND BORINGS: Other unsealed and unused well or boring on property? ☐ Yes ☑ No How many?_____

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Clay	Br	M	0	5
Sand	Br	F	5	17

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

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.

Licensee Business Name: David Trout — License or Registration No.

Certified Representative Signature — Certified Rep. No. — Date

Name of Person Sealing Well or Boring: Tammy Roy

MINN. DEPT OF HEALTH COPY

BANN FORMS TECHNOLOGY • 651-224-5135

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 1031

Minnesota Well and Boring Sealing No. / Minnesota Unique Well No. or W-series No. (Leave blank if not known): 847665

WELL OR BORING LOCATION

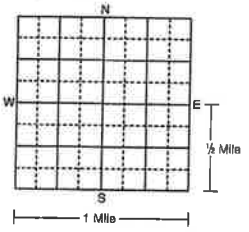
County Name: Sherburne

Township Name	Township No.	Range No.	Section No.	Fraction (sm. → lg.)
Becker	33	29	1	NW SE SE

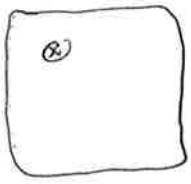
GPS LOCATION: Latitude_____ degrees_____ minutes_____ seconds; Longitude_____ degrees_____ minutes_____ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 13999 Industrial Blvd Becker

Show exact location of well or boring in section grid with "X."



Sketch map of well or boring location, showing property lines, roads, and buildings.



Date Sealed: 3/30/20 | Date Well or Boring Constructed: 2/6/20

Depth Before Sealing: 62 ft. | Original Depth: 62 ft.

AQUIFER(S): ☒ Single Aquifer ☐ Multiaquifer

WELL/BORING: ☐ Water-Supply Well ☒ Monit. Well ☐ Env. Bore Hole ☐ Other_____

STATIC WATER LEVEL: ☐ Measured ☐ Estimated Date Measure 3/33/20 — 8 ft. ☒ Below ☐ above land surface

CASING TYPE(S): ☐ Steel ☒ Plastic ☐ Tile ☐ Other_____

WELLHEAD COMPLETION

Outside: ☐ Well House ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☒ Other 6" protop

Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other_____

PROPERTY OWNER'S NAME/COMPANY NAME: Northern States Power

Property owner's mailing address if different than well location address indicated above: 414 Nicollet Mall, Minneapolis MN 55401

WELL OWNER'S NAME/COMPANY NAME: Same

Well owner's mailing address if different than property owner's address indicated above: Same

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
2 in. from 0	to 60 ft.	☒ Yes ☐ No	☒ Yes ☐ No ☐ Unknown
_____ in. from_____	to_____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
_____ in. from_____	to_____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: Screen from 60 to 62 ft. Open Hole from_____ to_____ ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction

Type of Obstructions (Describe)_____

Obstructions removed? ☐ Yes ☐ No Describe_____

PUMP: Type NA

☐ Removed ☐ Not Present ☐ Other_____

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_____

☐ Other_____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material Bentonite from 0 to 62 ft._____ yards 1 bags

_____ from_____ to_____ ft._____ yards_____ bags

_____ from_____ to_____ ft._____ yards_____ bags

OTHER WELLS AND BORINGS

Other unsealed and unused well or boring on property? ☐ Yes ☒ No How many?_____

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Cobbles/Sand	Br	M	0	8
S & G	↓	↓	8	62

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

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.

Licensed Business Name: David Trout — License or Registration No.

Certified Representative Signature — Certified Rep. No. — Date

Name of Person Sealing Well or Boring: Tammy Roy

MINN. DEPT OF HEALTH COPY

BANN FORMS TECHNOLOGY • 651-224-5135

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING SEALING RECORD
Minnesota Statutes, Chapter 103I

Minnesota Well and Boring Sealing No. / Minnesota Unique Well No. or W-series No. (Leave blank if not known): 847666

WELL OR BORING LOCATION

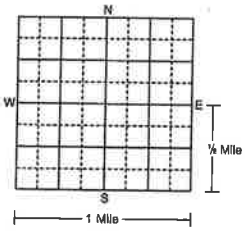
County Name: Sherburne

Township Name	Township No.	Range No.	Section No.	Fraction (sm. → lg.)
Becker	33	29	1	NW SE SE

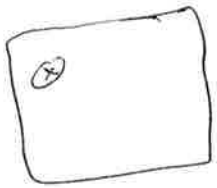
GPS LOCATION: Latitude_____ degrees_____ minutes_____ seconds; Longitude_____ degrees_____ minutes_____ seconds

Numerical Street Address or Fire Number and City of Well or Boring Location: 13999 Industrial Blvd Becker

Show exact location of well or boring in section grid with "X."



Sketch map of well or boring location, showing property lines, roads, and buildings.



PROPERTY OWNER'S NAME/COMPANY NAME: Northern States Power

Property owner's mailing address if different than well location address indicated above: 414 Nicollet Mall, Minneapolis MN 55401

WELL OWNER'S NAME/COMPANY NAME: Same

Well owner's mailing address if different than property owner's address indicated above: Same

GEOLOGICAL MATERIAL	COLOR	HARDNESS OR FORMATION	FROM	TO
If not known, indicate estimated formation log from nearby well or boring.				
Cobbles/Sand	Br	M	0	8
Sd	d	d	8	18

REMARKS, SOURCE OF DATA, DIFFICULTIES IN SEALING

MINN. DEPT OF HEALTH COPY

Date Sealed: 3/30/20

Date Well or Boring Constructed: 2/4/20

Depth Before Sealing: 18 ft.

Original Depth: 18 ft.

AQUIFER(S): ☒ Single Aquifer ☐ Multiaquifer

WELL/BORING: ☐ Water-Supply Well ☒ Monit. Well ☐ Env. Bore Hole ☐ Other_____

STATIC WATER LEVEL: ☐ Measured ☐ Estimated Date Measured 3/33/20 — 8 ft. ☒ below ☐ above land surface

CASING TYPE(S): ☐ Steel ☒ Plastic ☐ Tile ☐ Other_____

WELLHEAD COMPLETION

Outside: ☐ Well House ☐ At Grade ☐ Pitless Adapter/Unit ☐ Buried ☐ Well Pit ☒ Other 6" protop

Inside: ☐ Basement Offset ☐ Well Pit ☐ Buried ☐ Other_____

CASING(S)

Diameter	Depth	Set in oversize hole?	Annular space initially grouted?
2 in. from 0	to 13 ft.	☒ Yes ☐ No	☒ Yes ☐ No ☐ Unknown
_____ in. from_____	to_____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown
_____ in. from_____	to_____ ft.	☐ Yes ☐ No	☐ Yes ☐ No ☐ Unknown

SCREEN/OPEN HOLE: Screen from 13 to 18 ft. Open Hole from_____ to_____ ft.

OBSTRUCTIONS: ☐ Rods/Drop Pipe ☐ Check Valve(s) ☐ Debris ☐ Fill ☒ No Obstruction

Type of Obstructions (Describe)_____

Obstructions removed? ☐ Yes ☐ No Describe_____

PUMP: Type NA ☐ Removed ☐ Not Present ☐ Other_____

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_____

☐ Other_____

GROUTING MATERIAL(S) (One bag of cement = 94 lbs., one bag of bentonite = 50 lbs.)

Grouting Material Bentonite from 0 to 18 ft. _____ yards 4 bags

_____ from_____ to_____ ft._____ yards_____ bags

_____ from_____ to_____ ft._____ yards_____ bags

OTHER WELLS AND BORINGS: Other unsealed and unused well or boring on property? ☐ Yes ☒ 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.

Licensee Business Name: David Trout — License or Registration No.

Certified Representative Signature — Certified Rep. No. — Date

Name of Person Sealing Well or Boring: Tammy Roy