

2019 CCR ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

BOTTOM ASH POND

Sherburne County (Sherco) Generating Plant
Becker, Minnesota

Prepared for:

Northern States Power Company, a Minnesota Corporation

January 28, 2020



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2019 CCR ANNUAL GROUNDWATER MONITORING
AND CORRECTIVE ACTION REPORT

Bottom Ash Pond
Becker, Minnesota

I hereby certify that this plan, specification, or report was prepared by me 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 this report has been prepared to meet the requirements of § 257.90(e), Annual groundwater monitoring and corrective action report, 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: January 28, 2020

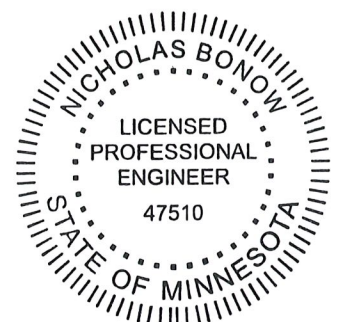


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1. EXECUTIVE SUMMARY

Groundwater monitoring was conducted for the Bottom Ash Pond at the Sherburne County Generating Plant during monitoring year 2019 to comply with the requirements of U.S. Code of Federal Regulations, Title 40, Section 257.95 (i.e. assessment monitoring). Assessment monitoring was initiated for the Bottom Ash Pond during the 2018 monitoring year and continued during the 2019 monitoring year with routine assessment monitoring events occurring during the spring and fall of the year. Statistical analysis performed on 2019 groundwater data indicates no exceedances of groundwater protection standards. Concentrations of certain constituents continue to exceed background; therefore, the Bottom Ash Pond will continue with assessment monitoring going into 2020. No additional notifications or assessment of corrective measures are required at this time.

2. INTRODUCTION

This report presents the documentation of the status of groundwater monitoring and corrective action for the year 2019 (YR2019) for the Bottom Ash Pond (BAP) at the Sherburne County Generating Plant (Sherco) located in Becker, Minnesota. The BAP is owned and operated by Northern States Power Company, a Minnesota Corporation (NSPM).

The BAP is an existing coal combustion residuals (CCR) 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 Section 257.90(e), annual groundwater monitoring and corrective action for YR2019.

This report has been prepared in general accordance with the reporting procedures outlined in the Sherco Bottom Ash Pond CCR Groundwater Sampling Plan (NSPM, 2018). Any deviations from the requirements of the Groundwater Sampling Plan are described in subsequent sections of this report.

2.1 Annual Groundwater Monitoring Report Requirements

According to §257.90(e), CCR units must prepare an annual groundwater monitoring and corrective action report each year that complies with the following:

“For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year. For purposes of this section, the owner or operator has prepared the annual report when the report is placed in the facility's operating record as required by § 257.105(h)(1). At a minimum, the annual groundwater monitoring and corrective action report must contain the following information, to the extent available:

- (1) A map, aerial image, or diagram showing the CCR unit and all background (or upgradient) and downgradient monitoring wells, to include the well identification numbers, that are part of the groundwater monitoring program for the CCR unit;*
- (2) Identification of any monitoring wells that were installed or decommissioned during the preceding year, along with a narrative description of why those actions were taken;*
- (3) In addition to all the monitoring data obtained under §§ 257.90 through 257.98, a summary including the number of groundwater samples that were collected for analysis for each background and downgradient well, the dates the samples were collected, and whether the sample was required by the detection monitoring or assessment monitoring programs;*
- (4) A narrative discussion of any transition between monitoring programs (e.g., the date and circumstances for transitioning from detection monitoring to assessment monitoring in addition to identifying the constituent(s) detected at a statistically significant increase over background levels); and*
- (5) Other information required to be included in the annual report as specified in §§ 257.90 through 257.98.*

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Section 3.6.2 of the CCR Groundwater Sampling Plan (NSPM, 2018) also includes a list of items to be included in the annual report that is similar to items 1 through 5 above, with the addition of a water table contour map using data collected from the current year.

In this report, Section 2 (Site Description) briefly describes the site location and hydrogeologic setting, Section 3 (Monitoring Results) discusses the reporting requirements of the CCR Sampling Plan and §257.90(e), and Section 4 (Discussion) summarizes key actions completed in YR2019, describes any problems reported in YR2019 and the actions to resolve the problems, and key activities projected for 2020.

3. SITE DESCRIPTION

The BAP is located in the City of Becker, Sherburne County, Minnesota. The BAP is approximately 18 acres in size and is part of a larger generating plant site. The BAP construction was last modified in 1982. The BAP location is shown on Figure 1 and an aerial photograph and site layout map for BAP are shown on Figure 2.

3.1 Site Hydrogeology

The site hydrogeology is discussed in more detail in the Bottom Ash Pond Groundwater Monitoring System Certification (Carlson McCain, 2017), which was prepared for compliance with 40 CFR §257.91. Facility hydrogeology is briefly summarized below for convenience. Unless otherwise cited, the data presented in this section is credited to Carlson McCain, 2017.

The Facility is located in the Anoka Sand Plain physiogeographic region. The site consists of moderate to highly permeable alluvial deposits above and below a low-permeability glacial till. Precambrian granite, the first bed rock encountered, is considered impermeable. Groundwater flows southwest beneath the Facility toward the Mississippi River, which is the regional groundwater discharge for the surficial sand and gravel aquifer. The till layer exhibits variable thickness and is absent in some locations, and no perched groundwater conditions have been identified above the till. Groundwater travel velocities are estimated at 153 feet/year.

The conceptual model for the hypothetical (or potential) release of a constituent of concern (COC) from the BAP focuses on groundwater as the transport mechanism. The water table beneath the BAP typically occurs below the Superior till. Exfiltration from the BAP 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, a COC would likely travel mainly horizontally toward the south and/or southwest and towards the Mississippi River.

4. MONITORING RESULTS

Section 3.1 below presents the monitoring results obtained during YR2019 in terms of the specific requirements of §257.90(e) that are to be included in this report.

4.1 Compliance with §257.90(e)

4.1.1 Groundwater Monitoring System (§257.90(e)(1))

The area of the BAP and all upgradient and downgradient monitoring well locations, with labels for the well identification numbers, included in the BAP CCR groundwater monitoring system are shown on Figure 2. A summary of the monitoring wells included in the BAP CCR Groundwater Monitoring System is included in Table 1.

4.1.2 Well Installation or Decommissioning (§257.90(e)(2))

No monitoring wells that are part of the groundwater monitoring system for the BAP were installed or decommissioned during YR2019.

4.1.3 Summary of Monitoring Data (§257.90(e)(3))

Monitoring data collected during YR2019 is summarized in Tables 2 and 3 and results are provided in Tables 4 and 5. Table 2 summarizes the data collected and includes the number of groundwater samples that were collected for analysis for each upgradient and downgradient well, the dates the samples were collected, and whether the samples were required by the detection monitoring (i.e. constituents listed Appendix III to 40 CFR §257, hereafter referred to as “Appendix III constituents”) or assessment monitoring (i.e. constituents listed in Appendix IV of 40 CFR §257, hereafter referred to as “Appendix IV constituents”) programs. Table 3 summarizes the analytical parameters and the number of times that each parameter was analyzed for each well in the groundwater monitoring system. A summary of the spring 2019 monitoring data is provided on Table 4 and a summary of the fall 2019 monitoring data is provided on Table 5.

Assessment Monitoring Data

As discussed in a Technical Memorandum dated April 13, 2018 (Carlson McCain, 2018c), NSPM initiated an assessment monitoring program at the BAP during YR2018, and assessment monitoring continued in 2019. Pursuant to the assessment monitoring semiannual sampling requirements listed in §257.95(d)(1), the following groundwater sampling events were conducted during YR2019:

- All wells in the BAP groundwater monitoring system were sampled during the spring monitoring event conducted on April 24 and 25, 2019. Samples were analyzed for Appendix III constituents and Appendix IV constituents. Laboratory reports and field datasheets for the spring monitoring event are included in this report as Appendix A.
- Well P-155 was resampled on June 5, 2019 as part of the spring assessment monitoring event and the sample was analyzed for all Appendix III and Appendix IV constituents. The resample of well P-155 is discussed further in Section 4.2 (Problems).

- All wells in the BAP groundwater monitoring system were sampled during the fall monitoring event conducted on October 22 and 23, 2019, and samples were analyzed for all Appendix III constituents and only those Appendix IV constituents detected during the spring 2019 assessment monitoring event. Laboratory reports and field datasheets for the fall monitoring event are included in this report as Appendix B.

Recorded Concentrations, Background Concentrations and Groundwater Protection Standards

Pursuant to §257.95(d)(3), the annual groundwater monitoring and corrective action report must include the recorded concentrations required by §257.95(d)(1), identify the background parameter concentrations established under §257.94(b) and identify the groundwater protection standards established under §257.95(d)(2).

- Recorded Concentrations: The concentrations for the spring and fall monitoring events that are recorded in the operating record are attached to this report as Appendices A and B, respectively, and summary tables of the data are also provided in Tables 4 and 5, respectively.
- Background Concentrations: The background wells at the BAP include P-17, P-23, P-152A, P-157 and P-158 and the background parameter concentrations were obtained as part of the baseline data set that was completed by collecting nine independent samples from each of the wells in the groundwater monitoring system from December 2016 through September 2017. Each of the baseline samples were analyzed for Appendix III and Appendix IV constituents. Laboratory reports and field datasheets for the baseline dataset, which includes all background concentrations, are provided in Appendix A of the 2017 CCR Annual Groundwater Monitoring and Corrective Action Report (Carlson McCain, 2018b).
- Groundwater Protection Standards: Pursuant to §257.95(h)(1) through §257.95(h)(3), groundwater protection standards have been established for each Appendix IV constituent as either: 1) the maximum contaminant level (MCL) established under 40 CFR §141.62 and §141.66, 2) for those constituents without an MCL (i.e. cobalt, lead, lithium, and molybdenum), the concentration listed in §257.95(h)(2), as amended on July 30, 2018 or 3) for constituents for which the background level is higher than the levels identified under 1) or 2), the background concentration.

The range of background concentrations for each Appendix III and Appendix IV constituent sampled pursuant to §257.94(b) and the groundwater protection standard for each Appendix IV constituent are summarized on the following page.

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	Parameter	Background Range	Groundwater Protection Standard
Appendix III Parameters	Boron, total (mg/L)	<0.050 to 1.37	NA
	Calcium, total (mg/L)	48.6 to 145	NA
	Chloride, total (mg/L)	<1.0 to 27.5	NA
	Fluoride, total (mg/L)	<0.750	NA
	pH (lab) (pH)	7.57 to 8.01	NA
	Sulfate, total (mg/L)	8.09 to 269	NA
	Total Dissolved Solids (mg/L)	168 to 688	NA
Appendix IV Parameters	Antimony, total (mg/L)	<0.0005	0.006
	Arsenic, total (mg/L)	<0.0005 to 0.0008	0.01
	Barium, total (mg/L)	<0.05 to 0.116	2
	Beryllium, total (mg/L)	<0.0005	0.004
	Cadmium, total (mg/L)	<0.0005	0.05
	Chromium, total (mg/L)	0.0006 to 0.0069	0.1
	Cobalt, total (mg/L)	<0.0005 to 0.0013	0.006
	Fluoride, total (mg/L)	<0.750	4
	Lead, total (mg/L)	<0.0005 to 0.0007	0.015
	Lithium Total (mg/L)	<0.05 ¹	0.04 ¹
	Mercury, total (mg/L)	<0.0002	0.002
	Molybdenum, total (mg/L)	<0.0005 to 0.0023	0.1
	Radium, 226 and 228 combined (pCi/L)	<0.92 to 2.92	5
	Selenium, total (mg/L)	<0.0005 to 0.0033	0.05
Thallium, total (mg/L)	<0.0005	0.002	

¹ All background samples for lithium were obtained prior to amendment of §257.95(h)(2) on July 30, 2018, which implemented a groundwater protection standard of 0.04 mg/L for lithium. The analytical laboratory lowered the reporting limit for lithium from 0.05 mg/L to 0.015 mg/L in response to the rule amendment.

Statistical Analysis

Statistical analysis was performed on the YR2019 monitoring data using the procedures described in the BAP’s Statistical Analysis Plan (NSPM, 2017), and demonstrates compliance with §257.95(e), §257.95(f), and §257.95(g) as described below:

1. *Subpart §257.95(e) (paraphrased): If the concentrations of all Appendix III and Appendix IV constituents are shown to be at or below background values for two consecutive monitoring events, the owner or operator may return to detection monitoring of the CCR unit.*
 - a. Based on statistical comparisons of compliance data to background data for Appendix III and Appendix IV constituents, concentrations of one or more constituents continue to exceed background values, therefore the BAP will not return to detection monitoring at this time.

2. *Subpart §257.95(f) (paraphrased): If the concentrations of any Appendix III or Appendix IV constituent are above background values, but all concentrations are below the applicable groundwater protection standard, the owner or operator must continue assessment monitoring.*
 - a. Based on statistical comparisons of Appendix III and Appendix IV constituent concentrations to groundwater protection standards, all concentrations are below the applicable groundwater protection standards, therefore the BAP will continue assessment monitoring.

3. *Subpart §257.95(g) (paraphrased): If one or more Appendix IV constituents are detected at statistically significant levels above the groundwater protection standard in any sampling event, the owner or operator must issue notifications of the exceedance(s) and initiate an assessment of corrective measures.*
 - a. As stated in item 2.a, above, all Appendix III and Appendix IV concentrations are below applicable groundwater protection standards, therefore no additional notifications or assessment of corrective measures are required.

Groundwater Elevations and Flow Direction

Groundwater elevations and flow direction in the vicinity of the BAP during the spring and fall of 2019 monitoring events are shown on the water table elevation contour maps in Figures 3 and 4, respectively. The contours were derived from water level measurements from the wells included in the CCR groundwater monitoring system for the BAP along with additional water level piezometers near the BAP. For both of the events, the flow direction was generally to the southwest. The flow direction is consistent with historical data from over 20 years of monitoring at the facility and is also consistent with the regional groundwater flow direction towards the Mississippi River.

4.1.4 Transition Between Monitoring Programs (§257.90(e)(4))

The BAP transitioned from the detection monitoring program (§257.94) to the assessment monitoring program (§257.95) as described in Technical Memorandums dated January 15, 2018 (Carlson McCain, 2018a) and April 13, 2018 (Carlson McCain, 2018c). Based on the results of the statistical analysis of the monitoring data from the initial detection monitoring event completed in October 2017, NSPM determined that one or more monitoring wells exhibited a statistically significant increase (SSI) for one or more Appendix III constituent. The following table lists each monitoring well in which an SSI was originally identified, and the constituent which exhibited the SSI:

Monitoring Well	Constituents Exhibiting SSIs - October 2017
P-22	Boron
P-155	Boron

Since the initial transition to assessment monitoring program (§257.95) during YR2018, the BAP has not transitioned between monitoring programs and continues monitoring for the assessment monitoring program.

4.1.5 Other Information (§257.90(e)(5))

No other information is required to be reported in this CCR Annual Groundwater Monitoring and Corrective Action Report pursuant to §257.90 through §257.98.

5. DISCUSSION

§257.90(e) states that “For the preceding calendar year, the annual report must document the status of the groundwater monitoring and corrective action program for the CCR unit, summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year.”

Pursuant to the rule requirements, Section 5.1 below discusses the key actions completed for the groundwater monitoring program at the BAP; Section 5.2 discusses the any problems encountered with the groundwater monitoring and actions to resolve such problems; and Section 5.3 discusses key activities that may occur in the upcoming year.

5.1 Key Actions Completed

Key actions that were completed during YR2019 include the following items:

- The 2018 Annual CCR Groundwater Monitoring and Corrective Report (Carlson McCain, 2018b) was completed and placed on the BAP’s publicly available website by January 31, 2019.
- Monitoring wells were sampled during the spring event conducted on April 24 and 25, 2019 and analyzed for all Appendix III and Appendix IV constituents as required by §257.95(d)(1);
- Monitoring well P-155, as part of the spring monitoring event, was resampled on June 5, 2019 and analyzed for all Appendix III and Appendix IV constituents;
- Monitoring wells were sampled during the fall event conducted on October 22 and 23, 2019 and analyzed for all Appendix III constituents and only those Appendix IV constituents that were detected during the spring 2019 event as part of semiannual sampling required by §257.95(d)(1);
- Laboratory reports and field datasheets for the spring and fall sampling events were placed in the operating record on July 11, 2019 and December 31, 2019, respectively;
- Pursuant to §257.95(d)(2), groundwater protection standards are established for all Appendix IV constituents; and
- Statistical evaluation of the monitoring data was conducted to demonstrate compliance with §257.95(e) through (g).

5.2 Problems

5.2.1 Problems Encountered

The dedicated bladder pump in well P-155 did not work at the time of the sampling on April 25, 2019 and, as a result, the well was bailed to obtain the sample. The bailed sample exhibited abnormally high field turbidity of 66.4 NTU and total suspended solids (TSS) concentration of 114 mg/L, which were attributed to mobilization of sediment caused by the bailer. The high turbidity and TSS values are inconsistent with historical background (i.e. upgradient) or downgradient water quality, as well as the well purging and stabilization procedures described in the CCR Groundwater Sampling Plan (NSPM, 2018), and the sample was therefore flagged as potentially invalid.

No other significant problems with the groundwater monitoring system, or deviations from the CCR Groundwater Sampling Plan were reported at the facility during YR2019. No corrective action was required at the facility during YR2019.

5.2.2 Resolution of Problems

The bladder pump in well P-155 was removed from the well on June 3, 2019 and was inspected, decontaminated and placed back in the well since it appeared to be in working condition. The well was resampled on June 5, 2019 and the dedicated bladder functioned properly, resulting in a successful sample. The data from the June 5, 2019 resample reported low field turbidity and TSS results and other parameter concentrations appeared normal.

The June 5, 2019 resampling of well P-155 confirmed that the sample obtained on April 25, 2019 was of low quality and, as such, the April 25, 2019 sampling data from P-155 (with the exception of the static water level and water level elevation) was invalidated and removed from the data set. The June 5, 2019 sampling data was used during YR2019 data interpretation and will also continue to be used during future data interpretation.

5.3 Key Activities for 2020

The following key actions are anticipated at the BAP in the year 2020:

1. Routine, semi-annual assessment monitoring events at monitoring system wells are planned in the spring between March 15 and May 15, 2020 and in the fall between September 15 and November 15, 2020.
2. Statistical analysis of monitoring results will be conducted to demonstrate compliance with §257.95(e) through (g).

5.0 REFERENCES

Carlson McCain, 2017. CCR Groundwater Monitoring System Certification, Bottom Ash Pond, Sherco Generating Plant, prepared for Northern States Power Company, A Minnesota Corporation, October 16, 2017.

Carlson McCain, 2018a. SSI Determination - Bottom Ash Pond, Prepared for NSPM Environmental Services, Carlson McCain, Inc., January 15, 2018.

Carlson McCain, 2018b. CCR Annual Groundwater and Corrective Action Monitoring Report, Bottom Ash Pond, Sherco Generating Plant, prepared for Northern States Power Company, A Minnesota Corporation, January 29, 2018.

Carlson McCain, 2018c. Alternate Source Demonstration Update - Bottom Ash Pond, Prepared for NSPM Environmental Services, Carlson McCain, Inc., April 13, 2018.

Carlson McCain, 2019. 2018 CCR Annual Groundwater and Corrective Action Monitoring Report, Bottom Ash Pond, Sherco Generating Plant, prepared for Northern States Power Company, A Minnesota Corporation, January 30, 2019.

NSPM, 2017. Statistical Analysis Plan, Bottom Ash Pond, Northern States Power Company, a Minnesota Corporation, October 16, 2017.

NSPM, 2018. Bottom Ash Pond CCR Ground Water Sampling Plan Revision #1. Northern States Power Company, a Minnesota Corporation, December 27, 2018.

Tables

Table 1
CCR Groundwater Monitoring System
Bottom Ash Pond

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-01A-1	NA	1/4/78	2028267.7	865408.3	1002.8	2	924	922	Routine Semi-annual	Down-Gradient
P-17	NA	8/26/81	2030284.1	866284.1	964.34	20	923	903	Routine Semi-annual	Up-Gradient
P-22	NA	8/27/81	2027386.3	865147.1	964.33	20	922	902	Routine Semi-annual	Down-Gradient
P-23	NA	8/28/81	2028068.1	866241.6	967.26	30	926	896	Routine Semi-annual	Up-Gradient
P-152A	806318	10/10/14	2031471.6	866696.4	965.87	10	934	924	Routine Semi-annual	Up-Gradient
P-155	812964	9/22/15	2027791	865410	1002.72	10	927	917	Routine Semi-annual	Down-Gradient
P-156	812965	9/22/15	2028707	865410	1002.39	10	927	917	Routine Semi-annual	Down-Gradient
P-157	812966	9/22/15	2028485	866287	968.17	10	929	919	Routine Semi-annual	Up-Gradient
P-158	812967	9/23/15	2029122	866410	966.55	10	927	917	Routine Semi-annual	Up-Gradient

*Notes:

Elevation is feet above mean sea level

Table 2
Summary of Data Collected
Bottom Ash Pond

Upgradient Wells				
Well ID	Number of Samples	Sample Dates		
		Spring 2019 ¹	Spring 2019 Resample ²	Fall 2019 ³
P-17	2	4/24/2019	NS	10/24/2019
P-23	2	4/25/2019	NS	10/23/2019
P-152A	2	4/24/2019	NS	10/21/2019
P-157	2	4/25/2019	NS	10/24/2019
P-158	2	4/25/2019	NS	10/23/2019

Downgradient Wells				
Well ID	Number of Samples	Sample Dates		
		Spring 2019 ¹	Spring 2019 Resample ²	Fall 2019 ³
P-01A-1	2	4/25/2019	NS	10/22/2019
P-22	2	4/25/2019	NS	10/23/2019
P-155	3	4/25/2019	6/5/2019	10/22/2019
P-156	2	4/25/2019	NS	10/22/2019

¹ Assessment monitoring event sampled and analyzed for appendix III and appendix IV of §257 constituents as required by §257.95(b).

² Well P-155 was resampled as part of the spring assessment monitoring event due to suspect data in the original April 25, 2019 sample.

³ Assessment monitoring semiannual resample event sampled and analyzed for appendix III of §257 and those appendix IV of §257 constituents detected during Spring 2019 as required by §257.95(d)(1).

Table 3
Count of Parameters Analyzed by Well
Bottom Ash Pond

Appendix III Parameters									
Parameter	Well ID and Number of Samples								
	P-01A-1	P-17	P-22	P-23	P-152A	P-155	P-156	P-157	P-158
Boron, total (mg/L)	2	2	2	2	2	3	2	2	2
Calcium, total (mg/L)	2	2	2	2	2	3	2	2	2
Chloride, total (mg/L)	2	2	2	2	2	3	2	2	2
Fluoride, total (mg/L)	2	2	2	2	2	3	2	2	2
pH (lab) (pH)	2	2	2	2	2	3	2	2	2
Sulfate, total (mg/L)	2	2	2	2	2	3	2	2	2
Total Dissolved Solids (mg/L)	2	2	2	2	2	3	2	2	2

Appendix IV Parameters									
Parameter	Well ID and Number of Samples								
	P-01A-1	P-17	P-22	P-23	P-152A	P-155	P-156	P-157	P-158
Antimony, total (mg/L)	1	1	1	1	1	2	1	1	1
Arsenic, total (mg/L)	2	2	2	2	2	3	2	2	2
Barium, total (mg/L)	2	2	2	2	2	3	2	2	2
Beryllium, total (mg/L)	1	1	1	1	1	2	1	1	1
Cadmium, total (mg/L)	1	1	1	1	1	2	1	1	1
Chromium, total (mg/L)	2	2	2	2	2	3	2	2	2
Cobalt, total (mg/L)	1	1	1	1	1	2	1	1	1
Lead, total (mg/L)	1	1	1	1	1	2	1	1	1
Lithium Total (mg/L)	1	1	1	1	1	2	1	1	1
Mercury, total (mg/L)	1	1	1	1	1	2	1	1	1
Molybdenum, total (mg/L)	1	1	1	1	1	2	1	1	1
Selenium, total (mg/L)	2	2	2	2	2	3	2	2	2
Thallium, total (mg/L)	1	1	1	1	1	2	1	1	1
Radium, 226 and 228 combined (pCi/l)	2	2	2	2	2	3	2	2	2

Table 4
Spring 2019 Groundwater Summary Data
 Bottom Ash Pond

Appendix III Parameters											
Parameter	Units	GWPS	Well ID and Sample Date								
			P-01A-1	P-17	P-22	P-23	P-152A	P-155	P-156	P-157	P-158
			4/25/2019	4/24/2019	4/25/2019	4/25/2019	4/24/2019	6/5/2019	4/25/2019	4/25/2019	4/25/2019
Boron, total	mg/L	NA	0.522	<0.0500	1.7	0.302	0.0537	1.67	0.134	0.288	0.436
Calcium, total	mg/L	NA	100	80.6	106	105	60.3	95.5	61.6	92.6	87.2
Chloride, total	mg/L	NA	8.82	23.5	13.5	23.1	<1.000	18.7	3.88	6.81	4.12
Fluoride, total	mg/L	NA	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500
pH, lab	pH	NA	7.66	7.86	7.76	7.77	7.97	7.72	7.87	7.66	7.71
Sulfate, total	mg/L	NA	89.3	24	135	92.2	7.9	180	16.9	68.1	52.4
Total Dissolved Solids	mg/L	NA	406	292	478	414	188	510	240	392	330

Appendix IV Parameters											
Parameter	Units	GWPS	Well ID and Sample Date								
			P-01A-1	P-17	P-22	P-23	P-152A	P-155	P-156	P-157	P-158
			4/25/2019	4/24/2019	4/25/2019	4/25/2019	4/24/2019	6/5/2019	4/25/2019	4/25/2019	4/25/2019
Antimony, total	mg/L	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Arsenic, total	mg/L	0.01	0.0006	0.0007	0.0006	0.0007	<0.0005	<0.0005	0.0006	0.0005	0.0006
Barium, total	mg/L	2	0.0458	0.0411	0.0641	0.0645	0.0354	0.0628	0.0478	0.0462	0.0529
Beryllium, total	mg/L	0.004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cadmium, total	mg/L	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Chromium, total	mg/L	0.1	0.0012	0.0009	0.0011	0.0011	0.0007	0.0011	0.0008	0.0015	0.0009
Cobalt, total	mg/L	0.006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Fluoride, total	mg/L	4	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500
Lead, total	mg/L	0.015	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Lithium, total	mg/L	0.04	<0.0150	<0.0150	<0.0150	<0.0150	<0.0150	0.0285	<0.0150	<0.0150	<0.0150
Mercury, total	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Molybdenum, total	mg/L	0.1	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Selenium, total	mg/L	0.05	0.0053	0.0007	0.0065	0.0014	<0.0005	0.0045	0.0013	0.0023	0.0018
Thallium, total	mg/L	0.002	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Radium, 226 and 228 combined	pCi/L	5	<1.120	<1.090	1.3	<1.200	3.12	<1.860	<1.160	<1.220	<1.560

Field Parameters											
Parameter	Units	GWPS	Well ID and Sample Date								
			P-01A-1	P-17	P-22	P-23	P-152A	P-155	P-156	P-157	P-158
			4/25/2019	4/24/2019	4/25/2019	4/25/2019	4/24/2019	6/5/2019	4/25/2019	4/25/2019	4/25/2019
ORP	mV	NA	153	195	178	173	184	248	183	187	224
Oxygen, dissolved	mg/L	NA	4.8	6.9	5.3	6.9	8.8	7.8	5.8	5.5	7.2
pH, field	pH	NA	7.3	7.5	7.4	7.3	7.4	6.9	7.4	7.3	7.3
Specific Cond, field	µmhos/cm	NA	630	500	720	660	350	760	400	600	520
Static Water Level	ft	NA	77	37.09	38.96	41.29	37.35	75.87	76.3	41.93	39.72
Temperature	degrees C	NA	12	11	11	11.5	10.5	12	12	11	10.5
Turbidity, field	NTU	NA	1.2	1.1	2.8	1.7	1.6	7.2	1.5	2.8	1.7
Water Level Elevation	ft	NA	925.8	927.25	925.37	925.97	928.52	926.85	926.09	926.24	926.83

GWPS = Groundwater Protection Standard

NA = Not Applicable

Downgradient Well

Table 5
Fall 2019 Groundwater Summary Data
 Bottom Ash Pond

Appendix III Parameters											
Parameter	Units	GWPS	Well ID and Sample Date								
			P-01A-1	P-17	P-22	P-23	P-152A	P-155	P-156	P-157	P-158
			10/22/2019	10/23/2019	10/23/2019	10/23/2019	10/21/2019	10/22/2019	10/22/2019	10/23/2019	10/23/2019
Boron, total	mg/L	NA	0.449	<0.0500	0.925	0.26	<0.0500	1.5	0.128	0.247	0.385
Calcium, total	mg/L	NA	87	69.8	72.6	84.9	49.4	84.8	59.2	81	90
Chloride, total	mg/L	NA	7.35	23.1	8.8	24.3	<1.000	18.8	3.51	5.99	4
Fluoride, total	mg/L	NA	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500	<0.7500
pH, Lab	pH	NA	7.72	7.97	7.94	7.93	7.94	7.82	7.93	7.8	7.79
Sulfate, total	mg/L	NA	104	25.8	80.3	70.7	7.71	180	25.5	62.6	102
Total Dissolved Solids	mg/L	NA	408	284	324	364	178	490	244	352	398

Appendix IV Parameters											
Parameter	Units	GWPS	Well ID and Sample Date								
			P-01A-1	P-17	P-22	P-23	P-152A	P-155	P-156	P-157	P-158
			10/22/2019	10/23/2019	10/23/2019	10/23/2019	10/21/2019	10/22/2019	10/22/2019	10/23/2019	10/23/2019
Antimony, total	mg/L	0.006	--	--	--	--	--	--	--	--	--
Arsenic, total	mg/L	0.01	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium, total	mg/L	2	0.0445	0.0391	0.0468	0.0567	0.0322	0.0623	0.0482	0.0444	0.0696
Beryllium, total	mg/L	0.004	--	--	--	--	--	--	--	--	--
Cadmium, total	mg/L	0.005	--	--	--	--	--	--	--	--	--
Chromium, total	mg/L	0.1	0.001	0.0008	0.0007	0.0008	0.0005	0.0009	0.0008	0.0012	0.0009
Cobalt, total	mg/L	0.006	--	--	--	--	--	--	--	--	--
Fluoride, total	mg/L	4	--	--	--	--	--	--	--	--	--
Lead, total	mg/L	0.015	--	--	--	--	--	--	--	--	--
Lithium, total	mg/L	0.04	<0.0150	<0.0150	<0.0150	<0.0150	<0.0150	0.0296	<0.0150	<0.0150	<0.0150
Mercury, total	mg/L	0.002	--	--	--	--	--	--	--	--	--
Molybdenum, total	mg/L	0.1	--	--	--	--	--	--	--	--	--
Selenium, total	mg/L	0.05	0.006	0.0006	0.0035	0.0011	<0.0005	0.0048	0.0021	0.002	0.0018
Thallium, total	mg/L	0.002	--	--	--	--	--	--	--	--	--
Radium, 226 and 228 combined	pCi/L	5	2.32	<1.440	<1.350	<1.360	<1.260	<1.250	<1.610	<1.510	<1.370

Field Parameters											
Parameter	Units	GWPS	Well ID and Sample Date								
			P-01A-1	P-17	P-22	P-23	P-152A	P-155	P-156	P-157	P-158
			10/22/2019	10/23/2019	10/23/2019	10/23/2019	10/21/2019	10/22/2019	10/22/2019	10/23/2019	10/23/2019
ORP	mV	NA	195	204	198	200	221	183	208	194	204
Oxygen, dissolved	mg/L	NA	5.6	6.6	7.1	7.6	9.5	5	5.6	8	8.8
pH, field	pH	NA	7.6	7.4	7.6	7.7	7.6	7.7	7.7	7.6	7.5
Specific Cond, field	µmhos/cm	NA	480	530	580	620	340	780	420	590	640
Static Water Level	ft	NA	75.63	35.2	37.58	39.64	35.11	75.85	74.87	40.21	37.86
Temperature	degrees C	NA	10.5	9.5	9.5	11.5	9.5	10.5	10.5	10	9.5
Turbidity, field	NTU	NA	4.3	4.2	3.4	3	3	6.7	3.3	2.9	204
Water Level Elevation	ft	NA	927.17	929.14	926.75	927.62	930.76	926.87	927.52	927.96	928.69

GWPS = Groundwater Protection Standard

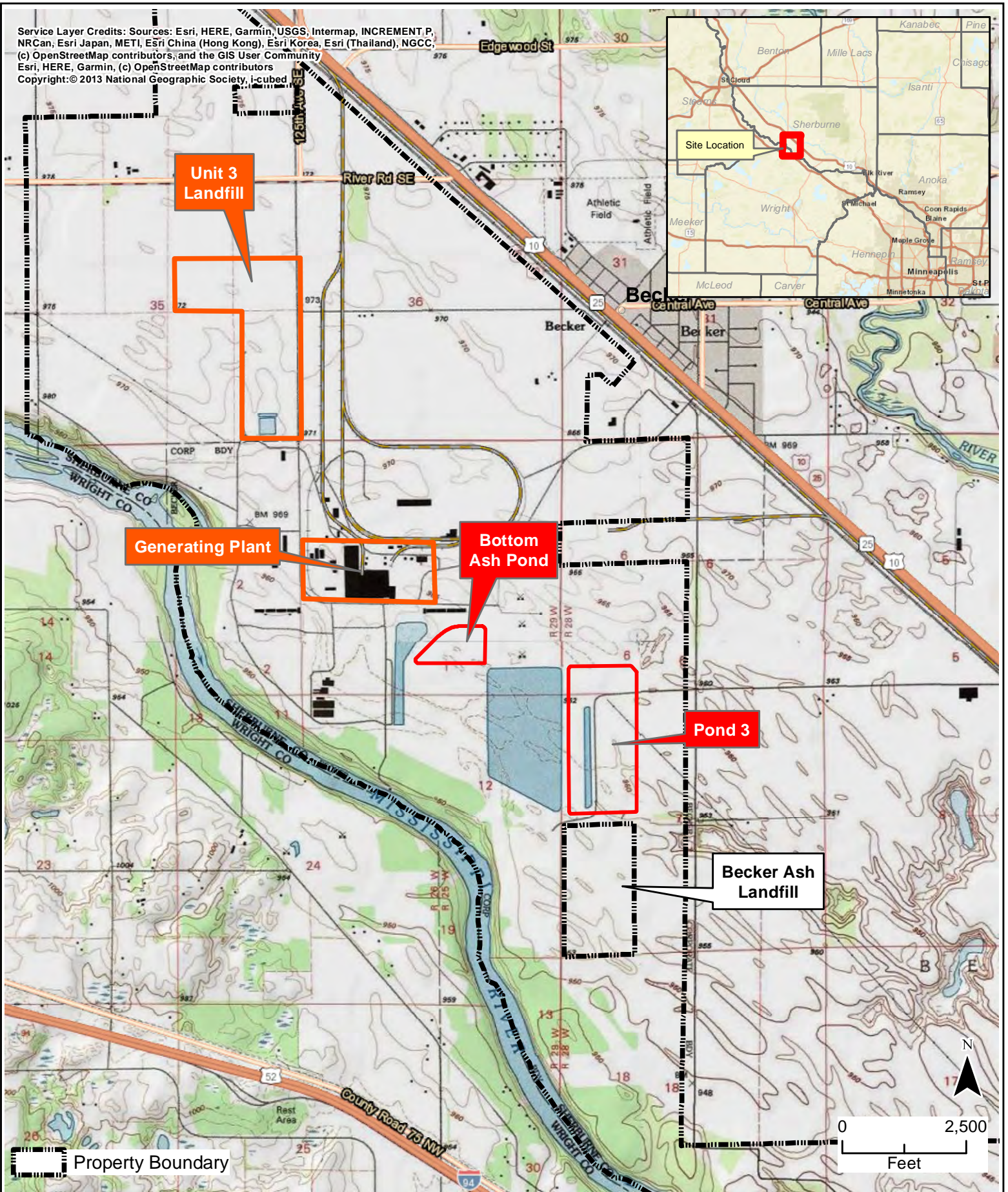
NA = Not Applicable

Two dashed lines = Not Analyzed

Downgradient Well

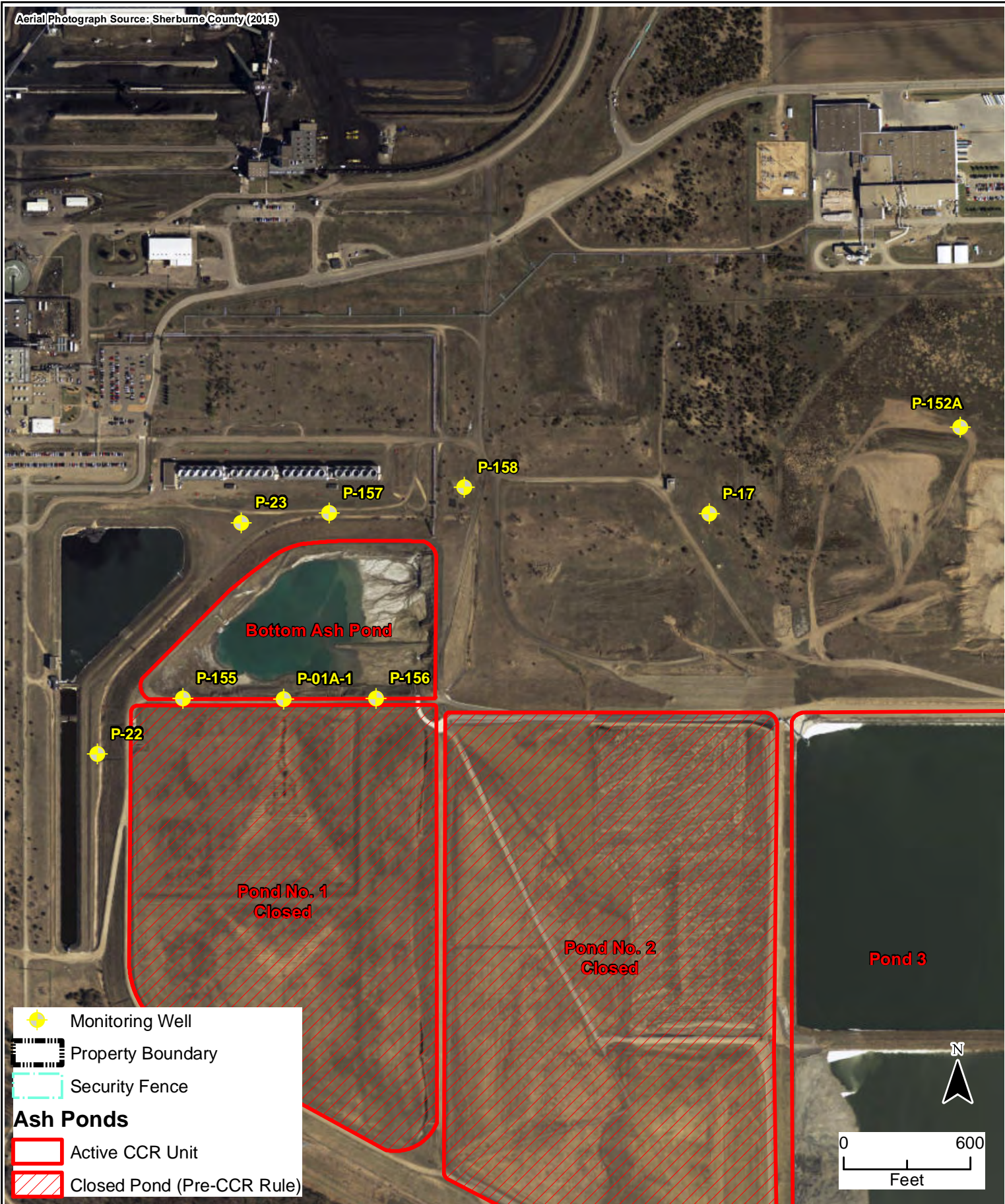
Figures

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2019 CCR ANNUAL GROUNDWATER
 MONITORING REPORT
 Bottom Ash Pond
 Sherburne County Generating Plant
 Becker, Minnesota

FIGURE 1
 SITE
 LOCATION MAP



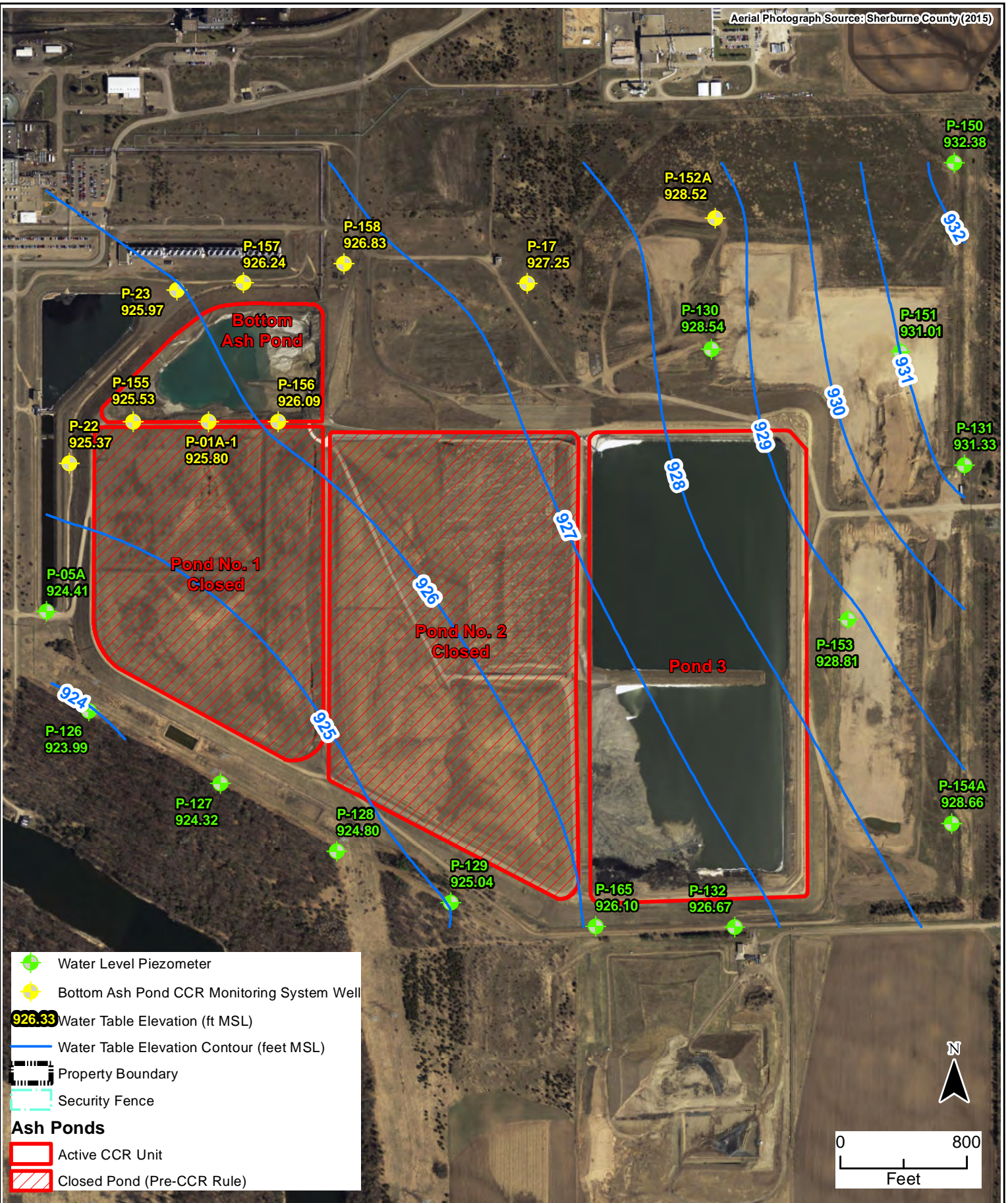
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-  Monitoring Well
-  Property Boundary
-  Security Fence
- Ash Ponds**
-  Active CCR Unit
-  Closed Pond (Pre-CCR Rule)

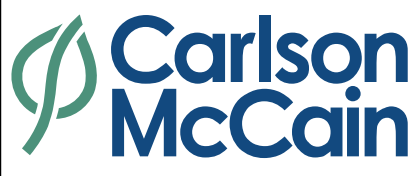


2019 CCR ANNUAL GROUNDWATER
 MONITORING REPORT
 Bottom Ash Pond
 Sherburne County Generating Plant
 Becker, Minnesota

FIGURE 2
 CCR GROUNDWATER
 MONITORING SYSTEM



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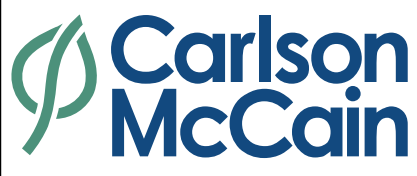
2019 CCR ANNUAL GROUNDWATER MONITORING REPORT
 Bottom Ash Pond
 Sherburne County Generating Plant
 Becker, Minnesota

FIGURE 3
 WATER TABLE ELEVATION CONTOUR MAP (04/21-24/2019)





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2019 CCR ANNUAL GROUNDWATER MONITORING REPORT
 Bottom Ash Pond
 Sherburne County Generating Plant
 Becker, Minnesota

FIGURE 4
 WATER TABLE ELEVATION CONTOUR MAP (10/21-24/2019)

Appendix A

Spring 2019 Assessment Monitoring Event Field Datasheets and Laboratory Reports

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Spring ²⁰¹⁹ Project No. 19-01918
 Monitoring Point ID P-01A-1 Labeled P-01A
 Inside Diameter 2 (inches) Key # 2106 Locked Not Locked
 Casing Material: PVC Steel Stainless Steel cover will not close.

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet
 Total Well Depth 80.98 Feet
 Static water level measurement before purging (Start Depth) 77.00 Feet
 Static water level measurement at time of sampling (Final Depth) 77.00 Feet
 Static Water Level Elevation Before Purging NA Feet
 Purge Method dedicated bladder pump Pump ID PC-6
 Date Purged 4/25/19 Water Column 3.98 Feet
 Time Purged 1325-1337 One Casing Volume 0.6 Gallons
 Pump Rate 0.15 **(GPM)** / LPM Volume Purged 1.8 Gallons

Field Sampling Data

Date Sampled 4/25/19 Time Sampled 1350
 Sampling Equip. above pump Meter ID MPS-5 Analyzed by DJA
Field Parameter Measurements of Sample
 pH 7.3 (units) D.O. 4.8 (mg/l)
 Spec. Cond. 630 (µmhos/cm) Turbidity 1.2 (NTU)
 Temp. 12.0 (°C) Eh 153 (mV)
 Other NA

Field Measurements Temp. Corrected: Yes No NA
 Sample for Soluble Metals Filtered in Field: Yes No NA
 Weather Conditions During Sampling: 65° + sunny, wind NW 15
 Sample Description: clear + odorless
 Observations: DJA 4/25/19

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1329	7.3	630	11.5	5.3	NA	160	0.6
1333	7.3	630	12.0	5.0	NA	156	1.2
1337	7.3	630	12.0	4.8	NA	153	1.8
<u>DJA 4/25/19</u>							

Samples chilled immediately after collection: Yes Other

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical
 Lead Technician Signature: David Anderson Date: 4/25/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Spring ²⁰¹⁹ Project No. 19-01918

Monitoring Point ID P-17 Labeled P17

Inside Diameter 2 (inches) Key # 2106 Locked Not Locked

Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet

Total Well Depth 58.76 Feet

Static water level measurement before purging (Start Depth) 37.09 Feet

Static water level measurement at time of sampling (Final Depth) 37.09 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 4/24/19 Water Column 21.67 Feet

Time Purged 1715-1827 One Casing Volume 3.5 Gallons

Pump Rate 0.15 **GPM** / LPM Volume Purged 10.8 Gallons

Field Sampling Data

Date Sampled 4/24/19

Time Sampled 1835

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.5 (units) D.O. 6.9 (mg/l)

Spec. Cond. 500 (µmhos/cm) Turbidity 1.1 (NTU)

Temp. 11.0 (°C) Eh 195 (mV)

Other NA

Field Measurements Temp. Corrected: Yes No NA

Sample for Soluble Metals Filtered in Field: Yes No NA

Weather Conditions During Sampling: 65°+ sunny, wind SW 15

Sample Description: clear + odorless

Observations: DJA 4/24/19

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1739	7.6	500	11.0	6.8	NA	145	3.6
1803	7.5	500	11.0	6.9	NA	169	7.2
1827	7.5	500	11.0	6.9	NA	195	10.8
DJA 4/24/19							

Samples chilled immediately after collection: Yes Other

Form Revised: 01/25/2018

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson Date: 4/24/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Spring ²⁰¹⁹ Project No. 19-01918

Monitoring Point ID P-22 Labeled P-22

Inside Diameter 2 (inches) Key # 2106 Locked Not Locked

Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet

Total Well Depth 57.85 Feet

Static water level measurement before purging (Start Depth) 38.96 Feet

Static water level measurement at time of sampling (Final Depth) 38.96 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 4/25/19 Water Column 18.89 Feet

Time Purged 1105 - 1153 One Casing Volume 3.1 Gallons

Pump Rate 0.2 (GPM) LPM Volume Purged 9.6 Gallons

Field Sampling Data

Date Sampled 4/25/19 Time Sampled 1200

Sampling Equip. above pump Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.4 (units) D.O. 5.3 (mg/l)

Spec. Cond. 720 (umhos/cm) Turbidity 2.8 (NTU)

Temp. 11.0 (°C) Eh 178 (mV)

Other NA

Field Measurements Temp. Corrected: Yes No NA

Sample for Soluble Metals Filtered in Field: Yes No NA

Weather Conditions During Sampling: 54° + partly cloudy, wind NW 10

Sample Description: clear + odorless

Observations: DJA 4/25/19

Stabilization Test

Time	pH (units)	Specific Conductance (umhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1121	7.3	720	11.0	5.3	NA	185	3.2
1137	7.4	720	11.0	5.3	NA	180	6.4
1153	7.4	720	11.0	5.3	NA	178	9.6
<u>DJA 4/25/19</u>							

Samples chilled immediately after collection Yes Other

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson Date: 4/25/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Spring ²⁰¹⁹ Project No. 19-01918

Monitoring Point ID P-23 Labeled P23

Inside Diameter 2 (inches) Key # 2106 Locked Not Locked

Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet

Total Well Depth 67.34 Feet

Static water level measurement before purging (Start Depth) 41.29 Feet

Static water level measurement at time of sampling (Final Depth) 41.29 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID SP-1

Date Purged 4/25/19 Water Column 26.05 Feet

Time Purged 0745-0848 One Casing Volume 4.2 Gallons

Pump Rate 0.2 **GPM** / LPM Volume Purged 12.6 Gallons

Field Sampling Data

Date Sampled 4/25/19

Time Sampled 0900

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.3 (units) D.O. 6.9 (mg/l)

Spec. Cond. 660 (µmhos/cm) Turbidity 1.7 (NTU)

Temp. 11.5 (°C) Eh 173 (mV)

Other NA

Field Measurements Temp. Corrected: Yes No NA

Sample for Soluble Metals Filtered in Field: Yes No NA

Weather Conditions During Sampling: 42° + cloudy, wind SW 10

Sample Description: clear + odorless

Observations: DJA 4/25/19

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
0806	7.3	660	11.5	7.2	NA	194	4.2
0827	7.3	660	11.5	7.0	NA	184	8.4
0848	7.3	660	11.5	6.9	NA	173	12.6
<u>DJA 4/25/19</u>							

Samples chilled immediately after collection Yes Other

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson Date: 4/25/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Spring ²⁰¹⁹ Project No. 19-01918

Monitoring Point ID P-152A Labeled 806318

Inside Diameter 2 (inches) Key # 2106 Locked Not Locked

Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet

Total Well Depth 42.18 Feet

Static water level measurement before purging (Start Depth) 37.35 Feet

Static water level measurement at time of sampling (Final Depth) 37.35 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 4/24/19 Water Column 4.83 Feet

Time Purged 0820-0838 One Casing Volume 0.8 Gallons

Pump Rate 0.15 **(GPM)** LPM Volume Purged 2.7 Gallons

Field Sampling Data

Date Sampled 4/24/19 Time Sampled 0850

Sampling Equip. above pump Meter ID MPS-5 Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.4 (units) D.O. 8.8 (mg/l)

Spec. Cond. 350 (µmhos/cm) Turbidity 1.6 (NTU)

Temp. 10.5 (°C) Eh 184 (mV)

Other NA

Field Measurements Temp. Corrected: Yes No NA

Sample for Soluble Metals Filtered in Field: Yes No NA

Weather Conditions During Sampling: 45° + cloudy, wind 510

Sample Description: clear + odorless

Observations: collected rinse CER - P3 Blank at this well.

DJA 4/24/19

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
0826	7.3	350	10.5	8.8	NA	185	0.9
0832	7.4	350	10.5	8.8	NA	184	1.8
0838	7.4	350	10.5	8.8	NA	184	2.7
DJA 4/24/19							

Samples chilled immediately after collection: Yes Other

Form Revised: 01/25/2018

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson Date: 4/24/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Spring ²⁰¹⁹ Project No. 19-01918
 Monitoring Point ID P-155 Labeled 812964
 Inside Diameter 2 (inches) Key # 2106 Locked Not Locked
 Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet
 Total Well Depth 85.47 Feet
 Static water level measurement before purging (Start Depth) 77.19 Feet
 Static water level measurement at time of sampling (Final Depth) 77.19 Feet
 Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump disposable boiler Pump ID NA
 Date Purged 4/25/19 Water Column 8.28 Feet
 Time Purged 1215-1242 One Casing Volume 1.3 Gallons
 Pump Rate 0.15 **GPM** / LPM Volume Purged 4.05 Gallons

Field Sampling Data

Date Sampled 4/25/19
 Time Sampled 1250
 Sampling Equip. above pump boiler
 Meter ID MPS-5
 Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.3 (units) D.O. 5.8 (mg/l)
 Spec. Cond. 750 (umhos/cm) Turbidity 66.4 (NTU)
 Temp. 11.5 (°C) Eh 178 (mV)
 Other NA

Field Measurements Temp. Corrected: Yes No NA
 Sample for Soluble Metals Filtered in Field: Yes No NA

Weather Conditions During Sampling: 60° + partly cloudy, wind NW 10
 Sample Description: clear + odorless
 Observations: pump would not work. DJA 4/25/19

Stabilization Test

Time	pH (units)	Specific Conductance (umhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1224	7.3	750	11.5	5.6	NA	182	1.35
1233	7.3	750	11.5	5.8	NA	179	2.70
1242	7.3	750	11.5	5.8	NA	178	4.05
DJA 4/25/19							

Samples chilled immediately after collection Yes Other

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical
 Lead Technician Signature: David Anderson Date: 4/25/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Special, 6/19 Project No. 19-02091

Monitoring Point ID P-155 Labeled 812964

Inside Diameter 2 (inches) Key # 2106 Locked Not Locked

Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet

Total Well Depth 85.47 Feet

Static water level measurement before purging (Start Depth) 75.87 Feet

Static water level measurement at time of sampling (Final Depth) 75.87 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method Grindfastediflo sub pump dedicated bladder Pump ID PC-6

Date Purged 6/5/19 Water Column 9.60 Feet

Time Purged 0915-1003 One Casing Volume 1.6 Gallons

Pump Rate 0.1 **GPM** / LPM Volume Purged 4.8 Gallons

Field Sampling Data

Date Sampled 6/5/19

Time Sampled 1015

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 6.9 (units) D.O. 7.8 (mg/l)

Spec. Cond. 760 (µmhos/cm) Turbidity 7.2 (NTU)

Temp. 12.0 (°C) Eh 248 (mV)

Other NA

Field Measurements Temp. Corrected: Yes No NA

Sample for Soluble Metals Filtered in Field: Yes No NA

Weather Conditions During Sampling: 65°+ sunny, wind N 5-10

Sample Description: clear + odorless

Observations: Dedicated bladder pump working, need to increase fill time for bladder to around 20 seconds.

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
0931	6.8	760	12.0	8.0	NA	273	1.6
0947	6.9	760	12.0	7.9	NA	260	3.2
1003	6.9	760	12.0	7.8		248	4.8
<u>DJA 6/5/19</u>							

Samples chilled immediately after collection: Yes Other

Form Revised: 01/25/2019

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson Date: 6/5/19

Well Description and Resampling Information

Client Xcel Energy Project Sherco Ponds, Spring ²⁰¹⁹ Project No. 19-01918

Monitoring Point ID P-156 Labeled 812965

Inside Diameter 2 (Inches) Key # 2106 Locked Not Locked

Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet

Total Well Depth 85.53 Feet

Static water level measurement before purging (Start Depth) 76.30 Feet

Static water level measurement at time of sampling (Final Depth) 76.30 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 4/25/19 Water Column 9.23 Feet

Time Purged 1405-1435 One Casing Volume 1.5 Gallons

Pump Rate 0.15 **GPM** / LPM Volume Purged 4.5 Gallons

Field Sampling Data

Date Sampled 4/25/19 Time Sampled 1450

Sampling Equip. above pump Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.4 (units) D.O. 5.8 (mg/l)

Spec. Cond. 400 (µmhos/cm) Turbidity 1.5 (NTU)

Temp. 12.0 (°C) Eh 183 (mV)

Other NA

Field Measurements Temp. Corrected: Yes No NA

Sample for Soluble Metals Filtered in Field: Yes No NA

Weather Conditions During Sampling: 67° + sunny, wind SW 20

Sample Description: clear + odorless

Observations: DJA 4/25/19

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1415	7.4	410	12.0	5.9	NA	194	1.5
1425	7.4	400	12.0	5.8	NA	187	3.0
1435	7.4	400	12.0	5.8	NA	183	4.5
<u>DJA 4/25/19</u>							

Samples chilled immediately after collection: Yes Other

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson Date: 4/25/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Spring ²⁰¹⁹ Project No. 19-01918

Monitoring Point ID P-157 Labeled 812966

Inside Diameter 2 (inches) Key # 2106 Locked Not Locked

Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet

Total Well Depth 49.06 Feet

Static water level measurement before purging (Start Depth) 41.93 Feet

Static water level measurement at time of sampling (Final Depth) 41.93 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 4/25/19 Water Column 7.13 Feet

Time Purged 1015-1039 One Casing Volume 1.2 Gallons

Pump Rate 0.15 **GPM** / LPM Volume Purged 3.6 Gallons

Field Sampling Data

Date Sampled 4/25/19

Time Sampled 1050

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.3 (units) D.O. 5.5 (mg/l)

Spec. Cond. 600 (µmhos/cm) Turbidity 2.8 (NTU)

Temp. 11.0 (°C) Eh 187 (mV)

Other NA

Field Measurements Temp. Corrected: Yes No NA

Sample for Soluble Metals Filtered in Field: Yes No NA

Weather Conditions During Sampling: 50° + cloudy, wind NW 10

Sample Description: clear + odorless

Observations: collected duplicate CCR-BAP at this well.

DJA 4/25/19

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1023	7.3	600	11.0	5.6	NA	189	1.2
1031	7.3	600	11.0	5.5	NA	188	2.4
1039	7.3	600	11.0	5.5	NA	187	3.6
<u>DJA 4/25/19</u>							

Samples chilled immediately after collection Yes Other

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson Date: 4/25/19

Client Xcel Energy **Project** Sherco Ponds, Spring ²⁰¹⁹ **Project No.** 19-01918

Monitoring Point ID P-158 **Labeled** 812967

Inside Diameter 2 (inches) **Key #** 2106 **Locked** **Not Locked**

Casing Material: **PVC** **Steel** **Stainless Steel**

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA **Feet**

Total Well Depth 49.16 **Feet**

Static water level measurement before purging (Start Depth) 39.72 **Feet**

Static water level measurement at time of sampling (Final Depth) 39.72 **Feet**

Static Water Level Elevation Before Purging NA **Feet**

Purge Method dedicated bladder pump **Pump ID** PC-6

Date Purged 4/25/19 **Water Column** 9.44 **Feet**

Time Purged 0920-0950 **One Casing Volume** 1.5 **Gallons**

Pump Rate 0.15 **GPM/LPM** **Volume Purged** 4.5 **Gallons**

Date Sampled 4/25/19 **Time Sampled** 1000

Sampling Equip. above pump **Meter ID** MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.3 (units) **D.O** 7.2 (mg/l)

Spec. Cond. 520 (µmhos/cm) **Turbidity** 1.7 (NTU)

Temp. 10.5 (°C) **Eh** 224 (mV)

Other NA

Field Measurements Temp. Corrected: **Yes** **No** **NA**

Sample for Soluble Metals Filtered in Field: **Yes** **No** **NA**

Weather Conditions During Sampling: 45°+ cloudy, wind SW 10

Sample Description: clear + odorless

Observations: collected rinse CCR-BAP at this well.

DJA 4/25/19.

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
0930	7.4	530	10.5	7.4	NA	190	1.5
0940	7.3	520	10.5	7.2	NA	220	3.0
0950	7.3	520	10.5	7.2	NA	224	4.5
DJA 4/25/19							

Samples chilled immediately after collection **Yes** **Other**

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson **Date:** 4/25/19



Minneapolis Testing Laboratory
1518 Chestnut Ave N
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Certification #MN-027-053-197
WI-999071150
Christine Keefe, Supervisor (612) 630-4506

17 May 2019

Eric Ealy

Environmental Services-Water Minneapolis

250 Marquette Plaza

Minneapolis, MN 55401

RE: Sherco Ponds Spring

cc:

Enclosed are the results of analyses for samples received by the laboratory on 04/25/2019 05:51-04/26/2019 09:00. If you have any questions concerning this report, please feel free to contact me.

I certify that this analysis report was prepared under my direction or supervision under a system designed to assure that qualified personnel analyzed the submitted samples. All protocols for analysis were followed as required by Minnesota Rules and the Applicable Management Plan.

Sincerely,

Steve Davis

Project Manager



Minneapolis Testing Laboratory
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 Minneapolis, MN 55043
 Certification # MN-027-053-197
 WI-999071150

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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ANALYTICAL REPORT FOR SAMPLES

Sample ID	Sample Qualifier	Laboratory ID	Matrix	Sampled	Received
P-152A		MED0226-02	Water	04/24/2019 8:50	04/25/2019 5:51
P-17		MED0235-06	Water	04/24/2019 18:35	04/26/2019 9:00
P-23		MED0235-07	Water	04/25/2019 9:00	04/26/2019 9:00
Rinse CCR-BAP		MED0235-08	Water	04/25/2019 9:15	04/26/2019 9:00
P-158		MED0235-09	Water	04/25/2019 10:00	04/26/2019 9:00
P-157		MED0235-10	Water	04/25/2019 10:50	04/26/2019 9:00
Duplicate CCR-BAP		MED0235-11	Water	04/25/2019 10:50	04/26/2019 9:00
P-22		MED0235-12	Water	04/25/2019 12:00	04/26/2019 9:00
P-155		MED0235-13	Water	04/25/2019 12:50	04/26/2019 9:00
P-01A-1		MED0235-14	Water	04/25/2019 13:50	04/26/2019 9:00
P-156		MED0235-15	Water	04/25/2019 14:50	04/26/2019 9:00

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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P-152A

MED0226-02 (Water) - Chain of Custody Number: 2273454

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	< 1.00	1.00	mg/L		1	BED0545	4/26/19 6:42	4/26/19 16:13	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BED0545	4/26/19 6:42	4/26/19 16:13	EPA 300.0	CRL
Sulfate	7.90	1.00	mg/L		1	BED0545	4/26/19 6:42	4/26/19 16:13	EPA 300.0	CRL

Wet Chemistry

pH	7.97		pH Units	M_TTT	1	BED0511	4/25/19 7:18	4/25/19 12:15	SM 4500-H+ B	CRL
Total Dissolved Solids	188	20.0	mg/L		1	BED0568	4/29/19 8:48	4/29/19 8:48	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BED0567	4/29/19 6:57	4/29/19 6:57	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 8:36	EPA 200.8	CRL
Barium	35.4	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 8:36	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 8:36	EPA 200.8	CRL
Cadmium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 8:36	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 8:36	EPA 200.8	CRL
Chromium	0.669	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 8:36	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 8:36	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 8:36	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 8:36	EPA 200.8	CRL
Selenium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 8:36	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 8:36	EPA 200.8	CRL

Total Metals by ICP

Boron	0.0537	0.0500	mg/L		1	BED0563	4/28/19 7:22	5/1/19 11:05	EPA 200.7	HRD
Calcium	60.3	1.25	mg/L		1	BED0563	4/28/19 7:22	5/1/19 11:03	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BED0563	4/28/19 7:22	5/1/19 11:03	EPA 200.7	HRD



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Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Ponds Spring	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Eric Ealy	05/17/2019 09:58

P-152A

MED0226-02 (Water) - Chain of Custody Number: 2273454

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
Mercury										
Mercury	< 0.200	0.200	ug/L		1	BEE0042	5/2/19 8:29	5/2/19 13:46	EPA 245.1, 7470A	HRD

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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P-17

MED0235-06 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	23.5	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 17:31	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BED0569	4/29/19 7:12	4/29/19 17:31	EPA 300.0	CRL
Sulfate	24.0	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 17:31	EPA 300.0	CRL

Wet Chemistry

pH	7.86		pH Units	M_TTT	1	BED0556	4/26/19 10:37	4/26/19 11:51	SM 4500-H+ B	CRL
Total Dissolved Solids	292	20.0	mg/L		1	BED0584	4/30/19 8:58	4/30/19 8:58	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BED0583	4/30/19 7:22	4/30/19 7:22	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.691	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:07	EPA 200.8	CRL
Barium	41.1	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:07	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:07	EPA 200.8	CRL
Cadmium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:07	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:07	EPA 200.8	CRL
Chromium	0.948	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:07	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:07	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:07	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:07	EPA 200.8	CRL
Selenium	0.728	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:07	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:07	EPA 200.8	CRL

Total Metals by ICP

Boron	< 0.0500	0.0500	mg/L		1	BED0563	4/28/19 7:22	5/1/19 11:45	EPA 200.7	HRD
Calcium	80.6	1.25	mg/L		1	BED0563	4/28/19 7:22	5/1/19 11:43	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BED0563	4/28/19 7:22	5/1/19 11:44	EPA 200.7	HRD



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Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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P-17

MED0235-06 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
Mercury										
Mercury	< 0.200	0.200	ug/L		1	BEE0158	5/8/19 8:25	5/8/19 13:28	EPA 245.1, 7470A	HRD

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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P-23

MED0235-07 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	23.1	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 17:52	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BED0569	4/29/19 7:12	4/29/19 17:52	EPA 300.0	CRL
Sulfate	92.2	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 17:52	EPA 300.0	CRL

Wet Chemistry

pH	7.77		pH Units	M_TTT	1	BED0556	4/26/19 10:37	4/26/19 11:57	SM 4500-H+ B	CRL
Total Dissolved Solids	414	20.0	mg/L		1	BED0584	4/30/19 8:58	4/30/19 8:58	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BED0583	4/30/19 7:22	4/30/19 7:22	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.715	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:19	EPA 200.8	CRL
Barium	64.5	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:19	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:19	EPA 200.8	CRL
Cadmium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:19	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:19	EPA 200.8	CRL
Chromium	1.11	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:19	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:19	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:19	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:19	EPA 200.8	CRL
Selenium	1.37	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:19	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:19	EPA 200.8	CRL

Total Metals by ICP

Boron	0.302	0.0500	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:11	EPA 200.7	HRD
Calcium	105	1.25	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:09	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:09	EPA 200.7	HRD



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Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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P-23

MED0235-07 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
Mercury										
Mercury	< 0.200	0.200	ug/L		1	BEE0158	5/8/19 8:25	5/8/19 13:30	EPA 245.1, 7470A	HRD

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Rinse CCR-BAP

MED0235-08 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	< 1.00	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 18:12	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BED0569	4/29/19 7:12	4/29/19 18:12	EPA 300.0	CRL
Sulfate	< 1.00	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 18:12	EPA 300.0	CRL

Wet Chemistry

pH	6.11		pH Units	M_TTT	1	BED0556	4/26/19 10:37	4/26/19 12:01	SM 4500-H+ B	CRL
Total Dissolved Solids	< 20.0	20.0	mg/L		1	BED0584	4/30/19 8:58	4/30/19 8:58	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BED0583	4/30/19 7:22	4/30/19 7:22	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:23	EPA 200.8	CRL
Barium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:23	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:23	EPA 200.8	CRL
Cadmium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:23	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:23	EPA 200.8	CRL
Chromium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:23	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:23	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:23	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:23	EPA 200.8	CRL
Selenium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:23	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:23	EPA 200.8	CRL

Total Metals by ICP

Boron	< 0.0500	0.0500	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:17	EPA 200.7	HRD
Calcium	< 1.25	1.25	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:15	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:15	EPA 200.7	HRD



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Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Rinse CCR-BAP

MED0235-08 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
Mercury										
Mercury	< 0.200	0.200	ug/L		1	BEE0158	5/8/19 8:25	5/8/19 13:35	EPA 245.1, 7470A	HRD

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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MED0235-09 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	4.12	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 18:33	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BED0569	4/29/19 7:12	4/29/19 18:33	EPA 300.0	CRL
Sulfate	52.4	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 18:33	EPA 300.0	CRL

Wet Chemistry

pH	7.71		pH Units	M_TTT	1	BED0556	4/26/19 10:37	4/26/19 12:04	SM 4500-H+ B	CRL
Total Dissolved Solids	330	20.0	mg/L		1	BED0584	4/30/19 8:58	4/30/19 8:58	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BED0583	4/30/19 7:22	4/30/19 7:22	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.616	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:27	EPA 200.8	CRL
Barium	52.9	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:27	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:27	EPA 200.8	CRL
Cadmium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:27	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:27	EPA 200.8	CRL
Chromium	0.864	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:27	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:27	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:27	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:27	EPA 200.8	CRL
Selenium	1.75	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:27	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:27	EPA 200.8	CRL

Total Metals by ICP

Boron	0.436	0.0500	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:22	EPA 200.7	HRD
Calcium	87.2	1.25	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:20	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:20	EPA 200.7	HRD



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Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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MED0235-09 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
Mercury										
Mercury	< 0.200	0.200	ug/L		1	BEE0158	5/8/19 8:25	5/8/19 13:37	EPA 245.1, 7470A	HRD

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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MED0235-10 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	6.81	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 18:53	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BED0569	4/29/19 7:12	4/29/19 18:53	EPA 300.0	CRL
Sulfate	68.1	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 18:53	EPA 300.0	CRL

Wet Chemistry

pH	7.66		pH Units	M_TTT	1	BED0556	4/26/19 10:37	4/26/19 12:08	SM 4500-H+ B	CRL
Total Dissolved Solids	392	20.0	mg/L		1	BED0584	4/30/19 8:58	4/30/19 8:58	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BED0583	4/30/19 7:22	4/30/19 7:22	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.528	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:30	EPA 200.8	CRL
Barium	46.2	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:30	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:30	EPA 200.8	CRL
Cadmium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:30	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:30	EPA 200.8	CRL
Chromium	1.46	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:30	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:30	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:30	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:30	EPA 200.8	CRL
Selenium	2.26	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:30	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:30	EPA 200.8	CRL

Total Metals by ICP

Boron	0.288	0.0500	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:27	EPA 200.7	HRD
Calcium	92.6	1.25	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:25	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:25	EPA 200.7	HRD



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MED0235-10 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
Mercury										
Mercury	< 0.200	0.200	ug/L		1	BEE0158	5/8/19 8:25	5/8/19 13:38	EPA 245.1, 7470A	HRD

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Duplicate CCR-BAP
MED0235-11 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	6.63	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 19:13	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BED0569	4/29/19 7:12	4/29/19 19:13	EPA 300.0	CRL
Sulfate	67.9	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 19:13	EPA 300.0	CRL

Wet Chemistry

pH	7.68		pH Units	M_TTT	1	BED0556	4/26/19 10:37	4/26/19 12:22	SM 4500-H+ B	CRL
Total Dissolved Solids	372	20.0	mg/L		1	BED0622	5/1/19 9:16	5/1/19 9:16	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BED0621	5/1/19 7:27	5/1/19 7:27	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.520	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:34	EPA 200.8	CRL
Barium	44.9	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:34	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:34	EPA 200.8	CRL
Cadmium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:34	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:34	EPA 200.8	CRL
Chromium	1.46	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:34	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:34	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:34	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:34	EPA 200.8	CRL
Selenium	2.27	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:34	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:34	EPA 200.8	CRL

Total Metals by ICP

Boron	0.287	0.0500	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:32	EPA 200.7	HRD
Calcium	92.2	1.25	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:31	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:31	EPA 200.7	HRD



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Duplicate CCR-BAP
MED0235-11 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
Mercury										
Mercury	< 0.200	0.200	ug/L		1	BEE0158	5/8/19 8:25	5/8/19 13:40	EPA 245.1, 7470A	HRD

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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MED0235-12 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	13.5	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 19:34	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BED0569	4/29/19 7:12	4/29/19 19:34	EPA 300.0	CRL
Sulfate	135	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 19:34	EPA 300.0	CRL

Wet Chemistry

pH	7.76		pH Units	M_TTT	1	BED0556	4/26/19 10:37	4/26/19 12:29	SM 4500-H+ B	CRL
Total Dissolved Solids	478	20.0	mg/L		1	BED0622	5/1/19 9:16	5/1/19 9:16	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BED0621	5/1/19 7:27	5/1/19 7:27	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.620	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:38	EPA 200.8	CRL
Barium	64.1	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:38	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:38	EPA 200.8	CRL
Cadmium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:38	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:38	EPA 200.8	CRL
Chromium	1.08	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:38	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:38	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:38	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:38	EPA 200.8	CRL
Selenium	6.49	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:38	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:38	EPA 200.8	CRL

Total Metals by ICP

Boron	1.70	0.0500	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:37	EPA 200.7	HRD
Calcium	106	1.25	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:36	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:36	EPA 200.7	HRD



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P-22

MED0235-12 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
Mercury										
Mercury	< 0.200	0.200	ug/L		1	BEE0158	5/8/19 8:25	5/8/19 13:42	EPA 245.1, 7470A	HRD

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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~~P-155~~

MED0235-13 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	19.0	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 19:54	EPA-300.0	CRL
Fluoride	<0.750	0.750	mg/L		1	BED0569	4/29/19 7:12	4/29/19 19:54	EPA-300.0	CRL
Sulfate	165	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 19:54	EPA-300.0	CRL

Wet Chemistry

pH	7.76		pH Units	M_TTT	1	BED0556	4/26/19 10:37	4/26/19 12:33	SM-4500-H+ B	CRL
Total Dissolved Solids	512	20.0	mg/L		1	BED0622	5/1/19 9:16	5/1/19 9:16	SM-2540C	HSD
Total Suspended Solids	114	10.0	mg/L		1	BED0621	5/1/19 7:27	5/1/19 7:27	SM-2540D	HSD

Total Metals by ICPMS

Arsenic	1.89	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:42	EPA-200.8	CRL
Barium	102	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:42	EPA-200.8	CRL
Beryllium	<0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:42	EPA-200.8	CRL
Cadmium	<0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:42	EPA-200.8	CRL
Cobalt	6.22	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:42	EPA-200.8	CRL
Chromium	22.5	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:42	EPA-200.8	CRL
Molybdenum	1.28	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:42	EPA-200.8	CRL
Lead	3.39	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:42	EPA-200.8	CRL
Antimony	<0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:42	EPA-200.8	CRL
Selenium	4.29	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:42	EPA-200.8	CRL
Thallium	<0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:42	EPA-200.8	CRL

Total Metals by ICP

Boron	1.64	0.0500	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:42	EPA-200.7	HRD
Calcium	103	1.25	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:41	EPA-200.7	HRD
Lithium	0.0301	0.0150	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:41	EPA-200.7	HRD



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 WI-999071150

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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~~P-155~~

MED0235-13 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
Mercury										
Mercury	<0.200	0.200	ug/L		1	BEE0158	5/8/19 8:25	5/8/19 13:43	EPA-245.1, 7470A	HRD

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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P-01A-1

MED0235-14 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	8.82	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 20:15	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BED0569	4/29/19 7:12	4/29/19 20:15	EPA 300.0	CRL
Sulfate	89.3	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 20:15	EPA 300.0	CRL

Wet Chemistry

pH	7.66		pH Units	M_TTT	1	BED0556	4/26/19 10:37	4/26/19 12:39	SM 4500-H+ B	CRL
Total Dissolved Solids	406	20.0	mg/L		1	BED0622	5/1/19 9:16	5/1/19 9:16	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BED0621	5/1/19 7:27	5/1/19 7:27	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.610	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:46	EPA 200.8	CRL
Barium	45.8	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:46	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:46	EPA 200.8	CRL
Cadmium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:46	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:46	EPA 200.8	CRL
Chromium	1.21	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:46	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:46	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:46	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:46	EPA 200.8	CRL
Selenium	5.28	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:46	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BED0564	4/28/19 7:27	4/30/19 9:46	EPA 200.8	CRL

Total Metals by ICP

Boron	0.522	0.0500	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:47	EPA 200.7	HRD
Calcium	100	1.25	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:46	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BED0563	4/28/19 7:22	5/1/19 12:46	EPA 200.7	HRD



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 WI-999071150

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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P-01A-1

MED0235-14 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
Mercury										
Mercury	< 0.200	0.200	ug/L		1	BEE0158	5/8/19 8:25	5/8/19 13:45	EPA 245.1, 7470A	HRD

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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MED0235-15 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	3.88	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 20:35	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BED0569	4/29/19 7:12	4/29/19 20:35	EPA 300.0	CRL
Sulfate	16.9	1.00	mg/L		1	BED0569	4/29/19 7:12	4/29/19 20:35	EPA 300.0	CRL

Wet Chemistry

pH	7.87		pH Units	M_TTT	1	BED0556	4/26/19 10:37	4/26/19 12:43	SM 4500-H+ B	CRL
Total Dissolved Solids	240	20.0	mg/L		1	BED0622	5/1/19 9:16	5/1/19 9:16	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BED0621	5/1/19 7:27	5/1/19 7:27	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.594	0.500	ug/L		1	BED0571	4/29/19 8:32	4/30/19 11:52	EPA 200.8	CRL
Barium	47.8	0.500	ug/L		1	BED0571	4/29/19 8:32	4/30/19 11:52	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BED0571	4/29/19 8:32	4/30/19 11:52	EPA 200.8	CRL
Cadmium	< 0.500	0.500	ug/L		1	BED0571	4/29/19 8:32	4/30/19 11:52	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BED0571	4/29/19 8:32	4/30/19 11:52	EPA 200.8	CRL
Chromium	0.814	0.500	ug/L		1	BED0571	4/29/19 8:32	4/30/19 11:52	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BED0571	4/29/19 8:32	4/30/19 11:52	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BED0571	4/29/19 8:32	4/30/19 11:52	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BED0571	4/29/19 8:32	4/30/19 11:52	EPA 200.8	CRL
Selenium	1.33	0.500	ug/L		1	BED0571	4/29/19 8:32	4/30/19 11:52	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BED0571	4/29/19 8:32	4/30/19 11:52	EPA 200.8	CRL

Total Metals by ICP

Boron	0.134	0.0500	mg/L		1	BED0570	4/29/19 8:29	4/30/19 15:33	EPA 200.7	HRD
Calcium	61.6	1.25	mg/L		1	BED0570	4/29/19 8:29	4/30/19 15:31	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BED0570	4/29/19 8:29	4/30/19 15:31	EPA 200.7	HRD



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MED0235-15 (Water) - Chain of Custody Number: 2273455/2273453

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
Mercury										
Mercury	< 0.200	0.200	ug/L		1	BEE0158	5/8/19 8:25	5/8/19 13:47	EPA 245.1, 7470A	HRD

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Anions by Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0545 - Wet Prep

Blank (BED0545-BLK1)

Prepared & Analyzed: 04/26/2019

Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

LCS (BED0545-BS1)

Prepared & Analyzed: 04/26/2019

Chloride	25.1	1.00	mg/L	25.026		100	90-110			
Fluoride	3.34	0.750	mg/L	2.5000		134	90-110			M_LCS-H
Sulfate	50.3	1.00	mg/L	50.150		100	90-110			

LCS (BED0545-BS2)

Prepared & Analyzed: 04/26/2019

Chloride	24.5	1.00	mg/L	25.026		97.7	90-110			
Fluoride	3.38	0.750	mg/L	2.5000		135	90-110			M_LCS-H
Sulfate	49.2	1.00	mg/L	50.150		98.2	90-110			

LCS (BED0545-BS3)

Prepared & Analyzed: 04/26/2019

Chloride	24.5	1.00	mg/L	25.026		97.8	90-110			
Fluoride	3.39	0.750	mg/L	2.5000		135	90-110			M_LCS-H
Sulfate	49.2	1.00	mg/L	50.150		98.2	90-110			

Duplicate (BED0545-DUP1)

Source: MED0230-01

Prepared & Analyzed: 04/26/2019

Chloride	7.72	1.00	mg/L		7.86			1.77	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	6.04	1.00	mg/L		6.41			6.02	20	

Duplicate (BED0545-DUP2)

Source: MED0230-02

Prepared & Analyzed: 04/26/2019

Chloride	7.80	1.00	mg/L		7.88			1.01	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	6.30	1.00	mg/L		6.37			1.10	20	

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Anions by Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0545 - Wet Prep

Matrix Spike (BED0545-MS1)	Source: MED0230-01			Prepared & Analyzed: 04/26/2019						
Chloride	39.4	1.25	mg/L	31.283	7.86	101	80-120			
Fluoride	4.29	0.938	mg/L	3.1250	<0.938	137	80-120			M_MS
Sulfate	69.0	1.25	mg/L	62.688	6.41	99.8	80-120			

Matrix Spike (BED0545-MS2)	Source: MED0230-02			Prepared & Analyzed: 04/26/2019						
Chloride	39.4	1.25	mg/L	31.283	7.88	101	80-120			
Fluoride	4.31	0.938	mg/L	3.1250	<0.938	138	80-120			M_MS
Sulfate	68.7	1.25	mg/L	62.688	6.37	99.4	80-120			

Matrix Spike Dup (BED0545-MSD1)	Source: MED0230-01			Prepared & Analyzed: 04/26/2019						
Chloride	39.5	1.25	mg/L	31.283	7.86	101	80-120	0.418	20	
Fluoride	4.44	0.938	mg/L	3.1250	<0.938	142	80-120	3.43	20	M_MS
Sulfate	69.7	1.25	mg/L	62.688	6.41	101	80-120	0.977	20	

Matrix Spike Dup (BED0545-MSD2)	Source: MED0230-02			Prepared & Analyzed: 04/26/2019						
Chloride	39.5	1.25	mg/L	31.283	7.88	101	80-120	0.326	20	
Fluoride	4.46	0.938	mg/L	3.1250	<0.938	143	80-120	3.36	20	M_MS
Sulfate	69.2	1.25	mg/L	62.688	6.37	100	80-120	0.787	20	

Batch BED0569 - Wet Prep

Blank (BED0569-BLK1)	Prepared & Analyzed: 04/29/2019									
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

Blank (BED0569-BLK2)	Prepared & Analyzed: 04/29/2019									
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Anions by Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0569 - Wet Prep

LCS (BED0569-BS1)		Prepared & Analyzed: 04/29/2019								
Chloride	24.8	1.00	mg/L	25.026		99.0	90-110			
Fluoride	3.23	0.750	mg/L	2.5000		129	90-110			M_LCS-H
Sulfate	46.3	1.00	mg/L	50.150		92.4	90-110			

LCS (BED0569-BS2)		Prepared & Analyzed: 04/29/2019								
Chloride	24.4	1.00	mg/L	25.026		97.4	90-110			
Fluoride	3.36	0.750	mg/L	2.5000		134	90-110			M_LCS-H
Sulfate	45.5	1.00	mg/L	50.150		90.8	90-110			

LCS (BED0569-BS3)		Prepared & Analyzed: 04/29/2019								
Chloride	24.3	1.00	mg/L	25.026		97.3	90-110			
Fluoride	3.36	0.750	mg/L	2.5000		134	90-110			M_LCS-H
Sulfate	45.2	1.00	mg/L	50.150		90.1	90-110			

Duplicate (BED0569-DUP1)		Source: MED0230-06		Prepared & Analyzed: 04/29/2019						
Chloride	8.20	1.00	mg/L		8.26			0.777	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	5.94	1.00	mg/L		5.88			1.10	20	

Duplicate (BED0569-DUP2)		Source: MED0230-07		Prepared & Analyzed: 04/29/2019						
Chloride	7.79	1.00	mg/L		7.90			1.31	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	6.27	1.00	mg/L		6.28			0.0478	20	

Matrix Spike (BED0569-MS1)		Source: MED0230-06		Prepared & Analyzed: 04/29/2019						
Chloride	38.1	1.25	mg/L	31.283	8.26	95.5	80-120			
Fluoride	3.90	0.938	mg/L	3.1250	<0.938	125	80-120			M_MS
Sulfate	61.4	1.25	mg/L	62.688	5.88	88.5	80-120			

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Anions by Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0569 - Wet Prep

Matrix Spike (BED0569-MS2)		Source: MED0230-07			Prepared & Analyzed: 04/29/2019					
Chloride	38.8	1.25	mg/L	31.283	7.90	98.6	80-120			
Fluoride	4.20	0.938	mg/L	3.1250	<0.938	134	80-120			M_MS
Sulfate	63.4	1.25	mg/L	62.688	6.28	91.2	80-120			

Matrix Spike Dup (BED0569-MSD1)		Source: MED0230-06			Prepared & Analyzed: 04/29/2019					
Chloride	39.0	1.25	mg/L	31.283	8.26	98.2	80-120	2.20	20	
Fluoride	4.29	0.938	mg/L	3.1250	<0.938	137	80-120	9.43	20	M_MS
Sulfate	63.3	1.25	mg/L	62.688	5.88	91.6	80-120	3.08	20	

Matrix Spike Dup (BED0569-MSD2)		Source: MED0230-07			Prepared & Analyzed: 04/29/2019					
Chloride	38.7	1.25	mg/L	31.283	7.90	98.4	80-120	0.200	20	
Fluoride	4.35	0.938	mg/L	3.1250	<0.938	139	80-120	3.36	20	M_MS
Sulfate	63.5	1.25	mg/L	62.688	6.28	91.2	80-120	0.0611	20	

Batch BEE0002 - Wet Prep

Blank (BEE0002-BLK1)		Prepared & Analyzed: 05/01/2019								
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

Blank (BEE0002-BLK2)		Prepared & Analyzed: 05/01/2019								
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

LCS (BEE0002-BS1)		Prepared & Analyzed: 05/01/2019								
Chloride	25.2	1.00	mg/L	25.026		101	90-110			
Fluoride	3.41	0.750	mg/L	2.5000		136	90-110			M_LCS-H
Sulfate	51.3	1.00	mg/L	50.150		102	90-110			

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Anions by Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEE0002 - Wet Prep

LCS (BEE0002-BS2)		Prepared & Analyzed: 05/01/2019								
Chloride	24.3	1.00	mg/L	25.026		97.2	90-110			
Fluoride	3.36	0.750	mg/L	2.5000		134	90-110			M_LCS-H
Sulfate	49.3	1.00	mg/L	50.150		98.2	90-110			

LCS (BEE0002-BS3)		Prepared & Analyzed: 05/01/2019								
Chloride	24.5	1.00	mg/L	25.026		98.0	90-110			
Fluoride	3.31	0.750	mg/L	2.5000		132	90-110			M_LCS-H
Sulfate	49.6	1.00	mg/L	50.150		98.9	90-110			

Duplicate (BEE0002-DUP1)		Source: MED0235-16		Prepared & Analyzed: 05/01/2019						
Chloride	28.0	1.00	mg/L		28.2			0.634	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	105	1.00	mg/L		105			0.325	20	

Duplicate (BEE0002-DUP2)		Source: MED0235-18		Prepared & Analyzed: 05/01/2019						
Chloride	10.1	1.00	mg/L		10.2			1.37	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	33.6	1.00	mg/L		34.1			1.42	20	

Matrix Spike (BEE0002-MS1)		Source: MED0235-16		Prepared & Analyzed: 05/01/2019						
Chloride	58.4	1.25	mg/L	31.283	28.2	96.7	80-120			
Fluoride	3.98	0.938	mg/L	3.1250	<0.938	127	80-120			M_MS
Sulfate	166	1.25	mg/L	62.688	105	96.6	80-120			

Matrix Spike (BEE0002-MS2)		Source: MED0235-18		Prepared & Analyzed: 05/01/2019						
Chloride	41.2	1.25	mg/L	31.283	10.2	98.8	80-120			
Fluoride	4.16	0.938	mg/L	3.1250	<0.938	133	80-120			M_MS
Sulfate	96.2	1.25	mg/L	62.688	34.1	99.0	80-120			



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Anions by Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEE0002 - Wet Prep

Matrix Spike Dup (BEE0002-MSD1)		Source: MED0235-16			Prepared & Analyzed: 05/01/2019					
Chloride	58.8	1.25	mg/L	31.283	28.2	97.9	80-120	0.672	20	
Fluoride	4.22	0.938	mg/L	3.1250	<0.938	135	80-120	5.82	20	M_MS
Sulfate	168	1.25	mg/L	62.688	105	99.1	80-120	0.932	20	
Matrix Spike Dup (BEE0002-MSD2)		Source: MED0235-18			Prepared & Analyzed: 05/01/2019					
Chloride	41.5	1.25	mg/L	31.283	10.2	99.8	80-120	0.705	20	
Fluoride	4.32	0.938	mg/L	3.1250	<0.938	138	80-120	3.89	20	M_MS
Sulfate	96.9	1.25	mg/L	62.688	34.1	100	80-120	0.732	20	

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Wet Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0511 - Wet Prep

LCS (BED0511-BS1)		Prepared & Analyzed: 04/25/2019								
pH	7.05		pH Units	7.0000		101	90-110			
LCS (BED0511-BS2)		Prepared & Analyzed: 04/25/2019								
pH	7.04		pH Units	7.0000		101	90-110			
Duplicate (BED0511-DUP1)		Source: MED0225-02		Prepared & Analyzed: 04/25/2019						
pH	7.76		pH Units		7.81			0.642	20	
Duplicate (BED0511-DUP2)		Source: MED0225-11		Prepared & Analyzed: 04/25/2019						
pH	7.64		pH Units		7.63			0.131	20	
Duplicate (BED0511-DUP3)		Source: MED0225-21		Prepared & Analyzed: 04/25/2019						
pH	7.49		pH Units		7.48			0.134	20	
Duplicate (BED0511-DUP4)		Source: MED0226-02		Prepared & Analyzed: 04/25/2019						
pH	7.91		pH Units		7.97			0.756	20	

Batch BED0556 - Wet Prep

LCS (BED0556-BS1)		Prepared & Analyzed: 04/26/2019								
pH	7.05		pH Units	7.0000		101	90-110			
LCS (BED0556-BS2)		Prepared & Analyzed: 04/26/2019								
pH	7.06		pH Units	7.0000		101	90-110			
Duplicate (BED0556-DUP1)		Source: MED0235-01		Prepared & Analyzed: 04/26/2019						
pH	7.74		pH Units		7.80			0.772	20	

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Wet Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0556 - Wet Prep

Duplicate (BED0556-DUP2)		Source: MED0235-11		Prepared & Analyzed: 04/26/2019						
pH	7.67		pH Units		7.68			0.130	20	

Batch BED0561 - Wet Prep

Blank (BED0561-BLK1)		Prepared & Analyzed: 04/28/2019								
Total Suspended Solids	<4.00	4.00	mg/L							
Duplicate (BED0561-DUP1)		Source: MED0225-21		Prepared & Analyzed: 04/28/2019						
Total Suspended Solids	0.400	4.00	mg/L		<4.00				20	

Batch BED0562 - Wet Prep

Blank (BED0562-BLK1)		Prepared & Analyzed: 04/28/2019								
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BED0562-DUP1)		Source: MED0225-21		Prepared & Analyzed: 04/28/2019						
Total Dissolved Solids	1230	20.0	mg/L		1260			1.93	20	

Batch BED0567 - Wet Prep

Blank (BED0567-BLK1)		Prepared & Analyzed: 04/29/2019								
Total Suspended Solids	<4.00	4.00	mg/L							
Duplicate (BED0567-DUP1)		Source: MED0226-02		Prepared & Analyzed: 04/29/2019						
Total Suspended Solids	<4.00	4.00	mg/L		<4.00				20	

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Wet Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0568 - Wet Prep

Blank (BED0568-BLK1)		Prepared & Analyzed: 04/29/2019								
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BED0568-DUP1)		Source: MED0226-02		Prepared & Analyzed: 04/29/2019						
Total Dissolved Solids	180	20.0	mg/L		188			4.35	20	

Batch BED0583 - Wet Prep

Blank (BED0583-BLK1)		Prepared & Analyzed: 04/30/2019								
Total Suspended Solids	<4.00	4.00	mg/L							
Duplicate (BED0583-DUP1)		Source: MED0230-08		Prepared & Analyzed: 04/30/2019						
Total Suspended Solids	11.2	4.00	mg/L		11.6			3.51	20	
Duplicate (BED0583-DUP2)		Source: MED0230-09		Prepared & Analyzed: 04/30/2019						
Total Suspended Solids	11.2	4.00	mg/L		11.6			3.51	20	

Batch BED0584 - Wet Prep

Blank (BED0584-BLK1)		Prepared & Analyzed: 04/30/2019								
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BED0584-DUP1)		Source: MED0230-08		Prepared & Analyzed: 04/30/2019						
Total Dissolved Solids	136	20.0	mg/L		134			1.48	20	
Duplicate (BED0584-DUP2)		Source: MED0230-09		Prepared & Analyzed: 04/30/2019						
Total Dissolved Solids	144	20.0	mg/L		144			0.00	20	



Minneapolis Testing Laboratory
 1518 Chestnut Ave N
 Minneapolis, MN 55043
 Certification # MN-027-053-197
 WI-999071150

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Wet Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0621 - Wet Prep

Blank (BED0621-BLK1)		Prepared & Analyzed: 05/01/2019								
Total Suspended Solids	<4.00	4.00	mg/L							
Duplicate (BED0621-DUP1)		Source: MED0235-11		Prepared & Analyzed: 05/01/2019						
Total Suspended Solids	0.800	4.00	mg/L		0.400			66.7	20	M_D-RL
Duplicate (BED0621-DUP2)		Source: MED0242-02		Prepared & Analyzed: 05/01/2019						
Total Suspended Solids	103	6.67	mg/L		93.1			9.80	20	

Batch BED0622 - Wet Prep

Blank (BED0622-BLK1)		Prepared & Analyzed: 05/01/2019								
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BED0622-DUP1)		Source: MED0235-11		Prepared & Analyzed: 05/01/2019						
Total Dissolved Solids	362	20.0	mg/L		372			2.72	20	

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Total Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0564 - EPA 200.2, EPA 3005

Blank (BED0564-BLK1)

Prepared: 04/28/2019 Analyzed: 04/30/2019

Lead	<0.500	0.500	ug/L							
Antimony	<0.500	0.500	ug/L							
Cobalt	<0.500	0.500	ug/L							
Thallium	<0.500	0.500	ug/L							
Molybdenum	<0.500	0.500	ug/L							
Arsenic	<0.500	0.500	ug/L							
Cadmium	<0.500	0.500	ug/L							
Barium	<0.500	0.500	ug/L							
Beryllium	<0.500	0.500	ug/L							
Selenium	<0.500	0.500	ug/L							
Chromium	<0.500	0.500	ug/L							

LCS (BED0564-BS1)

Prepared: 04/28/2019 Analyzed: 04/30/2019

Antimony	99.8	0.500	ug/L	100.00		99.8	85-115			
Lead	95.2	0.500	ug/L	100.00		95.2	85-115			
Chromium	99.8	0.500	ug/L	100.00		99.8	85-115			
Molybdenum	100	0.500	ug/L	100.00		100	85-115			
Cobalt	97.6	0.500	ug/L	100.00		97.6	85-115			
Arsenic	97.5	0.500	ug/L	100.00		97.5	85-115			
Selenium	99.1	0.500	ug/L	100.00		99.1	85-115			
Beryllium	100	0.500	ug/L	100.00		100	85-115			
Thallium	96.3	0.500	ug/L	100.00		96.3	85-115			
Barium	99.0	0.500	ug/L	100.00		99.0	85-115			
Cadmium	97.6	0.500	ug/L	100.00		97.6	85-115			

Duplicate (BED0564-DUP1)

Source: MED0226-02

Prepared: 04/28/2019 Analyzed: 04/30/2019

Lead	0.0666	0.500	ug/L		0.0373		56.3	20		M_D-RL
Arsenic	0.454	0.500	ug/L		0.453		0.249	20		
Thallium	0.0779	0.500	ug/L		0.00343		183	20		M_D-RL
Antimony	0.110	0.500	ug/L		<0.500			20		
Molybdenum	0.197	0.500	ug/L		0.119		49.6	20		M_D-RL
Chromium	0.654	0.500	ug/L		0.669		2.27	20		
Cobalt	0.488	0.500	ug/L		0.493		1.05	20		
Cadmium	<0.500	0.500	ug/L		<0.500			20		
Beryllium	0.138	0.500	ug/L		<0.500			20		
Barium	35.5	0.500	ug/L		35.4		0.291	20		
Selenium	0.332	0.500	ug/L		0.447		29.5	20		M_D-RL

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Total Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0564 - EPA 200.2, EPA 3005

Duplicate (BED0564-DUP2)	Source: MED0226-03			Prepared: 04/28/2019 Analyzed: 04/30/2019						
Selenium	0.565	0.500	ug/L		0.631			11.0	20	
Molybdenum	0.965	0.500	ug/L		0.973			0.741	20	
Thallium	0.00965	0.500	ug/L		<0.500				20	
Antimony	<0.500	0.500	ug/L		<0.500				20	
Lead	0.0342	0.500	ug/L		0.0309			10.1	20	
Cobalt	0.124	0.500	ug/L		0.118			5.53	20	
Cadmium	<0.500	0.500	ug/L		<0.500				20	
Beryllium	<0.500	0.500	ug/L		<0.500				20	
Barium	54.0	0.500	ug/L		54.2			0.401	20	
Arsenic	1.36	0.500	ug/L		1.47			7.56	20	
Chromium	0.630	0.500	ug/L		0.673			6.56	20	

Matrix Spike (BED0564-MS1)	Source: MED0226-02			Prepared: 04/28/2019 Analyzed: 04/30/2019						
Chromium	102	0.500	ug/L	100.00	0.669	102	70-130			
Selenium	101	0.500	ug/L	100.00	0.447	101	70-130			
Antimony	98.1	0.500	ug/L	100.00	<0.500	98.1	70-130			
Thallium	95.2	0.500	ug/L	100.00	0.00343	95.2	70-130			
Lead	92.0	0.500	ug/L	100.00	0.0373	92.0	70-130			
Molybdenum	102	0.500	ug/L	100.00	0.119	102	70-130			
Arsenic	101	0.500	ug/L	100.00	0.453	100	70-130			
Cobalt	99.7	0.500	ug/L	100.00	0.493	99.2	70-130			
Cadmium	101	0.500	ug/L	100.00	<0.500	101	70-130			
Barium	130	0.500	ug/L	100.00	35.4	95.0	70-130			
Beryllium	101	0.500	ug/L	100.00	<0.500	101	70-130			

Matrix Spike (BED0564-MS2)	Source: MED0226-03			Prepared: 04/28/2019 Analyzed: 04/30/2019						
Cobalt	103	0.500	ug/L	100.00	0.118	103	70-130			
Chromium	108	0.500	ug/L	100.00	0.673	107	70-130			
Beryllium	100	0.500	ug/L	100.00	<0.500	100	70-130			
Molybdenum	105	0.500	ug/L	100.00	0.973	104	70-130			
Barium	159	0.500	ug/L	100.00	54.2	105	70-130			
Lead	99.1	0.500	ug/L	100.00	0.0309	99.1	70-130			
Arsenic	106	0.500	ug/L	100.00	1.47	104	70-130			
Selenium	102	0.500	ug/L	100.00	0.631	102	70-130			
Antimony	107	0.500	ug/L	100.00	<0.500	107	70-130			
Cadmium	101	0.500	ug/L	100.00	<0.500	101	70-130			
Thallium	102	0.500	ug/L	100.00	<0.500	102	70-130			

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Total Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0564 - EPA 200.2, EPA 3005

Matrix Spike Dup (BED0564-MSD1)		Source: MED0226-02		Prepared: 04/28/2019 Analyzed: 04/30/2019					
Beryllium	102	0.500	ug/L	100.00	<0.500	102	70-130	0.946	20
Molybdenum	103	0.500	ug/L	100.00	0.119	103	70-130	0.312	20
Cobalt	103	0.500	ug/L	100.00	0.493	103	70-130	3.57	20
Thallium	98.4	0.500	ug/L	100.00	0.00343	98.4	70-130	3.33	20
Lead	97.4	0.500	ug/L	100.00	0.0373	97.4	70-130	5.68	20
Cadmium	103	0.500	ug/L	100.00	<0.500	103	70-130	1.99	20
Arsenic	104	0.500	ug/L	100.00	0.453	104	70-130	3.82	20
Antimony	103	0.500	ug/L	100.00	<0.500	103	70-130	4.49	20
Chromium	105	0.500	ug/L	100.00	0.669	104	70-130	2.15	20
Barium	138	0.500	ug/L	100.00	35.4	102	70-130	5.44	20
Selenium	99.5	0.500	ug/L	100.00	0.447	99.1	70-130	1.94	20

Matrix Spike Dup (BED0564-MSD2)		Source: MED0226-03		Prepared: 04/28/2019 Analyzed: 04/30/2019					
Beryllium	104	0.500	ug/L	100.00	<0.500	104	70-130	4.17	20
Molybdenum	107	0.500	ug/L	100.00	0.973	106	70-130	2.40	20
Chromium	105	0.500	ug/L	100.00	0.673	104	70-130	2.73	20
Lead	99.3	0.500	ug/L	100.00	0.0309	99.2	70-130	0.153	20
Cadmium	98.7	0.500	ug/L	100.00	<0.500	98.7	70-130	2.17	20
Thallium	101	0.500	ug/L	100.00	<0.500	101	70-130	1.25	20
Barium	160	0.500	ug/L	100.00	54.2	106	70-130	0.467	20
Cobalt	102	0.500	ug/L	100.00	0.118	102	70-130	1.12	20
Antimony	104	0.500	ug/L	100.00	<0.500	104	70-130	2.34	20
Selenium	101	0.500	ug/L	100.00	0.631	100	70-130	1.78	20
Arsenic	109	0.500	ug/L	100.00	1.47	107	70-130	2.85	20

Batch BED0571 - EPA 200.2, EPA 3005

Blank (BED0571-BLK1)				Prepared: 04/29/2019 Analyzed: 04/30/2019	
Molybdenum	<0.500	0.500	ug/L		
Lead	<0.500	0.500	ug/L		
Chromium	<0.500	0.500	ug/L		
Beryllium	<0.500	0.500	ug/L		
Cadmium	<0.500	0.500	ug/L		
Thallium	<0.500	0.500	ug/L		
Antimony	<0.500	0.500	ug/L		
Arsenic	<0.500	0.500	ug/L		
Selenium	<0.500	0.500	ug/L		
Cobalt	<0.500	0.500	ug/L		
Barium	<0.500	0.500	ug/L		

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Total Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0571 - EPA 200.2, EPA 3005

LCS (BED0571-BS1)

Prepared: 04/29/2019 Analyzed: 04/30/2019

Thallium	98.7	0.500	ug/L	100.00		98.7	85-115			
Cadmium	103	0.500	ug/L	100.00		103	85-115			
Chromium	104	0.500	ug/L	100.00		104	85-115			
Molybdenum	102	0.500	ug/L	100.00		102	85-115			
Barium	101	0.500	ug/L	100.00		101	85-115			
Lead	96.8	0.500	ug/L	100.00		96.8	85-115			
Arsenic	98.4	0.500	ug/L	100.00		98.4	85-115			
Antimony	100	0.500	ug/L	100.00		100	85-115			
Cobalt	103	0.500	ug/L	100.00		103	85-115			
Selenium	99.8	0.500	ug/L	100.00		99.8	85-115			
Beryllium	95.9	0.500	ug/L	100.00		95.9	85-115			

Duplicate (BED0571-DUP1)

Source: MED0235-16

Prepared: 04/29/2019 Analyzed: 04/30/2019

Selenium	3.84	0.500	ug/L		3.83			0.326	20	
Thallium	0.0810	0.500	ug/L		0.0117			150	20	M_D-RL
Lead	0.105	0.500	ug/L		0.0606			53.9	20	M_D-RL
Chromium	9.34	0.500	ug/L		10.8			14.2	20	
Molybdenum	4.18	0.500	ug/L		4.27			2.01	20	
Cobalt	0.420	0.500	ug/L		0.450			6.91	20	
Cadmium	<0.500	0.500	ug/L		<0.500				20	
Beryllium	0.216	0.500	ug/L		0.0109			181	20	M_D-RL
Antimony	0.126	0.500	ug/L		0.0737			52.2	20	M_D-RL
Arsenic	0.695	0.500	ug/L		0.734			5.49	20	
Barium	66.2	0.500	ug/L		66.0			0.359	20	

Matrix Spike (BED0571-MS1)

Source: MED0235-16

Prepared: 04/29/2019 Analyzed: 04/30/2019

Selenium	103	0.500	ug/L	100.00	3.83	99.1	70-130			
Lead	92.9	0.500	ug/L	100.00	0.0606	92.8	70-130			
Beryllium	97.8	0.500	ug/L	100.00	0.0109	97.8	70-130			
Arsenic	105	0.500	ug/L	100.00	0.734	104	70-130			
Cobalt	104	0.500	ug/L	100.00	0.450	103	70-130			
Antimony	102	0.500	ug/L	100.00	0.0737	102	70-130			
Cadmium	102	0.500	ug/L	100.00	<0.500	102	70-130			
Molybdenum	108	0.500	ug/L	100.00	4.27	104	70-130			
Barium	171	0.500	ug/L	100.00	66.0	105	70-130			
Thallium	96.0	0.500	ug/L	100.00	0.0117	96.0	70-130			
Chromium	114	0.500	ug/L	100.00	10.8	103	70-130			

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Total Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0571 - EPA 200.2, EPA 3005

Matrix Spike Dup (BED0571-MSD1)	Source: MED0235-16		Prepared: 04/29/2019 Analyzed: 04/30/2019							
Chromium	114	0.500	ug/L	100.00	10.8	104	70-130	0.480	20	
Thallium	95.0	0.500	ug/L	100.00	0.0117	95.0	70-130	1.04	20	
Barium	168	0.500	ug/L	100.00	66.0	102	70-130	1.78	20	
Antimony	100	0.500	ug/L	100.00	0.0737	100	70-130	2.02	20	
Arsenic	105	0.500	ug/L	100.00	0.734	104	70-130	0.109	20	
Cadmium	99.4	0.500	ug/L	100.00	<0.500	99.4	70-130	2.32	20	
Selenium	104	0.500	ug/L	100.00	3.83	100	70-130	1.08	20	
Lead	91.2	0.500	ug/L	100.00	0.0606	91.1	70-130	1.83	20	
Beryllium	94.6	0.500	ug/L	100.00	0.0109	94.6	70-130	3.26	20	
Molybdenum	108	0.500	ug/L	100.00	4.27	104	70-130	0.0610	20	
Cobalt	102	0.500	ug/L	100.00	0.450	101	70-130	1.60	20	

Batch BEE0090 - EPA 200.2, EPA 3005

Blank (BEE0090-BLK1)	Prepared: 05/06/2019 Analyzed: 05/07/2019									
Cadmium	<0.500	0.500	ug/L							
Arsenic	<0.500	0.500	ug/L							
Selenium	<0.500	0.500	ug/L							
Thallium	<0.500	0.500	ug/L							
Barium	<0.500	0.500	ug/L							
Antimony	<0.500	0.500	ug/L							
Cobalt	<0.500	0.500	ug/L							
Chromium	<0.500	0.500	ug/L							
Molybdenum	<0.500	0.500	ug/L							
Lead	<0.500	0.500	ug/L							
Beryllium	<0.500	0.500	ug/L							

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Total Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEE0090 - EPA 200.2, EPA 3005

LCS (BEE0090-BS1)

Prepared: 05/06/2019 Analyzed: 05/07/2019

Lead	100	0.500	ug/L	100.00		100	85-115			
Arsenic	99.8	0.500	ug/L	100.00		99.8	85-115			
Thallium	101	0.500	ug/L	100.00		101	85-115			
Selenium	100	0.500	ug/L	100.00		100	85-115			
Cobalt	103	0.500	ug/L	100.00		103	85-115			
Antimony	98.3	0.500	ug/L	100.00		98.3	85-115			
Chromium	102	0.500	ug/L	100.00		102	85-115			
Beryllium	104	0.500	ug/L	100.00		104	85-115			
Molybdenum	99.9	0.500	ug/L	100.00		99.9	85-115			
Barium	101	0.500	ug/L	100.00		101	85-115			
Cadmium	98.4	0.500	ug/L	100.00		98.4	85-115			

Duplicate (BEE0090-DUP1)

Source: MED0235-18

Prepared: 05/06/2019 Analyzed: 05/07/2019

Cadmium	<0.500	0.500	ug/L		<0.500			20		
Chromium	9.00	0.500	ug/L		9.18			1.95	20	
Antimony	0.0823	0.500	ug/L		0.0459			56.9	20	M_D-RL
Arsenic	0.632	0.500	ug/L		0.651			2.97	20	
Thallium	0.0511	0.500	ug/L		<0.500				20	
Lead	0.0527	0.500	ug/L		0.0299			55.1	20	M_D-RL
Molybdenum	0.653	0.500	ug/L		0.631			3.53	20	
Barium	41.3	0.500	ug/L		41.1			0.348	20	
Selenium	1.83	0.500	ug/L		1.92			5.18	20	
Beryllium	0.144	0.500	ug/L		<0.500				20	
Cobalt	0.194	0.500	ug/L		0.195			0.408	20	

Matrix Spike (BEE0090-MS1)

Source: MED0235-18

Prepared: 05/06/2019 Analyzed: 05/07/2019

Lead	92.7	0.500	ug/L	100.00	0.0299	92.6	70-130			
Barium	144	0.500	ug/L	100.00	41.1	103	70-130			
Molybdenum	105	0.500	ug/L	100.00	0.631	105	70-130			
Chromium	110	0.500	ug/L	100.00	9.18	100	70-130			
Cobalt	101	0.500	ug/L	100.00	0.195	101	70-130			
Cadmium	95.6	0.500	ug/L	100.00	<0.500	95.6	70-130			
Beryllium	102	0.500	ug/L	100.00	<0.500	102	70-130			
Antimony	101	0.500	ug/L	100.00	0.0459	101	70-130			
Selenium	103	0.500	ug/L	100.00	1.92	101	70-130			
Thallium	98.1	0.500	ug/L	100.00	<0.500	98.1	70-130			
Arsenic	106	0.500	ug/L	100.00	0.651	105	70-130			



Minneapolis Testing Laboratory
 1518 Chestnut Ave N
 Minneapolis, MN 55043
 Certification # MN-027-053-197
 WI-999071150

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Total Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEE0090 - EPA 200.2, EPA 3005

Matrix Spike Dup (BEE0090-MSD1)	Source: MED0235-18	Prepared: 05/06/2019	Analyzed: 05/07/2019							
Chromium	115	0.500	ug/L	100.00	9.18	106	70-130	4.61	20	
Barium	145	0.500	ug/L	100.00	41.1	104	70-130	0.505	20	
Molybdenum	103	0.500	ug/L	100.00	0.631	102	70-130	2.66	20	
Selenium	103	0.500	ug/L	100.00	1.92	101	70-130	0.237	20	
Cobalt	101	0.500	ug/L	100.00	0.195	101	70-130	0.117	20	
Arsenic	106	0.500	ug/L	100.00	0.651	105	70-130	0.345	20	
Cadmium	96.8	0.500	ug/L	100.00	<0.500	96.8	70-130	1.29	20	
Lead	94.3	0.500	ug/L	100.00	0.0299	94.3	70-130	1.76	20	
Beryllium	101	0.500	ug/L	100.00	<0.500	101	70-130	1.37	20	
Thallium	98.7	0.500	ug/L	100.00	<0.500	98.7	70-130	0.580	20	
Antimony	102	0.500	ug/L	100.00	0.0459	102	70-130	1.25	20	

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Total Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0563 - EPA 200.2, EPA 3005

Blank (BED0563-BLK1)

Prepared: 04/28/2019 Analyzed: 05/01/2019

Lithium	<0.0150	0.0150	mg/L							
Calcium	<1.25	1.25	mg/L							
Boron	<0.0500	0.0500	mg/L							

LCS (BED0563-BS1)

Prepared: 04/28/2019 Analyzed: 05/01/2019

Calcium	108	1.25	mg/L	100.00		108	85-115			
Lithium	1.04	0.0150	mg/L	1.0000		104	85-115			
Boron	1.02	0.0500	mg/L	1.0000		102	85-115			

Duplicate (BED0563-DUP1)

Source: MED0225-28

Prepared: 04/28/2019 Analyzed: 05/01/2019

Lithium	0.00524	0.0150	mg/L		0.00522			0.346	20	
Boron	0.0285	0.0500	mg/L		0.0330			14.8	20	
Calcium	124	1.25	mg/L		132			5.94	20	

Duplicate (BED0563-DUP2)

Source: MED0225-29

Prepared: 04/28/2019 Analyzed: 05/01/2019

Lithium	0.00418	0.0150	mg/L		<0.0150				20	
Boron	0.0679	0.0500	mg/L		0.0726			6.72	20	
Calcium	111	1.25	mg/L		114			2.17	20	

Matrix Spike (BED0563-MS1)

Source: MED0225-28

Prepared: 04/28/2019 Analyzed: 05/01/2019

Boron	1.14	0.0500	mg/L	1.0000	0.0330	111	70-130			
Lithium	1.12	0.0150	mg/L	1.0000	0.00522	111	70-130			
Calcium	248	1.25	mg/L	100.00	132	116	70-130			

Matrix Spike (BED0563-MS2)

Source: MED0225-29

Prepared: 04/28/2019 Analyzed: 05/01/2019

Calcium	232	1.25	mg/L	100.00	114	118	70-130			
Lithium	1.12	0.0150	mg/L	1.0000	<0.0150	112	70-130			
Boron	1.20	0.0500	mg/L	1.0000	0.0726	113	70-130			

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Total Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0563 - EPA 200.2, EPA 3005

Matrix Spike Dup (BED0563-MSD1)		Source: MED0225-28			Prepared: 04/28/2019 Analyzed: 05/01/2019					
Calcium	252	1.25	mg/L	100.00	132	120	70-130	1.51	20	
Lithium	1.13	0.0150	mg/L	1.0000	0.00522	113	70-130	1.25	20	
Boron	1.17	0.0500	mg/L	1.0000	0.0330	114	70-130	2.78	20	

Matrix Spike Dup (BED0563-MSD2)		Source: MED0225-29			Prepared: 04/28/2019 Analyzed: 05/01/2019					
Calcium	236	1.25	mg/L	100.00	114	122	70-130	1.63	20	
Lithium	1.15	0.0150	mg/L	1.0000	<0.0150	115	70-130	2.60	20	
Boron	1.22	0.0500	mg/L	1.0000	0.0726	115	70-130	1.92	20	

Batch BED0570 - EPA 200.2, EPA 3005

Blank (BED0570-BLK1)		Prepared: 04/29/2019 Analyzed: 04/30/2019								
Calcium	<1.25	1.25	mg/L							
Lithium	<0.0150	0.0150	mg/L							
Boron	<0.0500	0.0500	mg/L							

LCS (BED0570-BS1)		Prepared: 04/29/2019 Analyzed: 04/30/2019								
Calcium	107	1.25	mg/L	100.00		107	85-115			
Lithium	1.05	0.0150	mg/L	1.0000		105	85-115			
Boron	1.02	0.0500	mg/L	1.0000		102	85-115			

Duplicate (BED0570-DUP1)		Source: MED0235-15			Prepared: 04/29/2019 Analyzed: 04/30/2019					
Lithium	<0.0150	0.0150	mg/L		<0.0150					20
Calcium	62.3	1.25	mg/L		61.6			1.13		20
Boron	0.134	0.0500	mg/L		0.134			0.0656		20

Matrix Spike (BED0570-MS1)		Source: MED0235-15			Prepared: 04/29/2019 Analyzed: 04/30/2019					
Boron	1.17	0.0500	mg/L	1.0000	0.134	104	70-130			
Calcium	172	1.25	mg/L	100.00	61.6	110	70-130			
Lithium	1.06	0.0150	mg/L	1.0000	<0.0150	106	70-130			

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Total Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BED0570 - EPA 200.2, EPA 3005

Matrix Spike Dup (BED0570-MSD1)	Source: MED0235-15		Prepared: 04/29/2019 Analyzed: 04/30/2019							
Calcium	171	1.25	mg/L	100.00	61.6	110	70-130	0.226	20	
Boron	1.17	0.0500	mg/L	1.0000	0.134	103	70-130	0.0943	20	
Lithium	1.05	0.0150	mg/L	1.0000	<0.0150	105	70-130	0.0913	20	

Batch BEE0089 - EPA 200.2, EPA 3005

Blank (BEE0089-BLK1)	Prepared: 05/06/2019 Analyzed: 05/14/2019									
Lithium	<0.0150	0.0150	mg/L							
Calcium	<1.25	1.25	mg/L							
Boron	<0.0500	0.0500	mg/L							

LCS (BEE0089-BS1)	Prepared: 05/06/2019 Analyzed: 05/14/2019									
Lithium	1.04	0.0150	mg/L	1.0000		104	85-115			
Boron	1.01	0.0500	mg/L	1.0000		101	85-115			
Calcium	106	1.25	mg/L	100.00		106	85-115			

Duplicate (BEE0089-DUP1)	Source: MED0235-17		Prepared: 05/06/2019 Analyzed: 05/14/2019							
Lithium	0.00513	0.0150	mg/L		<0.0150				20	
Calcium	86.7	1.25	mg/L		90.4			4.21	20	
Boron	0.0504	0.0500	mg/L		0.0530			4.93	20	

Matrix Spike (BEE0089-MS1)	Source: MED0235-17		Prepared: 05/06/2019 Analyzed: 05/14/2019							
Lithium	1.05	0.0150	mg/L	1.0000	<0.0150	105	70-130			
Calcium	198	1.25	mg/L	100.00	90.4	108	70-130			
Boron	1.09	0.0500	mg/L	1.0000	0.0530	104	70-130			

Matrix Spike Dup (BEE0089-MSD1)	Source: MED0235-17		Prepared: 05/06/2019 Analyzed: 05/14/2019							
Boron	1.10	0.0500	mg/L	1.0000	0.0530	105	70-130	0.714	20	
Lithium	1.05	0.0150	mg/L	1.0000	<0.0150	105	70-130	0.169	20	
Calcium	198	1.25	mg/L	100.00	90.4	108	70-130	0.200	20	

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Mercury - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEE0042 - EPA 245.1, EPA 7470A

Blank (BEE0042-BLK1)			Prepared & Analyzed: 05/02/2019							
Mercury	<0.200	0.200	ug/L							
LCS (BEE0042-BS1)			Prepared & Analyzed: 05/02/2019							
Mercury	2.77	0.200	ug/L	3.0030		92.4	85-115			
Duplicate (BEE0042-DUP1)			Source: MED0168-13		Prepared & Analyzed: 05/02/2019					
Mercury	<0.200	0.200	ug/L		<0.200				20	
Duplicate (BEE0042-DUP2)			Source: MED0168-15		Prepared & Analyzed: 05/02/2019					
Mercury	<0.200	0.200	ug/L		<0.200				20	
Matrix Spike (BEE0042-MS1)			Source: MED0168-13		Prepared & Analyzed: 05/02/2019					
Mercury	2.75	0.200	ug/L	3.0030	<0.200	91.7	70-130			
Matrix Spike (BEE0042-MS2)			Source: MED0168-15		Prepared & Analyzed: 05/02/2019					
Mercury	2.70	0.200	ug/L	3.0030	<0.200	89.9	70-130			
Matrix Spike Dup (BEE0042-MSD1)			Source: MED0168-13		Prepared & Analyzed: 05/02/2019					
Mercury	2.69	0.200	ug/L	3.0030	<0.200	89.7	70-130	2.20	20	
Matrix Spike Dup (BEE0042-MSD2)			Source: MED0168-15		Prepared & Analyzed: 05/02/2019					
Mercury	2.71	0.200	ug/L	3.0030	<0.200	90.2	70-130	0.248	20	

Batch BEE0158 - EPA 245.1, EPA 7470A

Blank (BEE0158-BLK1)			Prepared & Analyzed: 05/08/2019							
Mercury	<0.200	0.200	ug/L							

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Mercury - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEE0158 - EPA 245.1, EPA 7470A

LCS (BEE0158-BS1)				Prepared & Analyzed: 05/08/2019						
Mercury	2.78	0.200	ug/L	3.0030		92.6	85-115			
Duplicate (BEE0158-DUP1)				Source: MED0230-06 Prepared & Analyzed: 05/08/2019						
Mercury	<0.200	0.200	ug/L	<0.200					20	
Duplicate (BEE0158-DUP2)				Source: MED0230-07 Prepared & Analyzed: 05/08/2019						
Mercury	<0.200	0.200	ug/L	<0.200					20	
Matrix Spike (BEE0158-MS1)				Source: MED0230-06 Prepared & Analyzed: 05/08/2019						
Mercury	2.70	0.200	ug/L	3.0030	<0.200	90.0	70-130			
Matrix Spike (BEE0158-MS2)				Source: MED0230-07 Prepared & Analyzed: 05/08/2019						
Mercury	2.80	0.200	ug/L	3.0030	<0.200	93.3	70-130			
Matrix Spike Dup (BEE0158-MSD1)				Source: MED0230-06 Prepared & Analyzed: 05/08/2019						
Mercury	2.69	0.200	ug/L	3.0030	<0.200	89.5	70-130	0.546	20	
Matrix Spike Dup (BEE0158-MSD2)				Source: MED0230-07 Prepared & Analyzed: 05/08/2019						
Mercury	2.66	0.200	ug/L	3.0030	<0.200	88.7	70-130	5.08	20	

Batch BEE0302 - EPA 245.1, EPA 7470A

Blank (BEE0302-BLK1)				Prepared & Analyzed: 05/14/2019						
Mercury	<0.200	0.200	ug/L							
LCS (BEE0302-BS1)				Prepared & Analyzed: 05/14/2019						
Mercury	2.70	0.200	ug/L	3.0030		89.8	85-115			



Minneapolis Testing Laboratory
 1518 Chestnut Ave N
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Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Mercury - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEE0302 - EPA 245.1, EPA 7470A

Duplicate (BEE0302-DUP1)		Source: MEE0007-03		Prepared & Analyzed: 05/14/2019						
Mercury	<0.200	0.200	ug/L		<0.200				20	
Matrix Spike (BEE0302-MS1)		Source: MEE0007-03		Prepared & Analyzed: 05/14/2019						
Mercury	2.66	0.200	ug/L	3.0030	<0.200	88.6	70-130			
Matrix Spike Dup (BEE0302-MSD1)		Source: MEE0007-03		Prepared & Analyzed: 05/14/2019						
Mercury	2.59	0.200	ug/L	3.0030	<0.200	86.4	70-130	2.50	20	



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Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 05/17/2019 09:58
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Qualifiers and Definitions

- M_TTT Sample received at the lab outside of required hold time.
- M_MS The percent recovery and/or RPD were outside the acceptance limits for the MS/MSD due to possible matrix interference and/or non-homogeneous sample matrix.
- M_LCS-H The recovery of this analyte in the LCS was above the control limits. The sample result may be biased high.
- M_D-RL The RPD for the sample duplicate was outside of QC acceptance limits due to <RL.
- Z Non Accredited Analyte
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:	Section B Report To: <u>David Katznet</u> Copy To:	Section C Invoice Information: Attention: <u>Steve Davis</u> Company Name:	Page: <u>3</u> of <u>5</u>
Company: <u>Xcel Energy</u>	Project Name: <u>Sherco Ponds</u>	Address:	REGULATORY AGENCY
Address: <u>Environmental Services</u>	Project Number: <u>Spring 2019</u>	Pace Project Reference:	<input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER
Email To: <u>MP-7</u>	Purchase Order No.:	Pace Project Manager:	<input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER
Phone:	Project Number:	Pace Profile #:	Site Location
Fax:	Requested Due Date/TAT:	STATE:	

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	SAMPLE TEMP AT COLLECTION		# OF CONTAINERS	Preservatives	Y/N	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No. / Lab I.D.
			COMPOSITE START	COMPOSITE END/GRAB			DATE	TIME						
1	P-56	DW			WT		4/23/19	1620	3	1				
2	P-62	WT					1715	3	1	1				
3	P-60	WT					1800	3	1	1				
4	Rinse CCR - P3	WT					4/24/19	0810	2	1				
5	P-152A						0850	2	1	1				
6	P-130						0950	4	1	1				
7	P-154A						1100	2	1	1				
8	P-132						1150	4	1	1				
9	P-165						1240	2	1	1				
10														
11														
12														

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	<u>David Amberman</u>	<u>4/24/19</u>	<u>1245</u>	<u>Xcel</u>	<u>4/24/19</u>	<u>1245</u>	
	<u>Xcel</u>	<u>4/25/19</u>	<u>05:51</u>	<u>Xcel</u>	<u>4/25/19</u>	<u>05:51</u>	
				<u>pk strips: m000402</u>			
SAMPLER NAME AND SIGNATURE							
PRINT Name of SAMPLER: <u>David Anderson</u>				DATE Signed (MM/DD/YY): <u>4/24/19</u>			
SIGNATURE of SAMPLER: <u>David Anderson</u>							

ORIGINAL

CHAIN-OF-CUSTODY / Analytical Request Document
The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A
Required Client Information:
Company: Xcel Energy Environmental Services
Address: MP-7
Email To: _____
Phone: _____ Fax: _____
Requested Due Date/TAT: _____

Section B
Required Project Information:
Report To: David Katzner
Copy To: _____
Purchase Order No.: _____
Project Name: Shetek Ponds, Spring 2019
Project Number: _____

Section C
Invoice Information:
Attention: Steve Davis
Company Name: _____
Address: _____
Pace Quote Reference: _____
Pace Project Manager: _____
Pace Profile #: _____

Page: 4 of 5
Invoice No: 2273455

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER _____
Site Location _____
STATE: _____

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE DW Drinking Water WW Waste Water P Product SL Soil/Solid OL Oil WP Wipe AR Air TS Tissue OT Other	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP) (see valid codes to left)	MATRIX CODE (see valid codes to left)	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives Unpreserved H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ S ₂ O ₃ Methanol Other	Y/N	Requested Analysis Filtered (Y/N)		Pace Project No. / Lab I.D.
			COMPOSITE START	COMPOSITE END/GRAB							DATE	TIME	
1	P-150				WT								
2	Duplicate CCR-P3												
3	P-151												
4	P-131												
5	P-153												
6	P-17												
7	P-23												
8	Rinse CCR BAP												
9	P-158												
10	P-157												
11	Duplicate CCR-BAP												
12	P-22												

ADDITIONAL COMMENTS
Sam Anderson Area 4/24/19 0900 / Xcc 1

RELINQUISHED BY / AFFILIATION
Sam Anderson Area 4/24/19 0900 / Xcc 1

ACCEPTED BY / AFFILIATION
[Signature]

DATE
4/25/19 0900

TIME
0900

SAMPLE CONDITIONS
Received on Ice (Y/N)
Custody Sealed Cooler (Y/N)
Samples Intact (Y/N)

Temp in °C
8.4°C

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: David Anderson
SIGNATURE of SAMPLER: [Signature]
DATE Signed (MM/DD/YY): 4/25/19

pt strips: MDoody



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information: Company: <u>Xcel Energy Environmental Services</u> Address: <u>MP-7</u> Email To: Phone: Fax: Requested Due Date/TAT:	Section B Required Project Information: Report To: <u>David Katzner</u> Copy To: Purchase Order No.: Project Name: <u>Sherco Ponds</u> Project Number: <u>Spring 2019</u>	Section C Invoice Information: Attention: <u>Steve Davis</u> Company Name: Address: Pace Quote Reference: Pace Project Manager: Pace Profile #:	Page: <u>5</u> of <u>5</u> <u>2273453</u>	REGULATORY AGENCY <input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER	Site Location STATE:
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ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No. / Lab I.D.
			COMPOSITE START	COMPOSITE END/GRAB						
1	P-155	DW	4/25/19	1250	2	Unpreserved	Y			
2	P-01A-1	WT	4/25/19	1350	24	Unpreserved	Y			
3	P-156	WT	4/25/19	1450	2	Unpreserved	Y			
4	P-162	WT	4/25/19	1550	2	Unpreserved	Y			
5	P-163	WT	4/25/19	1650	2	Unpreserved	Y			
6	P-164	WT	4/25/19	1740	2	Unpreserved	Y			
7	DATA 4/25/19									
8	RELINQUISHED BY / AFFILIATION <u>David Anderson</u> / <u>Xcel</u> / <u>4/26/19 0900</u>									
9										
10										
11	ADDITIONAL COMMENTS <u>p155p5.mdown402</u>									
12	ACCEPTED BY / AFFILIATION <u>David Anderson</u> / <u>Xcel</u> / <u>4/25/19 0900</u>									

Temp in °C <u>34.2</u>	Received on <u>4/25/19</u>	Custody Sealed Cooler (Y/N) <input checked="" type="checkbox"/>	Samples Intact (Y/N) <input checked="" type="checkbox"/>
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SAMPLER NAME AND SIGNATURE PRINT Name of SAMPLER: <u>David Anderson</u> SIGNATURE of SAMPLER: <u>[Signature]</u> DATE Signed (MM/DD/YY): <u>4/25/19</u>	
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ORIGINAL

*Important Note: By signing this form, you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.



Minneapolis Testing Laboratory
1518 Chestnut Ave N
Minneapolis, MN 55043
Certification #MN-027-053-197
WI-999071150
Christine Keefe, Supervisor (612) 630-4506

26 June 2019

Eric Ealy

Environmental Services-Water Minneapolis

250 Marquette Plaza

Minneapolis, MN 55401

RE: Sherco Ponds Spring

cc:

Enclosed are the results of analyses for samples received by the laboratory on 06/06/2019 12:40. If you have any questions concerning this report, please feel free to contact me.

I certify that this analysis report was prepared under my direction or supervision under a system designed to assure that qualified personnel analyzed the submitted samples. All protocols for analysis were followed as required by Minnesota Rules and the Applicable Management Plan.

Sincerely,

Steve Davis

Project Manager



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Minneapolis, MN 55043
Certification # MN-027-053-197
WI-999071150

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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ANALYTICAL REPORT FOR SAMPLES

Sample ID	Sample Qualifier	Laboratory ID	Matrix	Sampled	Received
P-155		MEF0109-01	Water	06/05/2019 10:15	06/06/2019 12:40

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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P-155

MEF0109-01 (Water) - Chain of Custody Number: 2273462/2273465

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	18.7	1.00	mg/L		1	BEF0143	6/7/19 5:39	6/7/19 10:41	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BEF0143	6/7/19 5:39	6/7/19 10:41	EPA 300.0	CRL
Sulfate	180	1.00	mg/L		1	BEF0143	6/7/19 5:39	6/7/19 10:41	EPA 300.0	CRL

Wet Chemistry

pH	7.72		pH Units	M_TTT	1	BEF0136	6/6/19 13:31	6/6/19 14:27	SM 4500-H+ B	CRL
Total Dissolved Solids	510	20.0	mg/L		1	BEF0145	6/7/19 8:09	6/7/19 8:09	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BEF0144	6/7/19 6:42	6/7/19 6:42	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BEF0220	6/12/19 6:28	6/17/19 8:54	EPA 200.8	CRL
Barium	62.8	0.500	ug/L		1	BEF0220	6/12/19 6:28	6/17/19 8:54	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BEF0220	6/12/19 6:28	6/17/19 8:54	EPA 200.8	CRL
Cadmium	< 0.500	0.500	ug/L		1	BEF0220	6/12/19 6:28	6/17/19 8:54	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BEF0220	6/12/19 6:28	6/17/19 8:54	EPA 200.8	CRL
Chromium	1.13	0.500	ug/L		1	BEF0220	6/12/19 6:28	6/17/19 8:54	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BEF0220	6/12/19 6:28	6/17/19 8:54	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BEF0220	6/12/19 6:28	6/17/19 8:54	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BEF0220	6/12/19 6:28	6/17/19 8:54	EPA 200.8	CRL
Selenium	4.49	0.500	ug/L		1	BEF0220	6/12/19 6:28	6/17/19 8:54	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BEF0220	6/12/19 6:28	6/17/19 8:54	EPA 200.8	CRL

Total Metals by ICP

Boron	1.67	0.0500	mg/L		1	BEF0219	6/12/19 6:25	6/19/19 15:42	EPA 200.7	HRD
Calcium	95.5	1.25	mg/L		1	BEF0219	6/12/19 6:25	6/19/19 15:41	EPA 200.7	HRD
Lithium	0.0285	0.0150	mg/L		1	BEF0219	6/12/19 6:25	6/19/19 15:41	EPA 200.7	HRD



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Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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P-155

MEF0109-01 (Water) - Chain of Custody Number: 2273462/2273465

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
Mercury										
Mercury	< 0.200	0.200	ug/L		1	BEF0446	6/20/19 8:48	6/24/19 14:48	EPA 245.1/7470A	HRD

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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Anions by Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0143 - Wet Prep

Blank (BEF0143-BLK1)			Prepared & Analyzed: 06/07/2019							
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

Blank (BEF0143-BLK2)			Prepared & Analyzed: 06/07/2019							
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

LCS (BEF0143-BS1)			Prepared & Analyzed: 06/07/2019							
Chloride	24.7	1.00	mg/L	25.026		98.9	90-110			
Fluoride	2.63	0.750	mg/L	2.5000		105	90-110			
Sulfate	50.3	1.00	mg/L	50.150		100	90-110			

LCS (BEF0143-BS2)			Prepared & Analyzed: 06/07/2019							
Chloride	24.2	1.00	mg/L	25.026		96.6	90-110			
Fluoride	2.42	0.750	mg/L	2.5000		96.6	90-110			
Sulfate	48.5	1.00	mg/L	50.150		96.8	90-110			

LCS (BEF0143-BS3)			Prepared & Analyzed: 06/07/2019							
Chloride	23.9	1.00	mg/L	25.026		95.6	90-110			
Fluoride	2.43	0.750	mg/L	2.5000		97.3	90-110			
Sulfate	48.1	1.00	mg/L	50.150		96.0	90-110			

LCS (BEF0143-BS4)			Prepared: 06/07/2019 Analyzed: 06/10/2019							
Chloride	24.9	1.00	mg/L	25.026		99.4	90-110			
Fluoride	2.40	0.750	mg/L	2.5000		95.9	90-110			
Sulfate	50.1	1.00	mg/L	50.150		99.9	90-110			

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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Anions by Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0143 - Wet Prep

Duplicate (BEF0143-DUP1)		Source: MEF0080-01			Prepared & Analyzed: 06/07/2019					
Chloride	9.75	1.00	mg/L		9.78			0.348	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	6.13	1.00	mg/L		6.14			0.228	20	

Duplicate (BEF0143-DUP2)		Source: MEF0109-12			Prepared & Analyzed: 06/07/2019					
Chloride	0.720	1.00	mg/L		0.720			0.00	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	6.58	1.00	mg/L		6.59			0.0607	20	

Matrix Spike (BEF0143-MS1)		Source: MEF0080-01			Prepared & Analyzed: 06/07/2019					
Chloride	40.1	1.25	mg/L	31.283	9.78	96.8	80-120			
Fluoride	3.15	0.938	mg/L	3.1250	<0.938	101	80-120			
Sulfate	66.8	1.25	mg/L	62.688	6.14	96.7	80-120			

Matrix Spike (BEF0143-MS2)		Source: MEF0109-12			Prepared & Analyzed: 06/07/2019					
Chloride	31.5	1.25	mg/L	31.283	0.720	98.2	80-120			
Fluoride	3.18	0.938	mg/L	3.1250	<0.938	102	80-120			
Sulfate	68.6	1.25	mg/L	62.688	6.59	98.9	80-120			

Matrix Spike Dup (BEF0143-MSD1)		Source: MEF0080-01			Prepared & Analyzed: 06/07/2019					
Chloride	40.5	1.25	mg/L	31.283	9.78	98.1	80-120	0.993	20	
Fluoride	3.10	0.938	mg/L	3.1250	<0.938	99.1	80-120	1.64	20	
Sulfate	67.5	1.25	mg/L	62.688	6.14	97.9	80-120	1.14	20	

Matrix Spike Dup (BEF0143-MSD2)		Source: MEF0109-12			Prepared & Analyzed: 06/07/2019					
Chloride	31.7	1.25	mg/L	31.283	0.720	99.0	80-120	0.760	20	
Fluoride	3.12	0.938	mg/L	3.1250	<0.938	99.8	80-120	2.06	20	
Sulfate	69.1	1.25	mg/L	62.688	6.59	99.7	80-120	0.690	20	

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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Wet Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0136 - Wet Prep

LCS (BEF0136-BS1)

Prepared & Analyzed: 06/06/2019

pH	7.11		pH Units	7.0000		102	90-110			
Alkalinity, Total	98.2		mg/L	100.00		98.2	90-110			
Specific Conductance	1410		umhos/cm	1410.0		99.8	90-110			

LCS (BEF0136-BS2)

Prepared & Analyzed: 06/06/2019

Alkalinity, Total	97.6		mg/L	100.00		97.6	90-110			
Specific Conductance	1410		umhos/cm	1410.0		100	90-110			
pH	7.11		pH Units	7.0000		102	90-110			

Duplicate (BEF0136-DUP1)

Source: MEF0109-01

Prepared & Analyzed: 06/06/2019

Alkalinity, Total	190	10.0	mg/L		192			0.701	20	
pH	7.68		pH Units		7.72			0.519	20	
Specific Conductance	771	28.2	umhos/cm		769			0.260	20	

Duplicate (BEF0136-DUP2)

Source: MEF0109-11

Prepared & Analyzed: 06/06/2019

Alkalinity, Total	270	10.0	mg/L		270			0.0816	20	
Specific Conductance	893	28.2	umhos/cm		900			0.781	20	
pH	7.63		pH Units		7.64			0.131	20	

Batch BEF0144 - Wet Prep

Blank (BEF0144-BLK1)

Prepared & Analyzed: 06/07/2019

Total Suspended Solids	<4.00	4.00	mg/L							
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Duplicate (BEF0144-DUP1)

Source: MEF0109-01

Prepared & Analyzed: 06/07/2019

Total Suspended Solids	0.800	4.00	mg/L		0.800			0.00	20	
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Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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Wet Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0145 - Wet Prep

Blank (BEF0145-BLK1)		Prepared & Analyzed: 06/07/2019								
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BEF0145-DUP1)		Source: MEF0109-01		Prepared & Analyzed: 06/07/2019						
Total Dissolved Solids	506	20.0	mg/L		510			0.787	20	

Batch BEF0154 - Wet Prep

Duplicate (BEF0154-DUP1)		Source: MEE0336-01		Prepared: 06/07/2019 Analyzed: 06/10/2019						
Nitrate/Nitrite	6.67	0.250	mg/L		6.39			4.23	20	
Duplicate (BEF0154-DUP2)		Source: MEF0109-05		Prepared: 06/07/2019 Analyzed: 06/10/2019						
Nitrate/Nitrite	6.98	0.250	mg/L		6.80			2.64	20	
Matrix Spike (BEF0154-MS1)		Source: MEE0336-01		Prepared: 06/07/2019 Analyzed: 06/10/2019						
Nitrate/Nitrite	14.9	0.250	mg/L	8.0000	6.39	107	90-110			
Matrix Spike (BEF0154-MS2)		Source: MEF0109-05		Prepared: 06/07/2019 Analyzed: 06/10/2019						
Nitrate/Nitrite	15.3	0.250	mg/L	8.0000	6.80	107	90-110			
Matrix Spike Dup (BEF0154-MSD1)		Source: MEE0336-01		Prepared: 06/07/2019 Analyzed: 06/10/2019						
Nitrate/Nitrite	15.0	0.250	mg/L	8.0000	6.39	108	90-110	0.514	20	
Matrix Spike Dup (BEF0154-MSD2)		Source: MEF0109-05		Prepared: 06/07/2019 Analyzed: 06/10/2019						
Nitrate/Nitrite	14.7	0.250	mg/L	8.0000	6.80	98.7	90-110	4.33	20	

Batch BEF0172 - Wet Prep

Blank (BEF0172-BLK1)		Prepared & Analyzed: 06/10/2019								
Total Suspended Solids	<4.00	4.00	mg/L							

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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Wet Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0172 - Wet Prep

Duplicate (BEF0172-DUP1)		Source: MEF0109-05		Prepared & Analyzed: 06/10/2019						
Total Suspended Solids	4.40	4.00	mg/L		4.00			9.52	20	
Duplicate (BEF0172-DUP2)		Source: MEF0109-06		Prepared & Analyzed: 06/10/2019						
Total Suspended Solids	0.800	4.00	mg/L		<4.00				20	

Batch BEF0173 - Wet Prep

Blank (BEF0173-BLK1)		Prepared & Analyzed: 06/10/2019								
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BEF0173-DUP1)		Source: MEF0109-05		Prepared & Analyzed: 06/10/2019						
Total Dissolved Solids	408	20.0	mg/L		412			0.976	20	
Duplicate (BEF0173-DUP2)		Source: MEF0109-06		Prepared & Analyzed: 06/10/2019						
Total Dissolved Solids	582	20.0	mg/L		604			3.71	20	

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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Dissolved Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0175 - EPA 200.2, EPA 3005

Blank (BEF0175-BLK1)

Prepared: 06/10/2019 Analyzed: 06/12/2019

Arsenic	<0.500	0.500	ug/L							
Cadmium	<0.100	0.100	ug/L							
Manganese	<0.500	0.500	ug/L							
Molybdenum	<0.500	0.500	ug/L							
Chromium	<0.500	0.500	ug/L							

Blank (BEF0175-BLK2)

Prepared: 06/10/2019 Analyzed: 06/14/2019

Selenium	<0.500	0.500	ug/L							
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LCS (BEF0175-BS1)

Prepared: 06/10/2019 Analyzed: 06/12/2019

Manganese	107	0.500	ug/L	100.00		107	85-115			
Cadmium	99.2	0.100	ug/L	100.00		99.2	85-115			
Arsenic	99.4	0.500	ug/L	100.00		99.4	85-115			
Chromium	101	0.500	ug/L	100.00		101	85-115			
Molybdenum	98.8	0.500	ug/L	100.00		98.8	85-115			

Duplicate (BEF0175-DUP1)

Source: MEF0109-05

Prepared: 06/10/2019 Analyzed: 06/12/2019

Arsenic	0.599	0.500	ug/L		0.779			26.2	20	M_D
Chromium	1.84	0.500	ug/L		1.91			3.70	20	
Cadmium	<0.100	0.100	ug/L		<0.100				20	
Molybdenum	0.645	0.500	ug/L		0.607			6.18	20	
Manganese	1.01	0.500	ug/L		1.03			2.41	20	

Duplicate (BEF0175-DUP2)

Source: MEF0109-06

Prepared: 06/10/2019 Analyzed: 06/12/2019

Manganese	0.187	0.500	ug/L		0.331			55.5	20	M_D-RL
Cadmium	<0.100	0.100	ug/L		<0.100				20	
Arsenic	1.03	0.500	ug/L		1.03			0.560	20	
Molybdenum	9.47	0.500	ug/L		9.51			0.443	20	
Chromium	0.940	0.500	ug/L		0.932			0.928	20	

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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Dissolved Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0175 - EPA 200.2, EPA 3005

Duplicate (BEF0175-DUP3)		Source: MEF0109-05		Prepared: 06/10/2019 Analyzed: 06/14/2019						
Selenium	2.61	0.500	ug/L		2.58			1.26	20	
Duplicate (BEF0175-DUP4)		Source: MEF0109-06		Prepared: 06/10/2019 Analyzed: 06/14/2019						
Selenium	2.78	0.500	ug/L		2.85			2.59	20	
Matrix Spike (BEF0175-MS1)		Source: MEF0109-05		Prepared: 06/10/2019 Analyzed: 06/12/2019						
Manganese	106	0.500	ug/L	100.00	1.03	105	70-130			
Molybdenum	104	0.500	ug/L	100.00	0.607	103	70-130			
Chromium	107	0.500	ug/L	100.00	1.91	105	70-130			
Arsenic	103	0.500	ug/L	100.00	0.779	102	70-130			
Cadmium	101	0.100	ug/L	100.00	<0.100	101	70-130			
Matrix Spike (BEF0175-MS2)		Source: MEF0109-06		Prepared: 06/10/2019 Analyzed: 06/12/2019						
Cadmium	101	0.100	ug/L	100.00	<0.100	101	70-130			
Manganese	107	0.500	ug/L	100.00	0.331	106	70-130			
Molybdenum	109	0.500	ug/L	100.00	9.51	99.5	70-130			
Chromium	104	0.500	ug/L	100.00	0.932	103	70-130			
Arsenic	106	0.500	ug/L	100.00	1.03	105	70-130			
Matrix Spike (BEF0175-MS3)		Source: MEF0109-05		Prepared: 06/10/2019 Analyzed: 06/14/2019						
Selenium	105	0.500	ug/L	100.00	2.58	102	70-130			
Matrix Spike (BEF0175-MS4)		Source: MEF0109-06		Prepared: 06/10/2019 Analyzed: 06/14/2019						
Selenium	107	0.500	ug/L	100.00	2.85	104	70-130			
Matrix Spike Dup (BEF0175-MSD1)		Source: MEF0109-05		Prepared: 06/10/2019 Analyzed: 06/12/2019						
Chromium	106	0.500	ug/L	100.00	1.91	104	70-130	0.613	20	
Cadmium	99.3	0.100	ug/L	100.00	<0.100	99.3	70-130	1.56	20	
Manganese	108	0.500	ug/L	100.00	1.03	107	70-130	1.93	20	
Arsenic	107	0.500	ug/L	100.00	0.779	106	70-130	3.52	20	
Molybdenum	103	0.500	ug/L	100.00	0.607	102	70-130	0.781	20	



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 WI-999071150

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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Dissolved Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0175 - EPA 200.2, EPA 3005

Matrix Spike Dup (BEF0175-MSD2)		Source: MEF0109-06			Prepared: 06/10/2019 Analyzed: 06/12/2019					
Molybdenum	115	0.500	ug/L	100.00	9.51	106	70-130	5.42	20	
Chromium	113	0.500	ug/L	100.00	0.932	112	70-130	8.45	20	
Arsenic	107	0.500	ug/L	100.00	1.03	106	70-130	1.07	20	
Manganese	111	0.500	ug/L	100.00	0.331	111	70-130	4.32	20	
Cadmium	99.4	0.100	ug/L	100.00	<0.100	99.4	70-130	1.27	20	
Matrix Spike Dup (BEF0175-MSD3)		Source: MEF0109-05			Prepared: 06/10/2019 Analyzed: 06/14/2019					
Selenium	104	0.500	ug/L	100.00	2.58	101	70-130	0.750	20	
Matrix Spike Dup (BEF0175-MSD4)		Source: MEF0109-06			Prepared: 06/10/2019 Analyzed: 06/14/2019					
Selenium	107	0.500	ug/L	100.00	2.85	104	70-130	0.690	20	

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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Total Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0220 - EPA 200.2, EPA 3005

Blank (BEF0220-BLK1)

Prepared: 06/12/2019 Analyzed: 06/17/2019

Cadmium	<0.500	0.500	ug/L							
Lead	<0.500	0.500	ug/L							
Barium	<0.500	0.500	ug/L							
Selenium	<0.500	0.500	ug/L							
Cobalt	<0.500	0.500	ug/L							
Arsenic	<0.500	0.500	ug/L							
Beryllium	<0.500	0.500	ug/L							
Antimony	<0.500	0.500	ug/L							
Chromium	<0.500	0.500	ug/L							
Thallium	<0.500	0.500	ug/L							
Molybdenum	<0.500	0.500	ug/L							

LCS (BEF0220-BS1)

Prepared: 06/12/2019 Analyzed: 06/17/2019

Beryllium	94.5	0.500	ug/L	100.00		94.5	85-115			
Arsenic	96.0	0.500	ug/L	100.00		96.0	85-115			
Cadmium	101	0.500	ug/L	100.00		101	85-115			
Chromium	103	0.500	ug/L	100.00		103	85-115			
Lead	98.8	0.500	ug/L	100.00		98.8	85-115			
Selenium	101	0.500	ug/L	100.00		101	85-115			
Molybdenum	99.9	0.500	ug/L	100.00		99.9	85-115			
Antimony	102	0.500	ug/L	100.00		102	85-115			
Thallium	99.7	0.500	ug/L	100.00		99.7	85-115			
Cobalt	102	0.500	ug/L	100.00		102	85-115			
Barium	99.7	0.500	ug/L	100.00		99.7	85-115			

Duplicate (BEF0220-DUP1)

Source: MEF0145-01

Prepared: 06/12/2019 Analyzed: 06/17/2019

Chromium	0.397	0.500	ug/L		0.436		9.43	20		
Cobalt	0.190	0.500	ug/L		0.184		2.80	20		
Selenium	0.288	0.500	ug/L		0.323		11.5	20		
Molybdenum	0.723	0.500	ug/L		0.683		5.56	20		
Antimony	0.122	0.500	ug/L		0.0901		30.2	20		M_D-RL
Lead	0.145	0.500	ug/L		0.132		9.95	20		
Cadmium	<0.500	0.500	ug/L		<0.500			20		
Arsenic	1.28	0.500	ug/L		1.29		0.711	20		
Thallium	0.0413	0.500	ug/L		<0.500			20		
Beryllium	0.0877	0.500	ug/L		0.0118		153	20		M_D-RL
Barium	53.9	0.500	ug/L		52.4		2.82	20		

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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Total Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0220 - EPA 200.2, EPA 3005

Matrix Spike (BEF0220-MS1)	Source: MEF0145-01			Prepared: 06/12/2019 Analyzed: 06/17/2019						
Cadmium	101	0.500	ug/L	100.00	<0.500	101	70-130			
Molybdenum	99.1	0.500	ug/L	100.00	0.683	98.5	70-130			
Barium	155	0.500	ug/L	100.00	52.4	103	70-130			
Lead	91.2	0.500	ug/L	100.00	0.132	91.0	70-130			
Antimony	103	0.500	ug/L	100.00	0.0901	103	70-130			
Selenium	102	0.500	ug/L	100.00	0.323	102	70-130			
Chromium	98.9	0.500	ug/L	100.00	0.436	98.5	70-130			
Cobalt	95.5	0.500	ug/L	100.00	0.184	95.3	70-130			
Arsenic	102	0.500	ug/L	100.00	1.29	101	70-130			
Beryllium	97.6	0.500	ug/L	100.00	0.0118	97.6	70-130			
Thallium	95.6	0.500	ug/L	100.00	<0.500	95.6	70-130			

Matrix Spike Dup (BEF0220-MSD1)	Source: MEF0145-01			Prepared: 06/12/2019 Analyzed: 06/17/2019						
Selenium	103	0.500	ug/L	100.00	0.323	103	70-130	1.02	20	
Thallium	98.5	0.500	ug/L	100.00	<0.500	98.5	70-130	2.97	20	
Cobalt	98.2	0.500	ug/L	100.00	0.184	98.0	70-130	2.78	20	
Lead	94.1	0.500	ug/L	100.00	0.132	94.0	70-130	3.17	20	
Barium	151	0.500	ug/L	100.00	52.4	98.7	70-130	2.84	20	
Beryllium	92.1	0.500	ug/L	100.00	0.0118	92.1	70-130	5.74	20	
Arsenic	103	0.500	ug/L	100.00	1.29	101	70-130	0.307	20	
Antimony	102	0.500	ug/L	100.00	0.0901	102	70-130	1.11	20	
Chromium	103	0.500	ug/L	100.00	0.436	102	70-130	3.62	20	
Molybdenum	98.6	0.500	ug/L	100.00	0.683	97.9	70-130	0.545	20	
Cadmium	103	0.500	ug/L	100.00	<0.500	103	70-130	1.31	20	

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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Dissolved Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0174 - EPA 200.2, EPA 3005

Blank (BEF0174-BLK1)

Prepared: 06/10/2019 Analyzed: 06/12/2019

Magnesium	<1.25	1.25	mg/L							
Potassium	<1.25	1.25	mg/L							
Boron	<0.0500	0.0500	mg/L							
Sodium	<1.25	1.25	mg/L							
Calcium	<1.25	1.25	mg/L							
Iron	<0.0500	0.0500	mg/L							

LCS (BEF0174-BS1)

Prepared: 06/10/2019 Analyzed: 06/12/2019

Sodium	111	1.25	mg/L	100.00		111	85-115			
Calcium	111	1.25	mg/L	100.00		111	85-115			
Magnesium	112	1.25	mg/L	100.00		112	85-115			
Boron	1.08	0.0500	mg/L	1.0000		108	85-115			
Potassium	111	1.25	mg/L	100.00		111	85-115			
Iron	1.05	0.0500	mg/L	1.0000		105	85-115			

Duplicate (BEF0174-DUP1)

Source: MEF0109-03

Prepared: 06/10/2019 Analyzed: 06/12/2019

Iron	<0.0500	0.0500	mg/L	<0.0500					20	
Boron	7.34	0.0500	mg/L	7.38				0.576	20	
Calcium	357	1.25	mg/L	356				0.255	20	
Sodium	49.6	1.25	mg/L	49.6				0.0294	20	
Magnesium	193	1.25	mg/L	193				0.404	20	
Potassium	3.11	1.25	mg/L	3.14				0.958	20	

Duplicate (BEF0174-DUP2)

Source: MEF0109-04

Prepared: 06/10/2019 Analyzed: 06/12/2019

Magnesium	188	1.25	mg/L	191				1.10	20	
Potassium	3.04	1.25	mg/L	3.06				0.669	20	
Iron	<0.0500	0.0500	mg/L	<0.0500					20	
Boron	7.15	0.0500	mg/L	7.33				2.49	20	
Calcium	347	1.25	mg/L	351				0.974	20	
Sodium	48.3	1.25	mg/L	48.8				0.894	20	



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Dissolved Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0174 - EPA 200.2, EPA 3005

Matrix Spike (BEF0174-MS1)		Source: MEF0109-03			Prepared: 06/10/2019 Analyzed: 06/12/2019					
Potassium	118	1.25	mg/L	100.00	3.14	115	70-130			
Sodium	166	1.25	mg/L	100.00	49.6	116	70-130			
Magnesium	320	1.25	mg/L	100.00	193	127	70-130			
Iron	1.02	0.0500	mg/L	1.0000	<0.0500	102	70-130			
Calcium	485	1.25	mg/L	100.00	356	129	70-130			
Boron	8.51	0.0500	mg/L	1.0000	7.38	113	70-130			

Matrix Spike (BEF0174-MS2)		Source: MEF0109-04			Prepared: 06/10/2019 Analyzed: 06/12/2019					
Magnesium	323	1.25	mg/L	100.00	191	133	70-130			M_MS
Sodium	169	1.25	mg/L	100.00	48.8	120	70-130			
Potassium	121	1.25	mg/L	100.00	3.06	118	70-130			
Iron	1.05	0.0500	mg/L	1.0000	<0.0500	105	70-130			
Calcium	491	1.25	mg/L	100.00	351	140	70-130			M_MS
Boron	8.64	0.0500	mg/L	1.0000	7.33	131	70-130			M_MS

Matrix Spike Dup (BEF0174-MSD1)		Source: MEF0109-03			Prepared: 06/10/2019 Analyzed: 06/12/2019					
Sodium	165	1.25	mg/L	100.00	49.6	116	70-130	0.333	20	
Magnesium	319	1.25	mg/L	100.00	193	126	70-130	0.187	20	
Iron	1.01	0.0500	mg/L	1.0000	<0.0500	101	70-130	0.866	20	
Potassium	118	1.25	mg/L	100.00	3.14	115	70-130	0.0908	20	
Calcium	482	1.25	mg/L	100.00	356	126	70-130	0.456	20	
Boron	8.52	0.0500	mg/L	1.0000	7.38	114	70-130	0.0610	20	

Matrix Spike Dup (BEF0174-MSD2)		Source: MEF0109-04			Prepared: 06/10/2019 Analyzed: 06/12/2019					
Sodium	168	1.25	mg/L	100.00	48.8	119	70-130	0.647	20	
Boron	8.44	0.0500	mg/L	1.0000	7.33	111	70-130	2.30	20	
Potassium	121	1.25	mg/L	100.00	3.06	118	70-130	0.304	20	
Calcium	489	1.25	mg/L	100.00	351	139	70-130	0.363	20	M_MS
Iron	1.02	0.0500	mg/L	1.0000	<0.0500	102	70-130	2.85	20	
Magnesium	321	1.25	mg/L	100.00	191	131	70-130	0.593	20	M_MS

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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Total Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0219 - EPA 200.2, EPA 3005

Blank (BEF0219-BLK1)

Prepared: 06/12/2019 Analyzed: 06/19/2019

Lithium	<0.0150	0.0150	mg/L							
Calcium	<1.25	1.25	mg/L							
Boron	<0.0500	0.0500	mg/L							

LCS (BEF0219-BS1)

Prepared: 06/12/2019 Analyzed: 06/19/2019

Boron	1.03	0.0500	mg/L	1.0000		103	85-115			
Lithium	1.04	0.0150	mg/L	1.0000		104	85-115			
Calcium	108	1.25	mg/L	100.00		108	85-115			

Duplicate (BEF0219-DUP1)

Source: MEF0076-01

Prepared: 06/12/2019 Analyzed: 06/19/2019

Boron	0.0624	0.0500	mg/L		0.0644			3.12	20	
Lithium	0.0348	0.0150	mg/L		0.0360			3.58	20	
Calcium	99.8	1.25	mg/L		98.8			0.958	20	

Duplicate (BEF0219-DUP2)

Source: MEF0076-03

Prepared: 06/12/2019 Analyzed: 06/19/2019

Boron	0.0557	0.0500	mg/L		0.0560			0.622	20	
Calcium	77.1	1.25	mg/L		76.1			1.30	20	
Lithium	0.0207	0.0150	mg/L		0.0215			3.84	20	

Matrix Spike (BEF0219-MS1)

Source: MEF0076-01

Prepared: 06/12/2019 Analyzed: 06/19/2019

Boron	1.12	0.0500	mg/L	1.0000	0.0644	106	70-130			
Calcium	215	1.25	mg/L	100.00	98.8	116	70-130			
Lithium	1.10	0.0150	mg/L	1.0000	0.0360	106	70-130			

Matrix Spike (BEF0219-MS2)

Source: MEF0076-03

Prepared: 06/12/2019 Analyzed: 06/19/2019

Lithium	1.12	0.0150	mg/L	1.0000	0.0215	110	70-130			
Boron	1.15	0.0500	mg/L	1.0000	0.0560	109	70-130			
Calcium	194	1.25	mg/L	100.00	76.1	118	70-130			



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Total Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0219 - EPA 200.2, EPA 3005

Matrix Spike Dup (BEF0219-MSD1)		Source: MEF0076-01			Prepared: 06/12/2019 Analyzed: 06/19/2019					
Lithium	1.11	0.0150	mg/L	1.0000	0.0360	107	70-130	1.15	20	
Calcium	217	1.25	mg/L	100.00	98.8	118	70-130	0.884	20	
Boron	1.14	0.0500	mg/L	1.0000	0.0644	107	70-130	1.51	20	
Matrix Spike Dup (BEF0219-MSD2)		Source: MEF0076-03			Prepared: 06/12/2019 Analyzed: 06/19/2019					
Lithium	1.08	0.0150	mg/L	1.0000	0.0215	106	70-130	3.49	20	
Boron	1.13	0.0500	mg/L	1.0000	0.0560	107	70-130	1.77	20	
Calcium	188	1.25	mg/L	100.00	76.1	112	70-130	3.11	20	



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Mercury - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEF0446 - EPA 245.1, EPA 7470A

Blank (BEF0446-BLK1)		Prepared: 06/20/2019 Analyzed: 06/24/2019								
Mercury	<0.200	0.200	ug/L							
LCS (BEF0446-BS1)		Prepared: 06/20/2019 Analyzed: 06/24/2019								
Mercury	2.89	0.200	ug/L	3.0030		96.3	85-115			
Duplicate (BEF0446-DUP1)		Source: MEF0109-01		Prepared: 06/20/2019 Analyzed: 06/24/2019						
Mercury	<0.200	0.200	ug/L		<0.200				20	
Matrix Spike (BEF0446-MS1)		Source: MEF0109-01		Prepared: 06/20/2019 Analyzed: 06/24/2019						
Mercury	2.84	0.200	ug/L	3.0030	<0.200	94.6	70-130			
Matrix Spike Dup (BEF0446-MSD1)		Source: MEF0109-01		Prepared: 06/20/2019 Analyzed: 06/24/2019						
Mercury	2.87	0.200	ug/L	3.0030	<0.200	95.7	70-130	1.19	20	

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco Ponds Spring Project Manager: Eric Ealy	Reported: 06/26/2019 08:33
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Qualifiers and Definitions

M_TTT	Sample received at the lab outside of required hold time.
M_MS	The percent recovery and/or RPD were outside the acceptance limits for the MS/MSD due to possible matrix interference and/or non-homogeneous sample matrix.
M_D-RL	The RPD for the sample duplicate was outside of QC acceptance limits due to <RL.
M_D	The RPD for the sample duplicate was outside of QC acceptance limits possibly due to non-homogeneous matrix.
Z	Non Accredited Analyte
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A
 Required Client Information:
 Company: Xcel Energy Environmental Services
 Address: mp-7
 Email To: _____
 Phone: _____ Fax: _____
 Requested Due Date/TAT: _____

Section B
 Required Project Information:
 Report To: David Katzner
 Copy To: _____
 Purchase Order No.: _____
 Project Name: Sherco special sampling, June 2019
 Project Number: _____

Section C
 Invoice Information:
 Attention: Steve Davis
 Company Name: _____
 Address: _____
 Pace Quote Reference: _____
 Pace Project Manager: _____
 Pace Profile #: _____

Page: 1 of 2
2273462

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER _____

Site Location
 STATE: _____

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE Drinking Water Water Waste Water Product Soil/Solid Oil Wipe Air Tissue Other	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		PRESERVATIVES	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)
					COMPOSITE START	COMPOSITE END/GRAB			
1	P-155		WT		DATE	TIME			
2	Rinse				6/5/19	1015			
3	P-50 D				1050				
4	Duplicate				1120				
5	P-50 B				1120				
6	P-50				1200				
7	P-92 D				1255				
8	P-92 B				1410				
9	P-92 A				1450				
10	P-94 B				1525				
11	P-94 A				1630				
12	P-152 A		WT		DATE	TIME			
					6/6/19	0810			

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
Sam Ambrose	6/6/19	1240	David Anderson	6/6/19	1240	Temp in °C 49.4 Sealed Cooler (Y/N) X Custody (Y/N) X Received on Ice (Y/N) X Samples Intact (Y/N) X

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: David Anderson
 SIGNATURE of SAMPLER: Sam Ambrose
 DATE Signed (MM/DD/YY): 6/6/19

ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information: Company: <u>Excel Energy</u> Address: <u>Environmental Services</u> Email To: <u>MP-7</u> Phone: _____ Fax: _____ Requested Due Date/TAT: _____		Section B Required Project Information: Report To: <u>David Kutzner</u> Copy To: _____ Purchase Order No.: _____ Project Name: <u>Shore special sampling</u> Project Number: <u>JUNE 2019</u>		Section C Invoice Information: Attention: <u>Steve Davis</u> Company Name: _____ Address: _____ Pace Quote Reference: _____ Pace Project Manager: _____ Pace Profile #: _____	
Page: <u>2</u> of <u>2</u> Invoice No: <u>2273465</u>		REGULATORY AGENCY <input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER _____ Site Location STATE: _____			

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
					COMPOSITE START	COMPOSITE END/GRAB						
1	P-152B	DW	WT		DATE	TIME						
2	P-93B	WT			6/6/19	0900		3	Unpreserved			
3	P-93B	WT			1015			3	H ₂ SO ₄			
4	P-93A	WT			1055			3	HNO ₃			
5		WT			1150			3	HCl			
6									NaOH			
7									Na ₂ S ₂ O ₅			
8									Methanol			
9									Other			
10												
11												
12												

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
phstg: mduvaloz	Sam Anderson	6/6/19	1240	[Signature]	6/6/19	1240	Temp in °C: <u>19.5</u> Received on Ice (Y/N): <u>Y</u> Custody Sealed Cooler (Y/N): <u>Y</u> Samples Intact (Y/N): <u>Y</u>

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: David Anderson DATE Signed (MM/DD/YY): 6/6/19

SIGNATURE of SAMPLER: [Signature]

ORIGINAL

May 20, 2019

Dave Anderson
Pace Analytical Services - Field Svcs Division
1700 Elm Street, Suite 200
Minneapolis, MN 55414

RE: Project: 19-01918, Xcel Energy-Sherco P
Pace Project No.: 30291817

Dear Dave Anderson:

Enclosed are the analytical results for sample(s) received by the laboratory on April 30, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Carin Ferris
carin.ferris@pacelabs.com
724-850-5615
Project Manager

Enclosures

cc: Eric Ealy, Xcel Energy
Christine M. Keefe, Xcel Energy
Ciara Ruikkie, Pace Analytical Services - Field Svcs
Division



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: 19-01918, Xcel Energy-Sherco P
Pace Project No.: 30291817

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991

Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 19-01918, Xcel Energy-Sherco P

Pace Project No.: 30291817

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30291817001	Rinse CCR-P3	Water	04/24/19 08:10	04/30/19 11:40
30291817002	P-152A	Water	04/24/19 08:50	04/30/19 11:40
30291817003	P-130	Water	04/24/19 09:50	04/30/19 11:40
30291817004	P-154A	Water	04/24/19 11:00	04/30/19 11:40
30291817005	P-132	Water	04/24/19 11:50	04/30/19 11:40
30291817006	P-165	Water	04/24/19 12:40	04/30/19 11:40
30291817007	P-150	Water	04/24/19 14:00	04/30/19 11:40
30291817008	Duplicate CCR-P3	Water	04/24/19 14:00	04/30/19 11:40
30291817009	P-151	Water	04/24/19 15:10	04/30/19 11:40
30291817010	P-131	Water	04/24/19 16:10	04/30/19 11:40
30291817011	P-153	Water	04/24/19 17:00	04/30/19 11:40
30291817012	P-17	Water	04/24/19 18:35	04/30/19 11:40
30291817013	P-23	Water	04/25/19 09:00	04/30/19 11:40
30291817014	Rinse CCR BAP	Water	04/25/19 09:15	04/30/19 11:40
30291817015	P-158	Water	04/25/19 10:00	04/30/19 11:40
30291817016	P-157	Water	04/25/19 10:50	04/30/19 11:40
30291817017	Duplicate CCR-BAP	Water	04/25/19 10:50	04/30/19 11:40
30291817018	P-22	Water	04/25/19 12:00	04/30/19 11:40
30291817019	P-155	Water	04/25/19 12:50	04/30/19 11:40
30291817020	P-01A-1	Water	04/25/19 13:50	04/30/19 11:40
30291817021	P-156	Water	04/25/19 14:50	04/30/19 11:40
30291817022	P-162	Water	04/25/19 15:50	04/30/19 11:40
30291817023	P-163	Water	04/25/19 16:50	04/30/19 11:40
30291817024	P-164	Water	04/25/19 17:40	04/30/19 11:40

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 19-01918, Xcel Energy-Sherco P
Pace Project No.: 30291817

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30291817001	Rinse CCR-P3	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817002	P-152A	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817003	P-130	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817004	P-154A	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817005	P-132	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817006	P-165	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817007	P-150	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817008	Duplicate CCR-P3	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817009	P-151	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817010	P-131	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817011	P-153	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817012	P-17	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817013	P-23	EPA 903.1	MK1	1	PASI-PA

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 19-01918, Xcel Energy-Sherco P

Pace Project No.: 30291817

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30291817014	Rinse CCR BAP	EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
30291817015	P-158	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817016	P-157	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30291817017	Duplicate CCR-BAP	EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
30291817018	P-22	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817019	P-155	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30291817020	P-01A-1	EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
30291817021	P-156	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30291817022	P-162	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30291817023	P-163	EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
30291817024	P-164	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 19-01918, Xcel Energy-Sherco P
Pace Project No.: 30291817

Method: EPA 903.1
Description: 903.1 Radium 226
Client: Pace-MN Field Services Division
Date: May 20, 2019

General Information:

24 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 19-01918, Xcel Energy-Sherco P

Pace Project No.: 30291817

Method: EPA 904.0

Description: 904.0 Radium 228

Client: Pace-MN Field Services Division

Date: May 20, 2019

General Information:

24 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 19-01918, Xcel Energy-Sherco P

Pace Project No.: 30291817

Method: Total Radium Calculation

Description: Total Radium 228+226

Client: Pace-MN Field Services Division

Date: May 20, 2019

General Information:

24 samples were analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 19-01918, Xcel Energy-Sherco P

Pace Project No.: 30291817

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: Rinse CCR-P3		Lab ID: 30291817001	Collected: 04/24/19 08:10	Received: 04/30/19 11:40	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Radium-226	EPA 903.1	0.228 ± 0.500 (0.903)	pCi/L	05/16/19 10:44	13982-63-3		
Radium-228	EPA 904.0	-0.187 ± 0.358 (0.868)	pCi/L	05/09/19 15:37	15262-20-1		
Total Radium	Total Radium Calculation	0.228 ± 0.858 (1.77)	pCi/L	05/16/19 14:13	7440-14-4		

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: P-152A		Lab ID: 30291817002	Collected: 04/24/19 08:50	Received: 04/30/19 11:40	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Radium-226	EPA 903.1	0.0535 ± 0.315 (0.643)	pCi/L	05/16/19 10:44	13982-63-3		
Radium-228	EPA 904.0	3.07 ± 0.817 (0.870)	pCi/L	05/09/19 15:37	15262-20-1		
Total Radium	Total Radium Calculation	3.12 ± 1.13 (1.51)	pCi/L	05/16/19 14:13	7440-14-4		

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: P-130		Lab ID: 30291817003	Collected: 04/24/19 09:50	Received: 04/30/19 11:40	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Radium-226	EPA 903.1	0.790 ± 0.516 (0.529)	pCi/L	05/16/19 10:44	13982-63-3		
Radium-228	EPA 904.0	0.500 ± 0.365 (0.714)	pCi/L	05/09/19 15:38	15262-20-1		
Total Radium	Total Radium Calculation	1.29 ± 0.881 (1.24)	pCi/L	05/16/19 14:13	7440-14-4		

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: P-154A		Lab ID: 30291817004	Collected: 04/24/19 11:00	Received: 04/30/19 11:40	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Radium-226	EPA 903.1	0.424 ± 0.298 (0.144)	pCi/L	05/16/19 10:44	13982-63-3		
Radium-228	EPA 904.0	0.787 ± 0.383 (0.663)	pCi/L	05/09/19 15:38	15262-20-1		
Total Radium	Total Radium Calculation	1.21 ± 0.681 (0.807)	pCi/L	05/16/19 14:13	7440-14-4		

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: P-132		Lab ID: 30291817005	Collected: 04/24/19 11:50	Received: 04/30/19 11:40	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Radium-226	EPA 903.1	0.199 ± 0.391 (0.702)	pCi/L	05/16/19 10:44	13982-63-3		
Radium-228	EPA 904.0	0.0442 ± 0.301 (0.690)	pCi/L	05/09/19 15:38	15262-20-1		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 19-01918, Xcel Energy-Sherco P

Pace Project No.: 30291817

Sample: P-132		Lab ID: 30291817005	Collected: 04/24/19 11:50	Received: 04/30/19 11:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Total Radium	Total Radium Calculation	0.243 ± 0.692 (1.39)	pCi/L	05/16/19 14:13	7440-14-4	

Sample: P-165		Lab ID: 30291817006	Collected: 04/24/19 12:40	Received: 04/30/19 11:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	1.11 ± 0.513 (0.389) C:NA T:97%	pCi/L	05/16/19 10:44	13982-63-3	
Radium-228	EPA 904.0	0.0636 ± 0.326 (0.741) C:85% T:85%	pCi/L	05/09/19 15:38	15262-20-1	
Total Radium	Total Radium Calculation	1.17 ± 0.839 (1.13)	pCi/L	05/16/19 14:13	7440-14-4	

Sample: P-150		Lab ID: 30291817007	Collected: 04/24/19 14:00	Received: 04/30/19 11:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.731 ± 0.535 (0.737) C:NA T:89%	pCi/L	05/16/19 10:44	13982-63-3	
Radium-228	EPA 904.0	0.484 ± 0.326 (0.620) C:84% T:90%	pCi/L	05/09/19 15:38	15262-20-1	
Total Radium	Total Radium Calculation	1.22 ± 0.861 (1.36)	pCi/L	05/16/19 14:13	7440-14-4	

Sample: Duplicate CCR-P3		Lab ID: 30291817008	Collected: 04/24/19 14:00	Received: 04/30/19 11:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.359 ± 0.304 (0.377) C:NA T:97%	pCi/L	05/16/19 11:03	13982-63-3	
Radium-228	EPA 904.0	0.449 ± 0.335 (0.658) C:86% T:87%	pCi/L	05/09/19 15:38	15262-20-1	
Total Radium	Total Radium Calculation	0.808 ± 0.639 (1.04)	pCi/L	05/16/19 14:13	7440-14-4	

Sample: P-151		Lab ID: 30291817009	Collected: 04/24/19 15:10	Received: 04/30/19 11:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.748 ± 0.473 (0.535) C:NA T:94%	pCi/L	05/16/19 11:03	13982-63-3	
Radium-228	EPA 904.0	0.248 ± 0.294 (0.617) C:78% T:83%	pCi/L	05/09/19 15:38	15262-20-1	
Total Radium	Total Radium Calculation	0.996 ± 0.767 (1.15)	pCi/L	05/16/19 14:13	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 19-01918, Xcel Energy-Sherco P

Pace Project No.: 30291817

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	0.434 ± 0.340 (0.399) C:NA T:95%	pCi/L	05/16/19 11:03	13982-63-3	
Radium-228		EPA 904.0	0.347 ± 0.281 (0.552) C:82% T:90%	pCi/L	05/09/19 15:38	15262-20-1	
Total Radium		Total Radium Calculation	0.781 ± 0.621 (0.951)	pCi/L	05/16/19 14:13	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	0.471 ± 0.369 (0.433) C:NA T:82%	pCi/L	05/16/19 11:03	13982-63-3	
Radium-228		EPA 904.0	0.346 ± 0.328 (0.667) C:82% T:80%	pCi/L	05/09/19 15:38	15262-20-1	
Total Radium		Total Radium Calculation	0.817 ± 0.697 (1.10)	pCi/L	05/16/19 14:13	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	-0.0489 ± 0.223 (0.527) C:NA T:97%	pCi/L	05/16/19 11:03	13982-63-3	
Radium-228		EPA 904.0	-0.0447 ± 0.231 (0.559) C:82% T:90%	pCi/L	05/09/19 15:38	15262-20-1	
Total Radium		Total Radium Calculation	0.000 ± 0.454 (1.09)	pCi/L	05/16/19 14:14	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	0.609 ± 0.426 (0.514) C:NA T:92%	pCi/L	05/16/19 11:03	13982-63-3	
Radium-228		EPA 904.0	0.279 ± 0.326 (0.682) C:76% T:78%	pCi/L	05/09/19 15:39	15262-20-1	
Total Radium		Total Radium Calculation	0.888 ± 0.752 (1.20)	pCi/L	05/16/19 14:14	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	0.477 ± 0.379 (0.493) C:NA T:93%	pCi/L	05/16/19 11:03	13982-63-3	
Radium-228		EPA 904.0	0.718 ± 0.402 (0.712) C:81% T:73%	pCi/L	05/09/19 15:39	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 19-01918, Xcel Energy-Sherco P
Pace Project No.: 30291817

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Total Radium		Total Radium Calculation	1.20 ± 0.781 (1.21)	pCi/L	05/16/19 14:14	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	0.738 ± 0.584 (0.852) C:NA T:83%	pCi/L	05/16/19 11:03	13982-63-3	
Radium-228		EPA 904.0	0.0916 ± 0.313 (0.707) C:80% T:79%	pCi/L	05/09/19 15:39	15262-20-1	
Total Radium		Total Radium Calculation	0.830 ± 0.897 (1.56)	pCi/L	05/16/19 14:14	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	0.552 ± 0.386 (0.466) C:NA T:97%	pCi/L	05/16/19 11:18	13982-63-3	
Radium-228		EPA 904.0	0.364 ± 0.368 (0.756) C:75% T:78%	pCi/L	05/09/19 15:39	15262-20-1	
Total Radium		Total Radium Calculation	0.916 ± 0.754 (1.22)	pCi/L	05/16/19 14:14	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	0.115 ± 0.276 (0.533) C:NA T:89%	pCi/L	05/16/19 11:18	13982-63-3	
Radium-228		EPA 904.0	-0.191 ± 0.268 (0.683) C:82% T:76%	pCi/L	05/09/19 15:39	15262-20-1	
Total Radium		Total Radium Calculation	0.115 ± 0.544 (1.22)	pCi/L	05/16/19 14:14	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	0.885 ± 0.488 (0.434) C:NA T:90%	pCi/L	05/16/19 11:18	13982-63-3	
Radium-228		EPA 904.0	0.416 ± 0.351 (0.697) C:78% T:77%	pCi/L	05/09/19 15:39	15262-20-1	
Total Radium		Total Radium Calculation	1.30 ± 0.839 (1.13)	pCi/L	05/16/19 14:14	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 19-01918, Xcel Energy-Sherco P
Pace Project No.: 30291817

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: P-155 Lab ID: 30291817019 Collected: 04/25/19 12:50 Received: 04/30/19 11:40 Matrix: Water PWS: Site ID: Sample Type:							
Radium-226		EPA 903.1	0.523 ± 0.473 (0.697) C:NA T:84%	pCi/L	05/16/19 11:18	13982-63-3	
Radium-228		EPA 904.0	1.34 ± 0.802 (1.47) C:78% T:38%	pCi/L	05/09/19 15:39	15262-20-1	
Total Radium		Total Radium Calculation	1.86 ± 1.28 (2.17)	pCi/L	05/16/19 14:14	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: P-01A-1 Lab ID: 30291817020 Collected: 04/25/19 13:50 Received: 04/30/19 11:40 Matrix: Water PWS: Site ID: Sample Type:							
Radium-226		EPA 903.1	0.481 ± 0.357 (0.446) C:NA T:97%	pCi/L	05/16/19 11:18	13982-63-3	
Radium-228		EPA 904.0	0.408 ± 0.336 (0.672) C:87% T:84%	pCi/L	05/09/19 15:39	15262-20-1	
Total Radium		Total Radium Calculation	0.889 ± 0.693 (1.12)	pCi/L	05/16/19 14:14	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: P-156 Lab ID: 30291817021 Collected: 04/25/19 14:50 Received: 04/30/19 11:40 Matrix: Water PWS: Site ID: Sample Type:							
Radium-226		EPA 903.1	0.331 ± 0.309 (0.439) C:NA T:100%	pCi/L	05/16/19 12:12	13982-63-3	
Radium-228		EPA 904.0	0.194 ± 0.329 (0.718) C:80% T:86%	pCi/L	05/09/19 11:07	15262-20-1	
Total Radium		Total Radium Calculation	0.525 ± 0.638 (1.16)	pCi/L	05/20/19 11:40	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: P-162 Lab ID: 30291817022 Collected: 04/25/19 15:50 Received: 04/30/19 11:40 Matrix: Water PWS: Site ID: Sample Type:							
Radium-226		EPA 903.1	0.734 ± 0.464 (0.525) C:NA T:86%	pCi/L	05/16/19 12:12	13982-63-3	
Radium-228		EPA 904.0	-0.00256 ± 0.275 (0.644) C:81% T:89%	pCi/L	05/09/19 11:07	15262-20-1	
Total Radium		Total Radium Calculation	0.734 ± 0.739 (1.17)	pCi/L	05/20/19 11:40	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: P-163 Lab ID: 30291817023 Collected: 04/25/19 16:50 Received: 04/30/19 11:40 Matrix: Water PWS: Site ID: Sample Type:							
Radium-226		EPA 903.1	0.311 ± 0.290 (0.381) C:NA T:91%	pCi/L	05/16/19 12:12	13982-63-3	
Radium-228		EPA 904.0	0.426 ± 0.339 (0.674) C:85% T:83%	pCi/L	05/09/19 11:07	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 19-01918, Xcel Energy-Sherco P

Pace Project No.: 30291817

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Total Radium		Total Radium Calculation	0.737 ± 0.629 (1.06)	pCi/L	05/20/19 11:40	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	1.000 ± 0.587 (0.728) C:NA T:86%	pCi/L	05/16/19 12:12	13982-63-3	
Radium-228		EPA 904.0	0.104 ± 0.363 (0.813) C:83% T:92%	pCi/L	05/09/19 11:08	15262-20-1	
Total Radium		Total Radium Calculation	1.10 ± 0.950 (1.54)	pCi/L	05/20/19 11:40	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 19-01918, Xcel Energy-Sherco P

Pace Project No.: 30291817

QC Batch: 340708 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 30291817021, 30291817022, 30291817023, 30291817024

METHOD BLANK: 1657927 Matrix: Water

Associated Lab Samples: 30291817021, 30291817022, 30291817023, 30291817024

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.194 ± 0.280 (0.602) C:83% T:93%	pCi/L	05/09/19 11:07	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 19-01918, Xcel Energy-Sherco P

Pace Project No.: 30291817

QC Batch: 340688

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Associated Lab Samples: 30291817021, 30291817022, 30291817023, 30291817024

METHOD BLANK: 1657870

Matrix: Water

Associated Lab Samples: 30291817021, 30291817022, 30291817023, 30291817024

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.481 ± 0.410 (0.576) C:NA T:94%	pCi/L	05/16/19 12:12	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 19-01918, Xcel Energy-Sherco P

Pace Project No.: 30291817

QC Batch:	340686	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
Associated Lab Samples:	30291817001, 30291817002, 30291817003, 30291817004, 30291817005, 30291817006, 30291817007, 30291817008, 30291817009, 30291817010, 30291817011, 30291817012, 30291817013, 30291817014, 30291817015, 30291817016, 30291817017, 30291817018, 30291817019, 30291817020		

METHOD BLANK:	1657868	Matrix:	Water
Associated Lab Samples:	30291817001, 30291817002, 30291817003, 30291817004, 30291817005, 30291817006, 30291817007, 30291817008, 30291817009, 30291817010, 30291817011, 30291817012, 30291817013, 30291817014, 30291817015, 30291817016, 30291817017, 30291817018, 30291817019, 30291817020		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.109 ± 0.369 (0.712) C:NA T:93%	pCi/L	05/16/19 10:44	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 19-01918, Xcel Energy-Sherco P

Pace Project No.: 30291817

QC Batch:	340707	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	30291817001, 30291817002, 30291817003, 30291817004, 30291817005, 30291817006, 30291817007, 30291817008, 30291817009, 30291817010, 30291817011, 30291817012, 30291817013, 30291817014, 30291817015, 30291817016, 30291817017, 30291817018, 30291817019, 30291817020		

METHOD BLANK:	1657923	Matrix:	Water
Associated Lab Samples:	30291817001, 30291817002, 30291817003, 30291817004, 30291817005, 30291817006, 30291817007, 30291817008, 30291817009, 30291817010, 30291817011, 30291817012, 30291817013, 30291817014, 30291817015, 30291817016, 30291817017, 30291817018, 30291817019, 30291817020		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.324 ± 0.339 (0.702) C:77% T:81%	pCi/L	05/09/19 15:38	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALIFIERS

Project: 19-01918, Xcel Energy-Sherco P
Pace Project No.: 30291817

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

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CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Xcel Energy	Report To:	David Anderson	Attention:	Clara Rukkie
Address:	50 Pace MN Field	Copy To:		Company Name:	Pace MN Field Services
Email To:		Purchase Order No.:		Address:	
Phone:		Project Name:	19-01918, Xcel Energy -	REGULATORY AGENCY:	<input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER
Requested Due Date/TAT:		Project Number:	Shereco Ponds, Spring 2019	Site Location:	<input type="checkbox"/> UST <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER
				State:	

Page: 1 of 2
2273456

ITEM #	Section D Required Client Information	Matrix Codes MATRIX I.D. CODE	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives							Analysis Test	Requested Analysis Filtered (Y/N)	Pace Project No./ Lab I.D.	
			COMPOSITE START	COMPOSITE END/GRAB			DATE	TIME	Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH				Na ₂ S ₂ O ₃
1	Rinse CCR - P3	WT			4/24/19	0810	2								RA-228 EPA 903.1	Y	001
2	P-152A					0850	2								RA-226 EPA 903.1	Y	002
3	P-130					0950	2									Y	003
4	P-154A					1100	2									Y	004
5	P-132					1150	2									Y	005
6	P-165					1240	2									Y	006
7	P-150					1400	2									Y	007
8	Duplicate CCR - P3					1400	2									Y	008
9	P-151					1510	2									Y	009
10	P-131					1610	2									Y	010
11	P-153					1700	2									Y	011
12	P-17					1835	2									Y	012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS												
① client needs to analyze for: Radium 226 + 228 p.c.f.A P combined.	David Anderson Pace	4/26/19		ms	4/30/19	1140	N N Y												
② RA - 226 EPA 903.1 RA - 228 EPA 904.0 ORIGINAL																			
<table border="1"> <tr> <td colspan="4">SAMPLER NAME AND SIGNATURE</td> </tr> <tr> <td>PRINT Name of SAMPLER:</td> <td>David Anderson</td> <td>DATE Signed (MM/DD/YYYY):</td> <td>4/24/19</td> </tr> <tr> <td>SIGNATURE of SAMPLER:</td> <td>[Signature]</td> <td></td> <td></td> </tr> </table>								SAMPLER NAME AND SIGNATURE				PRINT Name of SAMPLER:	David Anderson	DATE Signed (MM/DD/YYYY):	4/24/19	SIGNATURE of SAMPLER:	[Signature]		
SAMPLER NAME AND SIGNATURE																			
PRINT Name of SAMPLER:	David Anderson	DATE Signed (MM/DD/YYYY):	4/24/19																
SIGNATURE of SAMPLER:	[Signature]																		
Temp in °C	Received on	Sealed Cooler	Custody	Samples Intact	(Y/N)	(Y/N)	(Y/N)												

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.



The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A
Required Client Information:
 Company: Xcel Energy
 Address: c/o Pace-MN Field
 Email To: _____
 Phone: _____ Fax: _____
 Requested Due Date(TAT): _____

Section B
Required Project Information:
 Report To: David Anderson
 Copy To: _____
 Purchase Order No.: _____
 Project Name: 19-01918, Xcel Energy -
 Project Number: Sherece Ponds, Spring 2019

Section C
Invoice Information:
 Attention: Ciara Ruitkie
 Company Name: Pace-MN Field Services
 Address: _____
 Pace Quote Reference: Tom Halvetson
 Pace Project Manager: CARIN FETTIS
 Pace Profile #: _____

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER _____

Site Location _____ STATE: _____

Page: 2 of 2
 2273452

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	SAMPLE TEMP AT COLLECTION		# OF CONTAINERS	Preservatives								Analysis Test Y/N	Requested Analysis Filtered (Y/N)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
			COMPOSITE START	COMPOSITE END/GRAB			DATE	TIME		DATE	TIME	Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ O ₃				
1	P-23	Drinking Water			WT		4/25/19	0900	2												
2	Rinse CCR BAP	Water					0915		2												
3	P-158	Waste Water					1000		2												
4	P-157	Waste Water					1050		2												
5	Duplicate CCR-BAP	Product					1050		2												
6	P-22	Product					1200		2												
7	P-155	Oil					1250		2												
8	P-01A-1	Oil					1350		2												
9	P-156	Wipe					1450		2												
10	P-162	Air					1550		2												
11	P-163	Wipe					1650		2												
12	P-164	Other					1740		2												

ADDITIONAL COMMENTS
 Client needs to analyze for:
 Radium 226 + 228 pCi/L
 combined.

RELINQUISHED BY / AFFILIATION
Sam Anderson 4/26/19

ACCEPTED BY / AFFILIATION
MSO 4/29/19

DATE 4/25/19

TIME _____

Temp In °C _____

Received on _____

Ice (Y/N) _____

Sealed Cooler _____

Custody (Y/N) _____

Samples Intact (Y/N) _____

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: David Anderson
 SIGNATURE of SAMPLER: David Anderson
 DATE Signed (MM/DD/YY): 4/25/19

20 of 22
 RA-226 EPA 903.1 ORIGINAL
 RA-228 EPA 904.0

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Pittsburgh Lab Sample Condition Upon Receipt



Client Name: Xcel Energy

Project # 30291817

Courier: Fed Ex UPS USPS Client Commercial Pace Other

Tracking #: 49343729 6165

Label	<u>MDS</u>
LIMS Login	<u>MDS</u>

Custody Seal on Cooler/Box Present: yes no Seals intact: yes no

Thermometer Used NA Type of Ice: Wet Blue None

Cooler Temperature Observed Temp _____ °C Correction Factor: _____ °C Final Temp: _____ °C

Temp should be above freezing to 6°C

Comments:	pH paper Lot#			Date and Initials of person examining contents: <u>MDS 4/30/19</u>
	Yes	No	N/A	
Chain of Custody Present:	/			1.
Chain of Custody Filled Out:	/			2.
Chain of Custody Relinquished:	/			3.
Sampler Name & Signature on COC:	/			4.
Sample Labels match COC:	/			5.
-Includes date/time/ID Matrix: <u>WA</u>				
Samples Arrived within Hold Time:	/			6.
Short Hold Time Analysis (<72hr remaining):		/		7.
Rush Turn Around Time Requested:		/		8.
Sufficient Volume:	/			9.
Correct Containers Used:	/			10.
-Pace Containers Used:	/			
Containers Intact:	/			11.
Orthophosphate field filtered			/	12.
Hex Cr Aqueous sample field filtered			/	13.
Organic Samples checked for dechlorination:			/	14.
Filtered volume received for Dissolved tests			/	15.
All containers have been checked for preservation.	/			16.
exceptions: VOA, coliform, TOC, O&G, Phenolics, Radon, Non-aqueous matrix				<u>PHLZ</u>
All containers meet method preservation requirements.	/			Initial when completed: <u>MDS</u> Date/time of preservation
				Lot # of added preservative
Headspace in VOA Vials (>6mm):			/	17.
Trip Blank Present:			/	18.
Trip Blank Custody Seals Present			/	
Rad Samples Screened < 0.5 mrem/hr	/			Initial when completed: <u>MDS</u> Date: <u>4-30-19</u>

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

A check in this box indicates that additional information has been stored in ereports.

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.

Appendix B

Fall 2019 Assessment Monitoring Event
Field Datasheets and Laboratory Reports

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Fall 2019 Project No. 19-02662
 Monitoring Point ID P-01A-1 Labeled P-01A
 Inside Diameter 2 (Inches) Key # 2106 Locked Not Locked
 Casing Material: PVC Steel Stainless Steel cover will not close

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet
 Total Well Depth 80.98 Feet
 Static water level measurement before purging (Start Depth) 75.63 Feet
 Static water level measurement at time of sampling (Final Depth) 75.63 Feet
 Static Water Level Elevation Before Purging NA Feet
 Purge Method dedicated bladder pump Pump ID PC-6
 Date Purged 10/22/19 Water Column 5.35 Feet
 Time Purged 1615-1633 One Casing Volume 0.9 Gallons
 Pump Rate 0.15 GPM LPM Volume Purged 2.7 Gallons

Field Sampling Data

Date Sampled 10/22/19
 Time Sampled 1645
 Sampling Equip. above pump
 Meter ID MPS-5
 Analyzed by DTA

Field Parameter Measurements of Sample

pH 7.6 (units) D.O. 5.6 (mg/l)
 Spec. Cond. 480 (µmhos/cm) Turbidity 4.3 (NTU)
 Temp. 10.5 (°C) (ORP) Eh 195 (mV)
 Other NA

Field Measurements Temp. Corrected: Yes No NA
 Sample for Soluble Metals Filtered in Field: Yes No NA

Weather Conditions During Sampling: 41° + cloudy, wind NW 25
 Sample Description: clear + odorless
 Observations: DTA 10/22/19

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1621	7.6	470	10.0	5.5	NA	199	0.9
1627	7.6	480	10.5	5.6	NA	195	1.8
1633	7.6	480	10.5	5.6	NA	195	2.7
<u>DTA 10/22/19</u>							

Samples chilled immediately after collection

Yes Other

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson Date: 10/22/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Fall 2019 Project No. 19-02662

Monitoring Point ID P-17 Labeled P17

Inside Diameter 2 (inches) Key # 2106 Locked Not Locked

Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet

Total Well Depth 58.76 Feet

Static water level measurement before purging (Start Depth) 35.20 Feet

Static water level measurement at time of sampling (Final Depth) 35.20 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 10/23/19 Water Column 23.56 Feet

Time Purged 0735-0853 One Casing Volume 3.8 Gallons

Pump Rate 0.15 **GPM** / LPM Volume Purged 11.75 Gallons

Field Sampling Data

Date Sampled 10/23/19

Time Sampled 0900

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DTA

Field Parameter Measurements of Sample

pH 7.4 (units) D.O. 6.6 (mg/l)

Spec. Cond. 530 (umhos/cm) Turbidity 4.2 (NTU)

Temp. 9.5 (°C) (ORP) Eh 204 (mV)

Other NA

Field Measurements Temp. Corrected: Yes No NA

Sample for Soluble Metals Filtered in Field: Yes No NA

Weather Conditions During Sampling: 33° + sunny, wind @ W 10

Sample Description: clear + odorless

Observations: SWL measured 10/22/19
DTA 10/23/19

Stabilization Test

Time	pH (units)	Specific Conductance (umhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
0801	7.4	530	9.5	6.4	NA	211	3.9
0827	7.4	530	9.5	6.5	NA	205	7.8
0853 0900	7.4	530	9.5	6.6	NA	204	11.7
DTA 10/23/19							

Samples chilled immediately after collection:

Yes Other

Form Revised 01/25/2018

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson Date: 10/23/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Fall 2019 Project No. 19-02662

Monitoring Point ID P-22 Labeled P-22

Inside Diameter 2 (Inches) Key # 2106 Locked Not Locked

Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet

Total Well Depth 57.85 Feet

Static water level measurement before purging (Start Depth) 37.58 Feet

Static water level measurement at time of sampling (Final Depth) 37.58 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 10/23/19 Water Column 20.27 Feet

Time Purged 1240-1331 One Casing Volume 3.3 Gallons

Pump Rate 0.2 GPM/LPM Volume Purged 10.2 Gallons

Field Sampling Data

Date Sampled 10/23/19

Time Sampled 1340

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DTA

Field Parameter Measurements of Sample

pH 7.6 (units) D.O. 7.1 (mg/l)

Spec. Cond. 580 (µmhos/cm) Turbidity 3.4 (NTU)

Temp. 9.5 (°C) (ORP) Eh 198 (mV)

Other NA

Field Measurements Temp. Corrected: Yes No NA

Sample for Soluble Metals Filtered in Field: Yes No NA

Weather Conditions During Sampling: 42° + partly cloudy, wind NW 10

Sample Description: elect + odorless

Observations: SWL measured 10/22/19.

Stabilization Test

Time	pH (Units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (Cumulative gal)
1257	7.7	590	9.5	7.1	NA	202	3.4
1314	7.6	580	9.5	7.1	NA	198	6.8
1331	7.6	580	9.5	7.1	NA	198	10.2
DTA 10/23/19							

Samples chilled immediately after collection:

Yes Other

Form Revised 01/25/2018

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson Date: 10/23/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Fall 2019 Project No. 19-02662
 Monitoring Point ID P-23 Labeled P23
 Inside Diameter 2 (Inches) Key # 2106 Locked Not Locked
 Casing Material: PVC Steel Stainless Steel Had to cut off lock

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet
 Total Well Depth 67.34 Feet
 Static water level measurement before purging (Start Depth) 39.64 Feet
 Static water level measurement at time of sampling (Final Depth) 39.64 Feet
 Static Water Level Elevation Before Purging NA Feet
 Purge Method dedicated bladder pump Pump ID SP-1
 Date Purged 10/23/19 Water Column 27.70 Feet
 Time Purged 1125-1214 One Casing Volume 4.5 Gallons
 Pump Rate 0.2 GPM/LPM Volume Purged 13.8 Gallons

Field Sampling Data

Date Sampled 10/23/19 Time Sampled 1220
 Sampling Equip. above pump Meter ID MPS-5
 Analyzed by DTA

Field Parameter Measurements of Sample:
 pH 7.7 (units) D.O. 7.6 (mg/l)
 Spec. Cond. 620 (µmhos/cm) Turbidity 3.0 (NTU)
 Temp. 11.5 (°C) (ORP) Eh 200 (mV)
 Other NA

Field Measurements Temp. Corrected: Yes No NA
 Sample for Soluble Metals Filtered in Field: Yes No NA
 Weather Conditions During Sampling: 40°+ cloudy, wind NW 10
 Sample Description: clear + odorless
 Observations: SWL measured 10/22/19
* Had to cut off lock, needs to be replaced.

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1128	7.7	620	11.5	8.0	NA	215	4.6
1151	7.7	620	11.5	7.8	NA	204	9.2
1214	7.7	620	11.5	7.6	NA	200	13.8
<u>DTA 10/23/19</u>							

Samples chilled immediately after collection: Yes Other

Form Revised 01/25/2018

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical
 Lead Technician Signature: David Anderson Date: 10/23/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Fall 2019 Project No. 19-02662

Monitoring Point ID P-152 A Labeled 806318

Inside Diameter 2 (Inches) Key # 2106 Locked Not Locked

Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet

Total Well Depth 42.18 Feet

Static water level measurement before purging (Start Depth) 35.11 Feet

Static water level measurement at time of sampling (Final Depth) 35.11 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 10/21/19 Water Column 7.07 Feet

Time Purged 1340-1404 One Casing Volume 1.2 Gallons

Pump Rate 0.15 GPM / LPM Volume Purged 3.6 Gallons

Field Sampling Data

Date Sampled 10/21/19

Time Sampled 1440

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.6 (units) D.O. 9.5 (mg/l)

Spec. Cond. 340 (umhos/cm) Turbidity 3.0 (NTU)

Temp. 9.5 (°C) (ORP) Eh 221 (mV)

Other NA

Field Measurements Temp. Corrected: Yes No NA

Sample for Soluble Metals Filtered in Field: Yes No NA

Weather Conditions During Sampling: 44° + rain, wind NE 10-15

Sample Description: clear + odorless

Observations: DJA 10/21/19

Stabilization Test

Time	pH (units)	Specific Conductance (umhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1348	7.7	340	9.5	9.6	NA	226	1.2
1356	7.6	340	9.5	9.6	NA	223	2.4
1404	7.6	340	9.5	9.5	NA	221	3.6
<u>DJA 10/21/19</u>							

Samples chilled immediately after collection

Yes Other

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson Date: 10/21/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Fall 2019 Project No. 19-02662
 Monitoring Point ID P-155 Labeled 812964
 Inside Diameter 2 (inches) Key # 2106 Locked Not Locked
 Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet
 Total Well Depth 85.47 Feet
 Static water level measurement before purging (Start Depth) 75.85 Feet
 Static water level measurement at time of sampling (Final Depth) 75.85 Feet
 Static Water Level Elevation Before Purging NA Feet
 Purge Method dedicated bladder pump Pump ID PC-6
 Date Purged 10/22/19 Water Column 9.62 Feet
 Time Purged 1705-1738 One Casing Volume 1.6 Gallons
 Pump Rate 0.15 **GPM** LPM Volume Purged 4.95 Gallons

Field Sampling Data

Date Sampled 10/22/19
 Time Sampled 1750
 Sampling Equip. above pump
 Meter ID MPS-5
 Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.7 (units) D.O. 5.0 (mg/l)
 Spec. Cond. 780 (umhos/cm) Turbidity 6.7 (NTU)
 Temp. 10.5 (°C) (ORP) Eh 183 (mV)
 Other NA

Field Measurements Temp. Corrected: Yes No NA
 Sample for Soluble Metals Filtered in Field: Yes No NA
 Weather Conditions During Sampling: 41° + cloudy, wind NW 25
 Sample Description: clear + odorless
 Observations: DJA 10/22/19

Stabilization Test

Time	pH (units)	Specific Conductance (umhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1716	7.8	780	10.5	4.9	NA	164	1.65
1727	7.7	780	10.5	4.9	NA	180	3.30
1738	7.7	780	10.5	5.0	NA	183	4.95
<u>DJA 10/22/19</u>							

Samples chilled immediately after collection:

Yes Other

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson Date: 10/22/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Fall 2019 Project No. 19-02662
 Monitoring Point ID P-156 Labeled 812965
 Inside Diameter 2 (Inches) Key # 2106 Locked Not Locked
 Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet
 Total Well Depth 85.53 Feet
 Static water level measurement before purging (Start Depth) 74.87 Feet
 Static water level measurement at time of sampling (Final Depth) 74.87 Feet
 Static Water Level Elevation Before Purging NA Feet
 Purge Method dedicated bladder pump Pump ID PC-6
 Date Purged 10/22/19 Water Column 10.66 Feet
 Time Purged 1515-1551 One Casing Volume 1.7 Gallons
 Pump Rate 0.15 GPM / LPM Volume Purged 5.4 Gallons

Field Sampling Data

Date Sampled 10/22/19
 Time Sampled 1600
 Sampling Equip. above pump
 Meter ID MPS-5
 Analyzed by DTA

Field Parameter Measurements of Sample

pH 7.7 (units) D.O. 5.6 (mg/l)
 Spec. Cond. 420 (umhos/cm) Turbidity 3.3 (NTU)
 Temp. 10.5 (°C) (ORP) Eh 208 (mV)
 Other NA

Field Measurements Temp. Corrected: Yes No NA
 Sample for Soluble Metals Filtered in Field: Yes No NA

Weather Conditions During Sampling: 41° + cloudy, wind NW 25
 Sample Description: clear + odorless
 Observations: DTA 10/22/19

Stabilization Test

Time	pH (units)	Specific Conductance (umhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1527	7.7	420	10.5	5.7	NA	211	1.8
1539	7.7	420	10.5	5.6	NA	209	3.6
1551	7.7	420	10.5	5.6	NA	208	5.4
<u>DTA 10/22/19</u>							

Samples chilled immediately after collection:

Yes Other

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson Date: 10/22/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Fall 2019 Project No. 19-02662
 Monitoring Point ID P-157 Labeled 812966
 Inside Diameter 2 (Inches) Key # 2106 Locked Not Locked
 Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet
 Total Well Depth 49.06 Feet
 Static water level measurement before purging (Start Depth) 40.21 Feet
 Static water level measurement at time of sampling (Final Depth) 40.21 Feet
 Static Water Level Elevation Before Purging NA Feet
 Purge Method dedicated bladder pump Pump ID PC-6
 Date Purged 10/23/19 Water Column 8.85 Feet
 Time Purged 1005-1035 One Casing Volume 1.4 Gallons
 Pump Rate 0.15 (GPM/LPM) Volume Purged 4.5 Gallons

Field Sampling Data

Date Sampled 10/23/19 Time Sampled 1050
 Sampling Equip. above pump Meter ID MPS-5
 Analyzed by DTA

Field Parameter Measurements of Sample
 pH 7.6 (units) D.O. 8.0 (mg/l)
 Spec. Cond. 590 (µmhos/cm) Turbidity 2.9 (NTU)
 Temp. 10.0 (°C) (ORP) Eh 194 (mV)
 Other NA

Field Measurements Temp. Corrected: Yes No NA
 Sample for Soluble Metals Filtered in Field: Yes No NA
 Weather Conditions During Sampling: 37° + cloudy, wind NW 10
 Sample Description: clear + odorless
 Observations: SWL measured 10/22/19, collected duplicate ecr-BAP at this well.

Stabilization Test

Time	pH (Units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (Cumulative gal)
1015	7.6	590	10.0	8.5	NA	195	1.5
1025	7.6	590	10.0	8.0	NA	194	3.0
1035	7.6	590	10.0	8.0	NA	194	4.5
DTA 10/23/19							

Samples chilled immediately after collection: Yes Other

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical
 Lead Technician Signature: David Anderson Date: 10/23/19

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds, Fall 2019 Project No. 19-02662
 Monitoring Point ID P-158 Labeled 812967
 Inside Diameter 2 (Inches) Key # 2106 Locked Not Locked
 Casing Material: PVC Steel Stainless Steel

Depth Measurement and Elevations (from top of well casing)

Top of Casing Elevation NA Feet
 Total Well Depth 49.16 Feet
 Static water level measurement before purging (Start Depth) 37.86 Feet
 Static water level measurement at time of sampling (Final Depth) 37.86 Feet
 Static Water Level Elevation Before Purging NA Feet
 Purge Method dedicated bladder pump Pump ID PC-6
 Date Purged 10/23/19 Water Column 11.30 Feet
 Time Purged 0910 - 0946 One Casing Volume 1.8 Gallons
 Pump Rate 0.15 GPM/LPM Volume Purged 5.4 Gallons

Field Sampling Data

Date Sampled 10/23/19
 Time Sampled 0950
 Sampling Equip. above pump
 Meter ID MPS-5
 Analyzed by DTA

Field Parameter Measurements of Sample
 pH 7.5 (units) D.O. 8.8 (mg/l)
 Spec. Cond. 640 (umhos/cm) Turbidity 2.8 (NTU)
 Temp. 9.5 (°C) (ORP) Eh 204 (mV)
 Other NA

Field Measurements Temp. Corrected: Yes No NA
 Sample for Soluble Metals Filtered in Field: Yes No NA

Weather Conditions During Sampling: 36° + cloudy, wind NW 10
 Sample Description: clear + odorless
 Observations: SWL measured 10/22/19.
collected Rinse CCR-BAP at this well.

Stabilization Test

Time	pH (units)	Specific Conductance (umhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (Cumulative gal)
0922	7.6	640	9.5	9.0	NA	197	1.8
0934	7.6	640	9.5	8.9	NA	202	3.6
0946	7.5	640	9.5	8.8	NA	204	5.4
DTA 10/23/19							

Samples chilled immediately after collection: Yes Other

Form Revised 01/25/2018

Name/Affiliation of Sampler(s): David Anderson / Pace Analytical

Lead Technician Signature: David Anderson Date: 10/23/19



Minneapolis Testing Laboratory
1518 Chestnut Ave N
Minneapolis, MN 55043
Certification #MN-027-053-197
WI-999071150
Christine Keefe, Supervisor (612) 630-4506

15 November 2019

Eric Ealy

Environmental Services-Water Minneapolis

250 Marquette Plaza

Minneapolis, MN 55401

RE: Sherco BAP CCR

cc:

Enclosed are the results of analyses for samples received by the laboratory on 10/24/2019 05:45. If you have any questions concerning this report, please feel free to contact me.

I certify that this analysis report was prepared under my direction or supervision under a system designed to assure that qualified personnel analyzed the submitted samples. All protocols for analysis were followed as required by Minnesota Rules and the Applicable Management Plan.

Sincerely,

Steve Davis

Project Manager

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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ANALYTICAL REPORT FOR SAMPLES

Sample ID	Sample Qualifier	Laboratory ID	Matrix	Sampled	Received
P-152a		MEJ0273-04	Water	10/21/2019 14:10	10/24/2019 5:45
P-156		MEJ0273-15	Water	10/22/2019 16:00	10/24/2019 5:45
P-01A-1		MEJ0273-16	Water	10/22/2019 16:45	10/24/2019 5:45
P-155		MEJ0273-17	Water	10/22/2019 17:50	10/24/2019 5:45
P-17		MEJ0273-18	Water	10/23/2019 9:00	10/24/2019 5:45
Rinse CCR-BAP		MEJ0273-19	Water	10/23/2019 9:20	10/24/2019 5:45
P-158		MEJ0273-20	Water	10/23/2019 9:50	10/24/2019 5:45
P-157		MEJ0273-21	Water	10/23/2019 10:50	10/24/2019 5:45
Duplicate CCR-BAP		MEJ0273-22	Water	10/23/2019 10:50	10/24/2019 5:45
P-23		MEJ0273-23	Water	10/23/2019 12:20	10/24/2019 5:45
P-22		MEJ0273-24	Water	10/23/2019 13:40	10/24/2019 5:45

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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P-152a

MEJ0273-04 (Water) - Chain of Custody Number: 2266770/2266768

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	< 1.00	1.00	mg/L		1	BEJ0569	10/24/19 7:22	10/24/19 19:21	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BEJ0569	10/24/19 7:22	10/24/19 19:21	EPA 300.0	CRL
Sulfate	7.71	1.00	mg/L		1	BEJ0569	10/24/19 7:22	10/24/19 19:21	EPA 300.0	CRL

Wet Chemistry

pH	7.94		pH Units	M_TTT	1	BEJ0568	10/24/19 7:03	10/24/19 8:22	SM 4500-H+ B	CRL
Total Dissolved Solids	178	20.0	mg/L		1	BEJ0567	10/24/19 9:35	10/24/19 9:35	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BEJ0566	10/24/19 7:36	10/24/19 7:36	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 9:32	EPA 200.8	CRL
Barium	32.2	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 9:32	EPA 200.8	CRL
Chromium	0.501	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 9:32	EPA 200.8	CRL
Selenium	< 0.500	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 9:32	EPA 200.8	CRL

Total Metals by ICP

Boron	< 0.0500	0.0500	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 12:48	EPA 200.7	HRD
Calcium	49.4	1.25	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 12:46	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 12:46	EPA 200.7	HRD

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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MEJ0273-15 (Water) - Chain of Custody Number: 2266770/2266768

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	3.51	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 14:16	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 14:16	EPA 300.0	CRL
Sulfate	25.5	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 14:16	EPA 300.0	CRL

Wet Chemistry

pH	7.93		pH Units	M_TTT	1	BEJ0568	10/24/19 7:03	10/24/19 9:22	SM 4500-H+ B	CRL
Total Dissolved Solids	244	20.0	mg/L		1	BEJ0597	10/25/19 8:45	10/25/19 8:45	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BEJ0596	10/25/19 7:00	10/25/19 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:23	EPA 200.8	CRL
Barium	48.2	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:23	EPA 200.8	CRL
Chromium	0.800	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:23	EPA 200.8	CRL
Selenium	2.14	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:23	EPA 200.8	CRL

Total Metals by ICP

Boron	0.128	0.0500	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 13:54	EPA 200.7	HRD
Calcium	59.2	1.25	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 13:52	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 13:52	EPA 200.7	HRD

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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P-01A-1

MEJ0273-16 (Water) - Chain of Custody Number: 2266770/2266768

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	7.35	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 14:36	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 14:36	EPA 300.0	CRL
Sulfate	104	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 14:36	EPA 300.0	CRL

Wet Chemistry

pH	7.72		pH Units	M_TTT	1	BEJ0568	10/24/19 7:03	10/24/19 9:29	SM 4500-H+ B	CRL
Total Dissolved Solids	408	20.0	mg/L		1	BEJ0597	10/25/19 8:45	10/25/19 8:45	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BEJ0596	10/25/19 7:00	10/25/19 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:27	EPA 200.8	CRL
Barium	44.5	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:27	EPA 200.8	CRL
Chromium	1.02	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:27	EPA 200.8	CRL
Selenium	6.00	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:27	EPA 200.8	CRL

Total Metals by ICP

Boron	0.449	0.0500	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 13:59	EPA 200.7	HRD
Calcium	87.0	1.25	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 13:57	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 13:58	EPA 200.7	HRD

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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MEJ0273-17 (Water) - Chain of Custody Number: 2266770/2266768

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	18.8	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 14:56	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 14:56	EPA 300.0	CRL
Sulfate	180	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 14:56	EPA 300.0	CRL

Wet Chemistry

pH	7.82		pH Units	M_TTT	1	BEJ0568	10/24/19 7:03	10/24/19 9:32	SM 4500-H+ B	CRL
Total Dissolved Solids	490	20.0	mg/L		1	BEJ0597	10/25/19 8:45	10/25/19 8:45	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BEJ0596	10/25/19 7:00	10/25/19 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:31	EPA 200.8	CRL
Barium	62.3	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:31	EPA 200.8	CRL
Chromium	0.907	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:31	EPA 200.8	CRL
Selenium	4.77	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:31	EPA 200.8	CRL

Total Metals by ICP

Boron	1.50	0.0500	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 14:04	EPA 200.7	HRD
Calcium	84.8	1.25	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 14:03	EPA 200.7	HRD
Lithium	0.0296	0.0150	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 14:03	EPA 200.7	HRD



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 Certification # MN-027-053-197
 WI-999071150

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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MEJ0273-18 (Water) - Chain of Custody Number: 2266770/2266768

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	23.1	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 15:17	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 15:17	EPA 300.0	CRL
Sulfate	25.8	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 15:17	EPA 300.0	CRL

Wet Chemistry

pH	7.97		pH Units	M_TTT	1	BEJ0568	10/24/19 7:03	10/24/19 9:36	SM 4500-H+ B	CRL
Total Dissolved Solids	284	20.0	mg/L		1	BEJ0597	10/25/19 8:45	10/25/19 8:45	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BEJ0596	10/25/19 7:00	10/25/19 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:35	EPA 200.8	CRL
Barium	39.1	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:35	EPA 200.8	CRL
Chromium	0.786	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:35	EPA 200.8	CRL
Selenium	0.582	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:35	EPA 200.8	CRL

Total Metals by ICP

Boron	< 0.0500	0.0500	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 14:10	EPA 200.7	HRD
Calcium	69.8	1.25	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 14:08	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 14:08	EPA 200.7	HRD

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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Rinse CCR-BAP

MEJ0273-19 (Water) - Chain of Custody Number: 2266770/2266768

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	< 1.00	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 17:19	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 17:19	EPA 300.0	CRL
Sulfate	< 1.00	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 17:19	EPA 300.0	CRL

Wet Chemistry

pH	6.32		pH Units	M_TTT	1	BEJ0568	10/24/19 7:03	10/24/19 9:40	SM 4500-H+ B	CRL
Total Dissolved Solids	< 20.0	20.0	mg/L		1	BEJ0597	10/25/19 8:45	10/25/19 8:45	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BEJ0596	10/25/19 7:00	10/25/19 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:39	EPA 200.8	CRL
Barium	< 0.500	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:39	EPA 200.8	CRL
Chromium	< 0.500	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:39	EPA 200.8	CRL
Selenium	< 0.500	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:39	EPA 200.8	CRL

Total Metals by ICP

Boron	< 0.0500	0.0500	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 12:22	EPA 200.7	HRD
Calcium	< 1.25	1.25	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 12:20	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 12:20	EPA 200.7	HRD

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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MEJ0273-20 (Water) - Chain of Custody Number: 2266770/2266768

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	4.00	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 17:40	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 17:40	EPA 300.0	CRL
Sulfate	102	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 17:40	EPA 300.0	CRL

Wet Chemistry

pH	7.79		pH Units	M_TTT	1	BEJ0568	10/24/19 7:03	10/24/19 9:43	SM 4500-H+ B	CRL
Total Dissolved Solids	398	20.0	mg/L		1	BEJ0597	10/25/19 8:45	10/25/19 8:45	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BEJ0596	10/25/19 7:00	10/25/19 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:43	EPA 200.8	CRL
Barium	69.6	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:43	EPA 200.8	CRL
Chromium	0.927	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:43	EPA 200.8	CRL
Selenium	1.78	0.500	ug/L		1	BEJ0582	10/24/19 10:19	10/30/19 10:43	EPA 200.8	CRL

Total Metals by ICP

Boron	0.385	0.0500	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 14:14	EPA 200.7	HRD
Calcium	90.0	1.25	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 14:13	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BEJ0581	10/24/19 10:16	10/25/19 14:13	EPA 200.7	HRD

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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MEJ0273-21 (Water) - Chain of Custody Number: 2266770/2266768

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	5.99	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 18:00	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 18:00	EPA 300.0	CRL
Sulfate	62.6	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 18:00	EPA 300.0	CRL

Wet Chemistry

pH	7.80		pH Units	M_TTT	1	BEJ0568	10/24/19 7:03	10/24/19 9:58	SM 4500-H+ B	CRL
Total Dissolved Solids	352	20.0	mg/L		1	BEJ0597	10/25/19 8:45	10/25/19 8:45	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BEJ0596	10/25/19 7:00	10/25/19 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:14	EPA 200.8	CRL
Barium	44.4	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:14	EPA 200.8	CRL
Chromium	1.22	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:14	EPA 200.8	CRL
Selenium	1.99	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:14	EPA 200.8	CRL

Total Metals by ICP

Boron	0.247	0.0500	mg/L		1	BEJ0626	10/28/19 9:45	10/29/19 13:33	EPA 200.7	HRD
Calcium	81.0	1.25	mg/L		1	BEJ0626	10/28/19 9:45	10/29/19 13:31	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BEJ0626	10/28/19 9:45	10/29/19 13:31	EPA 200.7	HRD

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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Duplicate CCR-BAP
MEJ0273-22 (Water) - Chain of Custody Number: 2266770/2266768

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	6.04	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 18:21	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 18:21	EPA 300.0	CRL
Sulfate	63.0	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 18:21	EPA 300.0	CRL

Wet Chemistry

pH	7.80		pH Units	M_TTT	1	BEJ0568	10/24/19 7:03	10/24/19 10:01	SM 4500-H+ B	CRL
Total Dissolved Solids	330	20.0	mg/L		1	BEJ0597	10/25/19 8:45	10/25/19 8:45	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BEJ0596	10/25/19 7:00	10/25/19 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:18	EPA 200.8	CRL
Barium	43.4	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:18	EPA 200.8	CRL
Chromium	1.36	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:18	EPA 200.8	CRL
Selenium	2.04	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:18	EPA 200.8	CRL

Total Metals by ICP

Boron	0.247	0.0500	mg/L		1	BEJ0626	10/28/19 9:45	10/29/19 13:38	EPA 200.7	HRD
Calcium	81.0	1.25	mg/L		1	BEJ0626	10/28/19 9:45	10/29/19 13:36	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BEJ0626	10/28/19 9:45	10/29/19 13:36	EPA 200.7	HRD



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MEJ0273-23 (Water) - Chain of Custody Number: 2266770/2266768

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	24.3	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 18:41	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 18:41	EPA 300.0	CRL
Sulfate	70.7	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 18:41	EPA 300.0	CRL

Wet Chemistry

pH	7.93		pH Units	M_TTT	1	BEJ0568	10/24/19 7:03	10/24/19 10:08	SM 4500-H+ B	CRL
Total Dissolved Solids	364	20.0	mg/L		1	BEJ0597	10/25/19 8:45	10/25/19 8:45	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BEJ0596	10/25/19 7:00	10/25/19 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.522	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:22	EPA 200.8	CRL
Barium	56.7	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:22	EPA 200.8	CRL
Chromium	0.841	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:22	EPA 200.8	CRL
Selenium	1.06	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:22	EPA 200.8	CRL

Total Metals by ICP

Boron	0.260	0.0500	mg/L		1	BEJ0626	10/28/19 9:45	10/29/19 13:43	EPA 200.7	HRD
Calcium	84.9	1.25	mg/L		1	BEJ0626	10/28/19 9:45	10/29/19 13:41	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BEJ0626	10/28/19 9:45	10/29/19 13:41	EPA 200.7	HRD

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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P-22

MEJ0273-24 (Water) - Chain of Custody Number: 2266770/2266768

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Anions by Ion Chromatography

Chloride	8.80	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 19:01	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 19:01	EPA 300.0	CRL
Sulfate	80.3	1.00	mg/L		1	BEJ0642	10/28/19 9:11	10/28/19 19:01	EPA 300.0	CRL

Wet Chemistry

pH	7.94		pH Units	M_TTT	1	BEJ0568	10/24/19 7:03	10/24/19 10:15	SM 4500-H+ B	CRL
Total Dissolved Solids	324	20.0	mg/L		1	BEJ0597	10/25/19 8:45	10/25/19 8:45	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BEJ0596	10/25/19 7:00	10/25/19 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:26	EPA 200.8	CRL
Barium	46.8	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:26	EPA 200.8	CRL
Chromium	0.706	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:26	EPA 200.8	CRL
Selenium	3.45	0.500	ug/L		1	BEJ0627	10/28/19 9:49	10/30/19 11:26	EPA 200.8	CRL

Total Metals by ICP

Boron	0.925	0.0500	mg/L		1	BEJ0626	10/28/19 9:45	10/29/19 13:47	EPA 200.7	HRD
Calcium	72.6	1.25	mg/L		1	BEJ0626	10/28/19 9:45	10/29/19 13:46	EPA 200.7	HRD
Lithium	< 0.0150	0.0150	mg/L		1	BEJ0626	10/28/19 9:45	10/29/19 13:46	EPA 200.7	HRD



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Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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Anions by Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEJ0569 - Wet Prep

Blank (BEJ0569-BLK1)			Prepared & Analyzed: 10/24/2019							
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

Blank (BEJ0569-BLK2)			Prepared & Analyzed: 10/24/2019							
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

LCS (BEJ0569-BS1)			Prepared & Analyzed: 10/24/2019							
Chloride	25.5	1.00	mg/L	25.026		102	90-110			
Fluoride	2.54	0.750	mg/L	2.5000		102	90-110			
Sulfate	51.6	1.00	mg/L	50.150		103	90-110			

LCS (BEJ0569-BS2)			Prepared & Analyzed: 10/24/2019							
Chloride	24.9	1.00	mg/L	25.026		99.6	90-110			
Fluoride	2.48	0.750	mg/L	2.5000		99.1	90-110			
Sulfate	50.4	1.00	mg/L	50.150		101	90-110			

LCS (BEJ0569-BS3)			Prepared & Analyzed: 10/24/2019							
Chloride	24.8	1.00	mg/L	25.026		99.2	90-110			
Fluoride	2.47	0.750	mg/L	2.5000		98.9	90-110			
Sulfate	50.2	1.00	mg/L	50.150		100	90-110			

Duplicate (BEJ0569-DUP1)			Source: MEJ0187-01		Prepared & Analyzed: 10/24/2019					
Chloride	4.45	1.00	mg/L		4.44			0.225	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	1.88	1.00	mg/L		1.88			0.0531	20	

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Anions by Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEJ0569 - Wet Prep

Duplicate (BEJ0569-DUP2)	Source: MEJ0187-03			Prepared & Analyzed: 10/24/2019						
Chloride	7.18	1.00	mg/L		7.11			1.02	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	5.74	1.00	mg/L		5.69			0.875	20	

Matrix Spike (BEJ0569-MS1)	Source: MEJ0187-01			Prepared & Analyzed: 10/24/2019						
Chloride	34.8	1.25	mg/L	31.283	4.44	97.1	80-120			
Fluoride	3.19	0.938	mg/L	3.1250	<0.938	102	80-120			
Sulfate	63.4	1.25	mg/L	62.688	1.88	98.2	80-120			

Matrix Spike (BEJ0569-MS2)	Source: MEJ0187-03			Prepared & Analyzed: 10/24/2019						
Chloride	38.9	1.25	mg/L	31.283	7.11	102	80-120			
Fluoride	3.47	0.938	mg/L	3.1250	<0.938	111	80-120			
Sulfate	70.1	1.25	mg/L	62.688	5.69	103	80-120			

Matrix Spike Dup (BEJ0569-MSD1)	Source: MEJ0187-01			Prepared & Analyzed: 10/24/2019						
Chloride	35.8	1.25	mg/L	31.283	4.44	100	80-120	2.84	20	
Fluoride	3.22	0.938	mg/L	3.1250	<0.938	103	80-120	0.897	20	
Sulfate	65.4	1.25	mg/L	62.688	1.88	101	80-120	3.12	20	

Matrix Spike Dup (BEJ0569-MSD2)	Source: MEJ0187-03			Prepared & Analyzed: 10/24/2019						
Chloride	39.0	1.25	mg/L	31.283	7.11	102	80-120	0.433	20	
Fluoride	3.30	0.938	mg/L	3.1250	<0.938	106	80-120	5.13	20	
Sulfate	70.4	1.25	mg/L	62.688	5.69	103	80-120	0.450	20	

Batch BEJ0642 - Wet Prep

Blank (BEJ0642-BLK1)	Prepared & Analyzed: 10/28/2019									
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							



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Anions by Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEJ0642 - Wet Prep

Blank (BEJ0642-BLK2)		Prepared & Analyzed: 10/28/2019								
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

LCS (BEJ0642-BS1)		Prepared & Analyzed: 10/28/2019								
Chloride	25.6	1.00	mg/L	25.026		102	90-110			
Fluoride	2.71	0.750	mg/L	2.5000		108	90-110			
Sulfate	52.0	1.00	mg/L	50.150		104	90-110			

LCS (BEJ0642-BS2)		Prepared & Analyzed: 10/28/2019								
Chloride	24.8	1.00	mg/L	25.026		99.0	90-110			
Fluoride	2.65	0.750	mg/L	2.5000		106	90-110			
Sulfate	50.2	1.00	mg/L	50.150		100	90-110			

LCS (BEJ0642-BS3)		Prepared & Analyzed: 10/28/2019								
Chloride	24.8	1.00	mg/L	25.026		98.9	90-110			
Fluoride	2.65	0.750	mg/L	2.5000		106	90-110			
Sulfate	50.2	1.00	mg/L	50.150		100	90-110			

Duplicate (BEJ0642-DUP1)		Source: MEJ0273-23		Prepared & Analyzed: 10/28/2019						
Chloride	23.8	1.00	mg/L		24.3			2.13	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	69.6	1.00	mg/L		70.7			1.58	20	

Duplicate (BEJ0642-DUP2)		Source: MEJ0273-24		Prepared & Analyzed: 10/28/2019						
Chloride	8.71	1.00	mg/L		8.80			1.10	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	79.8	1.00	mg/L		80.3			0.602	20	

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Anions by Ion Chromatography - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEJ0642 - Wet Prep

Matrix Spike (BEJ0642-MS1)		Source: MEJ0273-23			Prepared & Analyzed: 10/28/2019					
Chloride	55.5	1.25	mg/L	31.283	24.3	99.9	80-120			
Fluoride	2.94	0.938	mg/L	3.1250	<0.938	94.1	80-120			
Sulfate	134	1.25	mg/L	62.688	70.7	101	80-120			
Matrix Spike (BEJ0642-MS2)		Source: MEJ0273-24			Prepared & Analyzed: 10/28/2019					
Chloride	40.9	1.25	mg/L	31.283	8.80	103	80-120			
Fluoride	3.32	0.938	mg/L	3.1250	<0.938	106	80-120			
Sulfate	143	1.25	mg/L	62.688	80.3	100	80-120			
Matrix Spike Dup (BEJ0642-MSD1)		Source: MEJ0273-23			Prepared & Analyzed: 10/28/2019					
Chloride	55.5	1.25	mg/L	31.283	24.3	99.8	80-120	0.0203	20	
Fluoride	3.45	0.938	mg/L	3.1250	<0.938	110	80-120	16.0	20	
Sulfate	134	1.25	mg/L	62.688	70.7	100	80-120	0.0570	20	
Matrix Spike Dup (BEJ0642-MSD2)		Source: MEJ0273-24			Prepared & Analyzed: 10/28/2019					
Chloride	40.5	1.25	mg/L	31.283	8.80	101	80-120	0.933	20	
Fluoride	3.49	0.938	mg/L	3.1250	<0.938	112	80-120	4.88	20	
Sulfate	143	1.25	mg/L	62.688	80.3	99.8	80-120	0.276	20	

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Wet Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEJ0566 - Wet Prep

Blank (BEJ0566-BLK1)		Prepared & Analyzed: 10/24/2019								
Total Suspended Solids	<4.00	4.00	mg/L							
Duplicate (BEJ0566-DUP1)		Source: MEJ0273-02		Prepared & Analyzed: 10/24/2019						
Total Suspended Solids	<4.00	4.00	mg/L		<4.00				20	
Duplicate (BEJ0566-DUP2)		Source: MEJ0273-03		Prepared & Analyzed: 10/24/2019						
Total Suspended Solids	6.40	4.00	mg/L		6.40			0.00	20	

Batch BEJ0567 - Wet Prep

Blank (BEJ0567-BLK1)		Prepared & Analyzed: 10/24/2019								
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BEJ0567-DUP1)		Source: MEJ0273-02		Prepared & Analyzed: 10/24/2019						
Total Dissolved Solids	300	20.0	mg/L		298			0.669	20	
Duplicate (BEJ0567-DUP2)		Source: MEJ0273-03		Prepared & Analyzed: 10/24/2019						
Total Dissolved Solids	204	20.0	mg/L		200			1.98	20	

Batch BEJ0568 - Wet Prep

LCS (BEJ0568-BS1)		Prepared & Analyzed: 10/24/2019								
pH	7.12		pH Units	7.0000		102	90-110			
LCS (BEJ0568-BS2)		Prepared & Analyzed: 10/24/2019								
pH	7.12		pH Units	7.0000		102	90-110			

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Wet Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEJ0568 - Wet Prep

Duplicate (BEJ0568-DUP1)		Source: MEJ0273-02		Prepared & Analyzed: 10/24/2019						
pH	7.82		pH Units		7.86			0.510	20	
Duplicate (BEJ0568-DUP2)		Source: MEJ0273-11		Prepared & Analyzed: 10/24/2019						
pH	8.19		pH Units		8.18			0.122	20	
Duplicate (BEJ0568-DUP3)		Source: MEJ0273-21		Prepared & Analyzed: 10/24/2019						
pH	7.79		pH Units		7.80			0.128	20	

Batch BEJ0596 - Wet Prep

Blank (BEJ0596-BLK1)		Prepared & Analyzed: 10/25/2019								
Total Suspended Solids	<4.00	4.00	mg/L							
Duplicate (BEJ0596-DUP1)		Source: MEJ0273-13		Prepared & Analyzed: 10/25/2019						
Total Suspended Solids	30.8	4.00	mg/L		28.0			9.52	20	
Duplicate (BEJ0596-DUP2)		Source: MEJ0273-14		Prepared & Analyzed: 10/25/2019						
Total Suspended Solids	4.80	4.00	mg/L		4.00			18.2	20	

Batch BEJ0597 - Wet Prep

Blank (BEJ0597-BLK1)		Prepared & Analyzed: 10/25/2019								
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BEJ0597-DUP1)		Source: MEJ0273-13		Prepared & Analyzed: 10/25/2019						
Total Dissolved Solids	370	20.0	mg/L		374			1.08	20	



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Wet Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEJ0597 - Wet Prep

Duplicate (BEJ0597-DUP2)	Source: MEJ0273-14	Prepared & Analyzed: 10/25/2019			
Total Dissolved Solids	310	20.0 mg/L	310	0.00	20

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Total Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEJ0582 - EPA 200.2, EPA 3005

Blank (BEJ0582-BLK1)

Prepared: 10/24/2019 Analyzed: 10/30/2019

Barium	<0.500	0.500	ug/L							
Arsenic	<0.500	0.500	ug/L							
Selenium	<0.500	0.500	ug/L							
Chromium	<0.500	0.500	ug/L							

LCS (BEJ0582-BS1)

Prepared: 10/24/2019 Analyzed: 10/30/2019

Chromium	95.6	0.500	ug/L	100.00		95.6	85-115			
Barium	97.0	0.500	ug/L	100.00		97.0	85-115			
Arsenic	98.6	0.500	ug/L	100.00		98.6	85-115			
Selenium	97.2	0.500	ug/L	100.00		97.2	85-115			

Duplicate (BEJ0582-DUP1)

Source: MEJ0273-17

Prepared: 10/24/2019 Analyzed: 10/30/2019

Chromium	0.983	0.500	ug/L		0.907			8.06	20	
Selenium	4.81	0.500	ug/L		4.77			0.726	20	
Barium	61.9	0.500	ug/L		62.3			0.738	20	
Arsenic	0.337	0.500	ug/L		0.258			26.7	20	M_D-RL

Duplicate (BEJ0582-DUP2)

Source: MEJ0273-18

Prepared: 10/24/2019 Analyzed: 10/30/2019

Barium	38.6	0.500	ug/L		39.1			1.22	20	
Chromium	0.978	0.500	ug/L		0.786			21.8	20	M_D
Selenium	0.505	0.500	ug/L		0.582			14.2	20	
Arsenic	0.397	0.500	ug/L		0.414			4.14	20	

Matrix Spike (BEJ0582-MS1)

Source: MEJ0273-17

Prepared: 10/24/2019 Analyzed: 10/30/2019

Arsenic	103	0.500	ug/L	100.00	0.258	103	70-130			
Chromium	96.6	0.500	ug/L	100.00	0.907	95.7	70-130			
Selenium	104	0.500	ug/L	100.00	4.77	99.3	70-130			
Barium	160	0.500	ug/L	100.00	62.3	97.4	70-130			

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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Total Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEJ0582 - EPA 200.2, EPA 3005

Matrix Spike (BEJ0582-MS2)	Source: MEJ0273-18			Prepared: 10/24/2019 Analyzed: 10/30/2019						
Selenium	99.1	0.500	ug/L	100.00	0.582	98.5	70-130			
Arsenic	104	0.500	ug/L	100.00	0.414	103	70-130			
Barium	141	0.500	ug/L	100.00	39.1	102	70-130			
Chromium	99.2	0.500	ug/L	100.00	0.786	98.4	70-130			

Matrix Spike Dup (BEJ0582-MSD1)	Source: MEJ0273-17			Prepared: 10/24/2019 Analyzed: 10/30/2019						
Chromium	100	0.500	ug/L	100.00	0.907	99.3	70-130	3.65	20	
Selenium	106	0.500	ug/L	100.00	4.77	101	70-130	1.61	20	
Barium	163	0.500	ug/L	100.00	62.3	101	70-130	2.09	20	
Arsenic	104	0.500	ug/L	100.00	0.258	104	70-130	1.51	20	

Matrix Spike Dup (BEJ0582-MSD2)	Source: MEJ0273-18			Prepared: 10/24/2019 Analyzed: 10/30/2019						
Chromium	101	0.500	ug/L	100.00	0.786	99.8	70-130	1.38	20	
Barium	142	0.500	ug/L	100.00	39.1	103	70-130	0.818	20	
Selenium	100	0.500	ug/L	100.00	0.582	99.5	70-130	0.964	20	
Arsenic	103	0.500	ug/L	100.00	0.414	103	70-130	0.624	20	

Batch BEJ0627 - EPA 200.2, EPA 3005

Blank (BEJ0627-BLK1)	Prepared: 10/28/2019 Analyzed: 10/30/2019									
Arsenic	<0.500	0.500	ug/L							
Barium	<0.500	0.500	ug/L							
Selenium	<0.500	0.500	ug/L							
Chromium	<0.500	0.500	ug/L							

LCS (BEJ0627-BS1)	Prepared: 10/28/2019 Analyzed: 10/30/2019									
Arsenic	97.6	0.500	ug/L	100.00		97.6	85-115			
Barium	98.5	0.500	ug/L	100.00		98.5	85-115			
Selenium	97.4	0.500	ug/L	100.00		97.4	85-115			
Chromium	97.8	0.500	ug/L	100.00		97.8	85-115			



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Total Metals by ICPMS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEJ0627 - EPA 200.2, EPA 3005

Duplicate (BEJ0627-DUP1)	Source: MEJ0273-22			Prepared: 10/28/2019 Analyzed: 10/30/2019						
Arsenic	0.284	0.500	ug/L		0.279			1.98	20	
Chromium	1.40	0.500	ug/L		1.36			2.86	20	
Selenium	2.03	0.500	ug/L		2.04			0.192	20	
Barium	44.1	0.500	ug/L		43.4			1.65	20	

Matrix Spike (BEJ0627-MS1)	Source: MEJ0273-22			Prepared: 10/28/2019 Analyzed: 10/30/2019						
Chromium	100	0.500	ug/L	100.00	1.36	98.8	70-130			
Barium	146	0.500	ug/L	100.00	43.4	102	70-130			
Selenium	104	0.500	ug/L	100.00	2.04	102	70-130			
Arsenic	102	0.500	ug/L	100.00	0.279	102	70-130			

Matrix Spike Dup (BEJ0627-MSD1)	Source: MEJ0273-22			Prepared: 10/28/2019 Analyzed: 10/30/2019						
Chromium	101	0.500	ug/L	100.00	1.36	100	70-130	1.19	20	
Barium	143	0.500	ug/L	100.00	43.4	100	70-130	1.57	20	
Arsenic	101	0.500	ug/L	100.00	0.279	100	70-130	1.26	20	
Selenium	101	0.500	ug/L	100.00	2.04	99.3	70-130	2.46	20	

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Total Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch BEJ0581 - EPA 200.2, EPA 3005

Blank (BEJ0581-BLK1)

Prepared: 10/24/2019 Analyzed: 10/25/2019

Boron	<0.0500	0.0500	mg/L							
Lithium	<0.0150	0.0150	mg/L							
Calcium	<1.25	1.25	mg/L							

LCS (BEJ0581-BS1)

Prepared: 10/24/2019 Analyzed: 10/25/2019

Calcium	104	1.25	mg/L	100.00		104	85-115			
Boron	0.998	0.0500	mg/L	1.0000		99.8	85-115			
Lithium	1.00	0.0150	mg/L	1.0000		100	85-115			

Duplicate (BEJ0581-DUP1)

Source: MEJ0273-02

Prepared: 10/24/2019 Analyzed: 10/25/2019

Boron	<0.0500	0.0500	mg/L		<0.0500				20	
Calcium	59.8	1.25	mg/L		58.6			2.08	20	
Lithium	0.00481	0.0150	mg/L		0.00466			3.22	20	

Duplicate (BEJ0581-DUP2)

Source: MEJ0273-03

Prepared: 10/24/2019 Analyzed: 10/25/2019

Boron	<0.0500	0.0500	mg/L		<0.0500				20	
Calcium	50.1	1.25	mg/L		50.9			1.42	20	
Lithium	0.00558	0.0150	mg/L		0.00609			8.67	20	

Matrix Spike (BEJ0581-MS1)

Source: MEJ0273-02

Prepared: 10/24/2019 Analyzed: 10/25/2019

Boron	1.04	0.0500	mg/L	1.0000	<0.0500	104	70-130			
Calcium	167	1.25	mg/L	100.00	58.6	108	70-130			
Lithium	1.02	0.0150	mg/L	1.0000	0.00466	102	70-130			

Matrix Spike (BEJ0581-MS2)

Source: MEJ0273-03

Prepared: 10/24/2019 Analyzed: 10/25/2019

Boron	1.05	0.0500	mg/L	1.0000	<0.0500	105	70-130			
Calcium	162	1.25	mg/L	100.00	50.9	111	70-130			
Lithium	1.04	0.0150	mg/L	1.0000	0.00609	103	70-130			

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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Total Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEJ0581 - EPA 200.2, EPA 3005

Matrix Spike Dup (BEJ0581-MSD1)	Source: MEJ0273-02			Prepared: 10/24/2019 Analyzed: 10/25/2019						
Calcium	168	1.25	mg/L	100.00	58.6	109	70-130	0.453	20	
Lithium	1.03	0.0150	mg/L	1.0000	0.00466	103	70-130	0.861	20	
Boron	1.05	0.0500	mg/L	1.0000	<0.0500	105	70-130	0.865	20	

Matrix Spike Dup (BEJ0581-MSD2)	Source: MEJ0273-03			Prepared: 10/24/2019 Analyzed: 10/25/2019						
Calcium	158	1.25	mg/L	100.00	50.9	107	70-130	2.37	20	
Lithium	1.02	0.0150	mg/L	1.0000	0.00609	101	70-130	2.21	20	
Boron	1.05	0.0500	mg/L	1.0000	<0.0500	105	70-130	0.523	20	

Batch BEJ0626 - EPA 200.2, EPA 3005

Blank (BEJ0626-BLK1)	Prepared: 10/28/2019 Analyzed: 10/29/2019									
Calcium	<1.25	1.25	mg/L							
Boron	<0.0500	0.0500	mg/L							
Lithium	<0.0150	0.0150	mg/L							

LCS (BEJ0626-BS1)	Prepared: 10/28/2019 Analyzed: 10/29/2019									
Lithium	1.04	0.0150	mg/L	1.0000		104	85-115			
Calcium	106	1.25	mg/L	100.00		106	85-115			
Boron	1.03	0.0500	mg/L	1.0000		103	85-115			

Duplicate (BEJ0626-DUP1)	Source: MEJ0273-21			Prepared: 10/28/2019 Analyzed: 10/29/2019						
Calcium	81.4	1.25	mg/L		81.0			0.585	20	
Boron	0.245	0.0500	mg/L		0.247			0.737	20	
Lithium	<0.0150	0.0150	mg/L		<0.0150				20	

Matrix Spike (BEJ0626-MS1)	Source: MEJ0273-21			Prepared: 10/28/2019 Analyzed: 10/29/2019						
Boron	1.31	0.0500	mg/L	1.0000	0.247	106	70-130			
Calcium	190	1.25	mg/L	100.00	81.0	109	70-130			
Lithium	1.04	0.0150	mg/L	1.0000	<0.0150	104	70-130			



Minneapolis Testing Laboratory
 1518 Chestnut Ave N
 Minneapolis, MN 55043
 Certification # MN-027-053-197
 WI-999071150

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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Total Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BEJ0626 - EPA 200.2, EPA 3005

Matrix Spike Dup (BEJ0626-MSD1)	Source: MEJ0273-21			Prepared: 10/28/2019 Analyzed: 10/29/2019						
Calcium	190	1.25	mg/L	100.00	81.0	109	70-130	0.147	20	
Lithium	1.04	0.0150	mg/L	1.0000	<0.0150	104	70-130	0.483	20	
Boron	1.29	0.0500	mg/L	1.0000	0.247	104	70-130	1.22	20	

Environmental Services-Water Minneapolis 250 Marquette Plaza Minneapolis MN, 55401	Project Name/Location: Sherco BAP CCR Project Manager: Eric Ealy	Reported: 11/15/2019 09:22
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Qualifiers and Definitions

M_TTT	Sample received at the lab outside of required hold time.
M_D-RL	The RPD for the sample duplicate was outside of QC acceptance limits due to <RL.
M_D	The RPD for the sample duplicate was outside of QC acceptance limits possibly due to non-homogeneous matrix.
Z	Non Accredited Analyte
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A
 Required Client Information:
 Company: Xcel Energy Environmental Services
 Address: MP-7
 Email To: _____
 Phone: _____ Fax: _____
 Requested Due Date/TAT: _____

Section B
 Required Project Information:
 Report To: David Katznet
 Copy To: _____
 Purchase Order No.: _____
 Project Name: Shetco Ponds, Fall 2019
 Project Number: _____

Section C
 Invoice Information:
 Attention: Steve Paris
 Company Name: _____
 Address: _____
 Pace Quote Reference: _____
 Pace Project Manager: _____
 Pace Profile #: _____

Page: 1 of 2
 Invoice No: 2266770

REGULATORY AGENCY
 NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER _____

Site Location
 STATE: _____

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	RELINQUISHED BY / AFFILIATION		ACCEPTED BY / AFFILIATION		SAMPLE CONDITIONS								
			COMPOSITE START	COMPOSITE END/GRAB			DATE	TIME	DATE	TIME	DATE	TIME	Temp in °C	Received on	Sealed Cooler	Custody	Samples intact		
1	Rinse CCR-P3	WT				WT													
2	P-150	WT	10/21/19	1040															
3	P-151	WT		1130															
4	P-152A	WT		1300															
5	P-130	WT		1410															
6	P-131	WT		1535															
7	P-132	WT		1650															
8	P-165	WT	10/21/19	0900															
9	P-154A	WT		1030															
10	Duplicate CCR-P3	WT		1030															
11	P-153	WT		1140															
12	P-162	WT		1300															

Requested Analysis Filtered (Y/N)

Preservatives
 H₂SO₄ HNO₃ HCl NaOH Na₂S₂O₃ Methanol Other

Analysis Test
 Residual Chlorine (Y/N)

Requested Analysis Filtered (Y/N)
 GW-D
 GW-CCR-BHP
 GW-CCR-BHP+GW-D
 GW-CCR-F3+GW-D
 GW-CCR-F3
 GW-CCR-BHP
 GW-CCR-BHP+GW-D
 GW-CCR-F3+GW-D
 GW-CCR-F3

Temp in °C
 1.7°C

Received on
 10/21/19

Sealed Cooler

Custody

Samples intact

RELINQUISHED BY / AFFILIATION
 David Anderson Xcel
 David Anderson Xcel
 Temp: 1.7°C M40084

ACCEPTED BY / AFFILIATION
 David Anderson Xcel
 David Anderson Xcel
 Temp: 1.7°C M40084

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: David Anderson
 SIGNATURE of SAMPLER: David Anderson
 DATE Signed (MM/DD/YYYY): 10/22/19

PH Steps: M-D-W-T-F-S-S
ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

FALL-C-010-rev.00, 09Nov2017



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A Required Client Information:

Company: Xcel Energy
 Address: Environmental Services
 Email To: MP-7
 Phone: _____ Fax: _____
 Requested Due Date/TAT: _____

Section B Required Project Information:

Report To: David Katzner
 Copy To: _____
 Purchase Order No.: _____
 Project Name: Sherco Ponds, Fall 2019
 Project Number: _____

Section C Invoice Information:

Attention: Steve Davis
 Company Name: _____
 Address: _____
 Pace Quote Reference: _____
 Pace Project Manager: _____
 Pace Profile #: _____

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER
 UST RCRA OTHER _____
 Site Location: _____
 STATE: _____

2266768

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	RELINQUISHED BY / AFFILIATION		ACCEPTED BY / AFFILIATION		DATE	TIME	SAMPLE CONDITIONS
			COMPOSITE START	COMPOSITE END/GRAB			DATE	TIME	DATE	TIME			
1	P-163	Drinking Water			WT	WT							
2	P-164	Water											
3	P-156	Waste Water											
4	P-01A-1	Product											
5	P-155	Soil/Solid											
6	P-17	Oil											
7	Riase CCR-BAP	Wipe											
8	P-158	Air											
9	P-157	Tissue											
10	Duplicate CCR-BAP	Other											
11	P-23												
12	P-22												

Additional Comments: Temp: 1.4°C M40841

Relinquished By / Affiliation: David Anderson / Xcel Date: 10/23/19 Time: 1350

Accepted By / Affiliation: Sam Anderson / Xcel Date: 10/24/19 Time: 0545

Requested Analysis Filtered (Y/N): FW-D

Preservatives: FW-CCR-BAP, FW-CCR-BAP+FW-CR, FW-CCR-BAP+FW-D, FW-CCR-B3, FW-CCR-B3+FW-D, FW-CCR-B3+FW-D, FW-CCR-BAP, FW-CCR-BAP+FW-D

Analysis Test: Analysis Test

OF CONTAINERS: 2, 2, 4, 2, 2, 2, 2, 2, 4, 4

SAMPLE TEMP AT COLLECTION: _____

DATE: _____ TIME: _____

Temp in °C: 1.4

Received on Ice (Y/N): Y

Sealed Cooler (Y/N): Y

Custody (Y/N): Y

Samples Intact (Y/N): Y

Residual Chlorine (Y/N): _____

Pace Project No. / Lab I.D.: _____

ORIGINAL

PRINT Name of SAMPLER: David Anderson

SIGNATURE of SAMPLER: Sam Anderson

DATE Signed (MM/DD/YYYY): 10/23/19

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-C-010-rev.00, 09Nov2017

November 21, 2019

Dave Anderson
Pace Analytical Services - Field Svcs Division
1700 Elm Street, Suite 200
Minneapolis, MN 55414


RE: Project: 19-02662, Xcel Energy-Sherco P
Pace Project No.: 30333423

Dear Dave Anderson:

Enclosed are the analytical results for sample(s) received by the laboratory on November 04, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Carin Ferris
carin.ferris@pacelabs.com
724-850-5615
Project Manager

Enclosures

cc: Eric Ealy, Xcel Energy
Christine M. Keefe, Xcel Energy
Ciara Ruikkie, Pace Analytical Services - Field Svcs
Division



REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
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CERTIFICATIONS

Project: 19-02662, Xcel Energy-Sherco P
Pace Project No.: 30333423

Pace Analytical Services Pennsylvania

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
ANAB DOD-ELAP Rad Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification #: PA01547
Connecticut Certification #: PH-0694
Delaware Certification
EPA Region 4 DW Rad
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Florida: Cert E871149 SEKS WET
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: KY90133
KY WW Permit #: KY0098221
KY WW Permit #: KY0000221
Louisiana DHH/TNI Certification #: LA180012
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: 2017020
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification #: 9991

Missouri Certification #: 235
Montana Certification #: Cert0082
Nebraska Certification #: NE-OS-29-14
Nevada Certification #: PA014572018-1
New Hampshire/TNI Certification #: 297617
New Jersey/TNI Certification #: PA051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Ohio EPA Rad Approval: #41249
Oregon/TNI Certification #: PA200002-010
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: 02867
Texas/TNI Certification #: T104704188-17-3
Utah/TNI Certification #: PA014572017-9
USDA Soil Permit #: P330-17-00091
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 9526
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Approve List for Rad
Wyoming Certification #: 8TMS-L

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: 19-02662, Xcel Energy-Sherco P
Pace Project No.: 30333423

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30333423001	Rinse CCR-P3	Water	10/21/19 10:40	11/04/19 09:40
30333423002	P-150	Water	10/21/19 11:30	11/04/19 09:40
30333423003	P-151	Water	10/21/19 13:00	11/04/19 09:40
30333423004	P-152A	Water	10/21/19 14:10	11/04/19 09:40
30333423005	P-130	Water	10/21/19 15:35	11/04/19 09:40
30333423006	P-131	Water	10/21/19 16:50	11/04/19 09:40
30333423007	P-132	Water	10/21/19 18:00	11/04/19 09:40
30333423008	P-165	Water	10/22/19 09:00	11/04/19 09:40
30333423009	P-154A	Water	10/22/19 10:30	11/04/19 09:40
30333423010	Duplicate CCR-P3	Water	10/22/19 10:30	11/04/19 09:40
30333423011	P-153	Water	10/22/19 11:40	11/04/19 09:40
30333423012	P-162	Water	10/22/19 13:00	11/04/19 09:40
30333423013	P-163	Water	10/22/19 14:00	11/04/19 09:40
30333423014	P-164	Water	10/22/19 14:50	11/04/19 09:40
30333423015	P-156	Water	10/22/19 16:00	11/04/19 09:40
30333423016	P-01A-1	Water	10/22/19 16:45	11/04/19 09:40
30333423017	P-155	Water	10/22/19 17:50	11/04/19 09:40
30333423018	P-17	Water	10/23/19 09:00	11/04/19 09:40
30333423019	Rinse CCR-BAP	Water	10/23/19 09:20	11/04/19 09:40
30333423020	P-158	Water	10/23/19 09:50	11/04/19 09:40
30333423021	P-157	Water	10/23/19 10:50	11/04/19 09:40
30333423022	Duplicate CCR-BAP	Water	10/23/19 10:50	11/04/19 09:40
30333423023	P-23	Water	10/23/19 12:20	11/04/19 09:40
30333423024	P-22	Water	10/23/19 13:40	11/04/19 09:40

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 19-02662, Xcel Energy-Sherco P
Pace Project No.: 30333423

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30333423001	Rinse CCR-P3	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30333423002	P-150	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30333423003	P-151	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30333423004	P-152A	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30333423005	P-130	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30333423006	P-131	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30333423007	P-132	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30333423008	P-165	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30333423009	P-154A	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30333423010	Duplicate CCR-P3	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30333423011	P-153	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30333423012	P-162	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30333423013	P-163	EPA 903.1	MK1	1	PASI-PA

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 19-02662, Xcel Energy-Sherco P
Pace Project No.: 30333423

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30333423014	P-164	EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30333423015	P-156	EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30333423016	P-01A-1	EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30333423017	P-155	EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30333423018	P-17	EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30333423019	Rinse CCR-BAP	EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30333423020	P-158	EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30333423021	P-157	EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30333423022	Duplicate CCR-BAP	EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30333423023	P-23	EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30333423024	P-22	EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 19-02662, Xcel Energy-Sherco P

Pace Project No.: 30333423

Method: EPA 903.1

Description: 903.1 Radium 226

Client: Pace-MN Field Services Division

Date: November 21, 2019

General Information:

24 samples were analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 19-02662, Xcel Energy-Sherco P

Pace Project No.: 30333423

Method: EPA 904.0

Description: 904.0 Radium 228

Client: Pace-MN Field Services Division

Date: November 21, 2019

General Information:

24 samples were analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 19-02662, Xcel Energy-Sherco P
Pace Project No.: 30333423

Method: Total Radium Calculation
Description: Total Radium 228+226
Client: Pace-MN Field Services Division
Date: November 21, 2019

General Information:

24 samples were analyzed for Total Radium Calculation. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 19-02662, Xcel Energy-Sherco P
Project No.: 30333423

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: Rinse CCR-P3 Lab ID: 30333423001 Collected: 10/21/19 10:40 Received: 11/04/19 09:40 Matrix: Water							
PWS:		Site ID:	Sample Type:				
Radium-226		EPA 903.1	0.136 ± 0.312 (0.502) C:NA T:85%	pCi/L	11/21/19 11:15	13982-63-3	
Radium-228		EPA 904.0	0.0567 ± 0.384 (0.872) C:80% T:94%	pCi/L	11/20/19 15:53	15262-20-1	
Total Radium		Total Radium Calculation	0.193 ± 0.696 (1.37)	pCi/L	11/21/19 13:56	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: P-150 Lab ID: 30333423002 Collected: 10/21/19 11:30 Received: 11/04/19 09:40 Matrix: Water							
PWS:		Site ID:	Sample Type:				
Radium-226		EPA 903.1	0.244 ± 0.340 (0.567) C:NA T:95%	pCi/L	11/21/19 11:15	13982-63-3	
Radium-228		EPA 904.0	0.363 ± 0.426 (0.898) C:79% T:82%	pCi/L	11/20/19 15:53	15262-20-1	
Total Radium		Total Radium Calculation	0.607 ± 0.766 (1.47)	pCi/L	11/21/19 13:56	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: P-151 Lab ID: 30333423003 Collected: 10/21/19 13:00 Received: 11/04/19 09:40 Matrix: Water							
PWS:		Site ID:	Sample Type:				
Radium-226		EPA 903.1	0.0694 ± 0.360 (0.747) C:NA T:92%	pCi/L	11/21/19 11:15	13982-63-3	
Radium-228		EPA 904.0	0.526 ± 0.387 (0.754) C:80% T:84%	pCi/L	11/20/19 15:53	15262-20-1	
Total Radium		Total Radium Calculation	0.595 ± 0.747 (1.50)	pCi/L	11/21/19 13:56	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: P-152A Lab ID: 30333423004 Collected: 10/21/19 14:10 Received: 11/04/19 09:40 Matrix: Water							
PWS:		Site ID:	Sample Type:				
Radium-226		EPA 903.1	0.000 ± 0.291 (0.470) C:NA T:96%	pCi/L	11/21/19 11:15	13982-63-3	
Radium-228		EPA 904.0	0.839 ± 0.441 (0.788) C:75% T:88%	pCi/L	11/20/19 15:54	15262-20-1	
Total Radium		Total Radium Calculation	0.839 ± 0.732 (1.26)	pCi/L	11/21/19 13:56	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Sample: P-130 Lab ID: 30333423005 Collected: 10/21/19 15:35 Received: 11/04/19 09:40 Matrix: Water							
PWS:		Site ID:	Sample Type:				
Radium-226		EPA 903.1	0.266 ± 0.452 (0.798) C:NA T:89%	pCi/L	11/21/19 11:15	13982-63-3	
Radium-228		EPA 904.0	0.537 ± 0.382 (0.747) C:77% T:94%	pCi/L	11/20/19 15:54	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 19-02662, Xcel Energy-Sherco P

Pace Project No.: 30333423

Sample: P-130		Lab ID: 30333423005	Collected: 10/21/19 15:35	Received: 11/04/19 09:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Total Radium	Total Radium Calculation	0.803 ± 0.834 (1.55)	pCi/L	11/21/19 13:56	7440-14-4	

Sample: P-131		Lab ID: 30333423006	Collected: 10/21/19 16:50	Received: 11/04/19 09:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0591 ± 0.384 (0.774) C:NA T:96%	pCi/L	11/21/19 11:15	13982-63-3	
Radium-228	EPA 904.0	0.603 ± 0.406 (0.781) C:79% T:88%	pCi/L	11/20/19 15:54	15262-20-1	
Total Radium	Total Radium Calculation	0.662 ± 0.790 (1.56)	pCi/L	11/21/19 13:56	7440-14-4	

Sample: P-132		Lab ID: 30333423007	Collected: 10/21/19 18:00	Received: 11/04/19 09:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0588 ± 0.346 (0.706) C:NA T:96%	pCi/L	11/21/19 13:12	13982-63-3	
Radium-228	EPA 904.0	0.560 ± 0.370 (0.707) C:76% T:91%	pCi/L	11/20/19 12:28	15262-20-1	
Total Radium	Total Radium Calculation	0.619 ± 0.716 (1.41)	pCi/L	11/21/19 14:29	7440-14-4	

Sample: P-165		Lab ID: 30333423008	Collected: 10/22/19 09:00	Received: 11/04/19 09:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.181 ± 0.488 (0.906) C:NA T:97%	pCi/L	11/21/19 13:12	13982-63-3	
Radium-228	EPA 904.0	0.164 ± 0.334 (0.736) C:78% T:87%	pCi/L	11/20/19 12:28	15262-20-1	
Total Radium	Total Radium Calculation	0.345 ± 0.822 (1.64)	pCi/L	11/21/19 14:29	7440-14-4	

Sample: P-154A		Lab ID: 30333423009	Collected: 10/22/19 10:30	Received: 11/04/19 09:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0561 ± 0.330 (0.673) C:NA T:102%	pCi/L	11/21/19 13:12	13982-63-3	
Radium-228	EPA 904.0	0.589 ± 0.406 (0.781) C:75% T:84%	pCi/L	11/20/19 12:28	15262-20-1	
Total Radium	Total Radium Calculation	0.645 ± 0.736 (1.45)	pCi/L	11/21/19 14:29	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 19-02662, Xcel Energy-Sherco P

Sample Project No.: 30333423

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	0.240 ± 0.334 (0.558) C:NA T:92%	pCi/L	11/21/19 13:12	13982-63-3	
Radium-228		EPA 904.0	0.462 ± 0.422 (0.868) C:78% T:91%	pCi/L	11/20/19 12:28	15262-20-1	
Total Radium		Total Radium Calculation	0.702 ± 0.756 (1.43)	pCi/L	11/21/19 14:29	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	-0.0576 ± 0.263 (0.620) C:NA T:95%	pCi/L	11/21/19 13:12	13982-63-3	
Radium-228		EPA 904.0	0.137 ± 0.383 (0.858) C:78% T:83%	pCi/L	11/20/19 12:28	15262-20-1	
Total Radium		Total Radium Calculation	0.137 ± 0.646 (1.48)	pCi/L	11/21/19 14:29	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	-0.0646 ± 0.295 (0.600) C:NA T:93%	pCi/L	11/21/19 13:12	13982-63-3	
Radium-228		EPA 904.0	0.689 ± 0.366 (0.658) C:79% T:96%	pCi/L	11/20/19 12:25	15262-20-1	
Total Radium		Total Radium Calculation	0.689 ± 0.661 (1.26)	pCi/L	11/21/19 14:29	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	-0.0547 ± 0.356 (0.772) C:NA T:100%	pCi/L	11/21/19 13:12	13982-63-3	
Radium-228		EPA 904.0	0.0497 ± 0.387 (0.890) C:70% T:75%	pCi/L	11/20/19 12:25	15262-20-1	
Total Radium		Total Radium Calculation	0.0497 ± 0.743 (1.66)	pCi/L	11/21/19 14:29	7440-14-4	

Parameters		Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226		EPA 903.1	0.000 ± 0.316 (0.708) C:NA T:89%	pCi/L	11/21/19 13:26	13982-63-3	
Radium-228		EPA 904.0	1.02 ± 0.468 (0.793) C:81% T:78%	pCi/L	11/20/19 12:25	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 19-02662, Xcel Energy-Sherco P
Pace Project No.: 30333423

Sample: P-164		Lab ID: 30333423014	Collected: 10/22/19 14:50	Received: 11/04/19 09:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Total Radium	Total Radium Calculation	1.02 ± 0.784 (1.50)	pCi/L	11/21/19 14:29	7440-14-4	

Sample: P-156		Lab ID: 30333423015	Collected: 10/22/19 16:00	Received: 11/04/19 09:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0570 ± 0.403 (0.804) C:NA T:95%	pCi/L	11/21/19 13:26	13982-63-3	
Radium-228	EPA 904.0	0.439 ± 0.394 (0.805) C:78% T:85%	pCi/L	11/20/19 12:25	15262-20-1	
Total Radium	Total Radium Calculation	0.496 ± 0.797 (1.61)	pCi/L	11/21/19 14:29	7440-14-4	

Sample: P-01A-1		Lab ID: 30333423016	Collected: 10/22/19 16:45	Received: 11/04/19 09:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	1.45 ± 0.636 (0.540) C:NA T:92%	pCi/L	11/21/19 13:26	13982-63-3	
Radium-228	EPA 904.0	0.867 ± 0.380 (0.624) C:85% T:92%	pCi/L	11/20/19 12:25	15262-20-1	
Total Radium	Total Radium Calculation	2.32 ± 1.02 (1.16)	pCi/L	11/21/19 14:29	7440-14-4	

Sample: P-155		Lab ID: 30333423017	Collected: 10/22/19 17:50	Received: 11/04/19 09:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.128 ± 0.293 (0.473) C:NA T:95%	pCi/L	11/21/19 13:26	13982-63-3	
Radium-228	EPA 904.0	0.527 ± 0.393 (0.772) C:83% T:78%	pCi/L	11/20/19 12:25	15262-20-1	
Total Radium	Total Radium Calculation	0.655 ± 0.686 (1.25)	pCi/L	11/21/19 14:29	7440-14-4	

Sample: P-17		Lab ID: 30333423018	Collected: 10/23/19 09:00	Received: 11/04/19 09:40	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.000 ± 0.295 (0.662) C:NA T:87%	pCi/L	11/21/19 13:26	13982-63-3	
Radium-228	EPA 904.0	0.713 ± 0.419 (0.779) C:78% T:84%	pCi/L	11/20/19 12:25	15262-20-1	
Total Radium	Total Radium Calculation	0.713 ± 0.714 (1.44)	pCi/L	11/21/19 14:29	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 19-02662, Xcel Energy-Sherco P
Project No.: 30333423

Sample: Rinse CCR-BAP		Lab ID: 30333423019	Collected: 10/23/19 09:20	Received: 11/04/19 09:40	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.000 ± 0.259 (0.417)		pCi/L	11/21/19 13:26	13982-63-3	
		C:NA T:98%					
Radium-228	EPA 904.0	0.769 ± 0.474 (0.893)		pCi/L	11/20/19 12:26	15262-20-1	
		C:76% T:74%					
Total Radium	Total Radium Calculation	0.769 ± 0.733 (1.31)		pCi/L	11/21/19 14:29	7440-14-4	

Sample: P-158		Lab ID: 30333423020	Collected: 10/23/19 09:50	Received: 11/04/19 09:40	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.552 ± 0.438 (0.569)		pCi/L	11/21/19 13:26	13982-63-3	
		C:NA T:93%					
Radium-228	EPA 904.0	0.607 ± 0.416 (0.801)		pCi/L	11/20/19 12:26	15262-20-1	
		C:77% T:78%					
Total Radium	Total Radium Calculation	1.16 ± 0.854 (1.37)		pCi/L	11/21/19 14:29	7440-14-4	

Sample: P-157		Lab ID: 30333423021	Collected: 10/23/19 10:50	Received: 11/04/19 09:40	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.000 ± 0.361 (0.763)		pCi/L	11/21/19 13:26	13982-63-3	
		C:NA T:97%					
Radium-228	EPA 904.0	0.618 ± 0.396 (0.749)		pCi/L	11/20/19 12:27	15262-20-1	
		C:78% T:83%					
Total Radium	Total Radium Calculation	0.618 ± 0.757 (1.51)		pCi/L	11/21/19 14:29	7440-14-4	

Sample: Duplicate CCR-BAP		Lab ID: 30333423022	Collected: 10/23/19 10:50	Received: 11/04/19 09:40	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0691 ± 0.315 (0.508)		pCi/L	11/21/19 13:39	13982-63-3	
		C:NA T:88%					
Radium-228	EPA 904.0	0.725 ± 0.422 (0.774)		pCi/L	11/20/19 12:27	15262-20-1	
		C:75% T:81%					
Total Radium	Total Radium Calculation	0.794 ± 0.737 (1.28)		pCi/L	11/21/19 14:29	7440-14-4	

Sample: P-23		Lab ID: 30333423023	Collected: 10/23/19 12:20	Received: 11/04/19 09:40	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0573 ± 0.262 (0.422)		pCi/L	11/21/19 13:39	13982-63-3	
		C:NA T:95%					
Radium-228	EPA 904.0	0.566 ± 0.466 (0.941)		pCi/L	11/20/19 12:27	15262-20-1	
		C:75% T:81%					

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 19-02662, Xcel Energy-Sherco P

Pace Project No.: 30333423

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Total Radium	Total Radium Calculation	0.623 ± 0.728 (1.36)	pCi/L	11/21/19 14:29	7440-14-4	

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0627 ± 0.286 (0.461) C:NA T:88%	pCi/L	11/21/19 13:39	13982-63-3	
Radium-228	EPA 904.0	0.645 ± 0.456 (0.889) C:75% T:78%	pCi/L	11/20/19 12:27	15262-20-1	
Total Radium	Total Radium Calculation	0.708 ± 0.742 (1.35)	pCi/L	11/21/19 14:29	7440-14-4	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 19-02662, Xcel Energy-Sherco P

Pace Project No.: 30333423

QC Batch: 369894

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Associated Lab Samples: 30333423001, 30333423002, 30333423003, 30333423004, 30333423005, 30333423006

METHOD BLANK: 1794441

Matrix: Water

Associated Lab Samples: 30333423001, 30333423002, 30333423003, 30333423004, 30333423005, 30333423006

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	-0.104 ± 0.322 (0.731) C:NA T:92%	pCi/L	11/21/19 10:49	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 19-02662, Xcel Energy-Sherco P

Pace Project No.: 30333423

QC Batch: 369897

Analysis Method: EPA 903.1

QC Batch Method: EPA 903.1

Analysis Description: 903.1 Radium-226

Associated Lab Samples: 30333423007, 30333423008, 30333423009, 30333423010, 30333423011, 30333423012, 30333423013, 30333423014, 30333423015, 30333423016, 30333423017, 30333423018, 30333423019, 30333423020, 30333423021, 30333423022, 30333423023, 30333423024

METHOD BLANK: 1794446

Matrix: Water

Associated Lab Samples: 30333423007, 30333423008, 30333423009, 30333423010, 30333423011, 30333423012, 30333423013, 30333423014, 30333423015, 30333423016, 30333423017, 30333423018, 30333423019, 30333423020, 30333423021, 30333423022, 30333423023, 30333423024

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.250 ± 0.354 (0.599) C:NA T:92%	pCi/L	11/21/19 13:12	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 19-02662, Xcel Energy-Sherco P

Pace Project No.: 30333423

QC Batch:	369900	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	30333423007, 30333423008, 30333423009, 30333423010, 30333423011, 30333423012, 30333423013, 30333423014, 30333423015, 30333423016, 30333423017, 30333423018, 30333423019, 30333423020, 30333423021, 30333423022, 30333423023, 30333423024		

METHOD BLANK:	1794452	Matrix:	Water
Associated Lab Samples:	30333423007, 30333423008, 30333423009, 30333423010, 30333423011, 30333423012, 30333423013, 30333423014, 30333423015, 30333423016, 30333423017, 30333423018, 30333423019, 30333423020, 30333423021, 30333423022, 30333423023, 30333423024		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.233 ± 0.289 (0.612) C:81% T:98%	pCi/L	11/20/19 12:28	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 19-02662, Xcel Energy-Sherco P

Pace Project No.: 30333423

QC Batch: 369895 Analysis Method: EPA 904.0

QC Batch Method: EPA 904.0 Analysis Description: 904.0 Radium 228

Associated Lab Samples: 30333423001, 30333423002, 30333423003, 30333423004, 30333423005, 30333423006

METHOD BLANK: 1794442 Matrix: Water

Associated Lab Samples: 30333423001, 30333423002, 30333423003, 30333423004, 30333423005, 30333423006

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.185 ± 0.287 (0.620) C:84% T:90%	pCi/L	11/20/19 12:28	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 19-02662, Xcel Energy-Sherco P
Pace Project No.: 30333423

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: For Safe Drinking Water Act (SDWA) analyses, the reported Unc. is the calculated Count Uncertainty (95% confidence interval) using a coverage factor of 1.96. For all other matrices (non-SDWA), the reported Unc. is the calculated Expanded Uncertainty (aka Combined Standard Uncertainty, CSU), reported at the 95% confidence interval using a coverage factor of 1.96.

Gamma Spec: The Unc. reported for all gamma-spectroscopy analyses (EPA 901.1), is the calculated Expanded Uncertainty (CSU) at the 95.4% confidence interval, using a coverage factor of 2.0.

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-PA Pace Analytical Services - Greensburg

REPORT OF LABORATORY ANALYSIS

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CHAIN-OF-WO# : 30333423
The Chain-of-Custody

ent
ity.

Page: 1 of 2
2266771

Section A
Required Client Information:
Company: Xcel Energy
Address: c/o Pace MN Field
Email To: David Andertson
Copy To: David Andertson
Purchase Order No.:
Project Name: 14-02663, Xcel Energy - Shelter Ponds, Fall 2019
Project Number:
Requested Due Date/TAT:

Section B
Required Project Information:
Report To: David Andertson
Copy To: David Andertson
Company Name: Cigara Ruitkic
Address: Pace MN Field Services
Reference: Tom Halverson
Pace Project Manager: CATIA FELLIS
Pace Profile #:

Section C
Regulatory Agency: NPDES GROUND WATER DRINKING WATER
UST RCRA OTHER
Site Location: STATE:

ITEM #	Section D Required Client Information	Section E Matrix Codes MATRIX CODE	Section F Sample ID (A-Z, 0-9 / . / -) Sample IDs MUST BE UNIQUE	Section G COLLECTED		Section H SAMPLE TYPE (G=GRAB C=COMP)	Section I MATRIX CODE (see valid codes to left)	Section J RELINQUISHED BY / AFFILIATION	Section K DATE	Section L TIME	Section M ACCEPTED BY / AFFILIATION	Section N DATE	Section O TIME	Section P SAMPLE CONDITIONS	Section Q Temp in °C	Section R Received on Ice (Y/N)	Section S Custody Sealed Cooler (Y/N)	Section T Samples Intact (Y/N)
				COMPOSITE START	COMPOSITE END/GRAB													
1	Rinse CCR-P3	DW	WT	10/21/19	1040	WT	WT	David Andertson / Pace	10/31/19	1130	BLM	11-4-19	0940	N/A	N	N	N	Y
2	P-150	Drinking Water	WT	1130														
3	P-151	Waste Water	WW	1300														
4	P-152A	Product	P	1440														
5	P-130	Soil/Solid	SL	1535														
6	P-131	Oil	OL	1650														
7	P-132	Wipe	WP	1800														
8	P-165	Air	AR	10/27/19	0900													
9	P-154A	Tissue	TS	1030														
10	duplicate CCR-P3	Other	OT	1030														
11	P-153			1140														
12	P-162			1300														

Section P
Requested Analysis Filtered (Y/N)

Section Q
Residual Chlorine (Y/N)

Section R
Pace Project No. / Lab I.D.

Section S
Requested Analysis Filtered (Y/N)

Section T
Analysis Test ↑

Section U
Preservatives

Section V
OF CONTAINERS

Section W
SAMPLE TEMP AT COLLECTION

Section X
SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: David Andertson
SIGNATURE of SAMPLER: David Andertson
DATE Signed (MM/DD/YY): 10/23/19

Section Y
Additional Comments:
Client needs to analyze for:
Radium 226+228pCi/L combined.
RA-226 EPA 903.1 ORIGINAL
RA-228 EPA 904.0



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

#30333423

Page: 2 of 2
2266769

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: Xcel Energy	Report To: David Anderson	Attention: Ciara Ruitkie	Company Name: Pace MN Field Services	REGULATORY AGENCY <input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> RCRA <input type="checkbox"/> UST <input type="checkbox"/> OTHER	Drinking Water
Address: c/o Pace mn Field	Copy To:	Purchase Order No.:	Address:	<input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> RCRA <input type="checkbox"/> UST <input type="checkbox"/> OTHER	Drinking Water
Phone:	Project Name: 19-02663, Xcel Energy -	Project Number: Shetca Ponds, Fall 2019	Reference: Tom Halverson	Site Location	Drinking Water
Requested Due Date/TAT:	Requested Due Date/TAT:	Requested Due Date/TAT:	Pace Project Manager: Carin Ferris	STATE:	Drinking Water

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
			COMPOSITE START	COMPOSITE END/GRAB												
1	P-163	DW	10/23/19	1400	WT	WT	David Anderson Pace	10/31/19	1130	David Anderson	11-4-19	0940	N/A	N	Y	
2	P-164	WW	1430													
3	P-156	WP	1600													
4	P-01A-1	SL	1645													
5	P-155	OL	1750													
6	P-17	WP	10/23/19	0900	WT	WT	David Anderson Pace	10/31/19	1130	David Anderson	11-4-19	0940	N/A	N	Y	
7	Rinse CER-BAP	AR	0920													
8	P-158	TS	0950													
9	P-157	OT	1050													
10	duplicate CER-BAP		1050													
11	P-23		1220													
12	P-32		1340													

Additional Comments: (1) client needs to analyze for: Radium 226+228pCi/L combined.

Signature: David Anderson

Date: 10/23/19

Print Name of Sampler: David Anderson

Signature of Sampler: David Anderson

Date Signed (MM/DD/YY): 10/23/19

Temp in °C

Received on Ice (Y/N)

Custody Sealed (Y/N)

Samples Intact (Y/N)

Pittsburgh Lab Sample Condition Upon Receipt



Client Name: xcel Energy Project # 30333423

Courier: Fed Ex UPS USPS Client Commercial Pace Other _____

Tracking #: 4934 3734 0577

Label	<u>BLM</u>
LIMS Login	<u>BLM</u>

Custody Seal on Cooler/Box Present: yes no Seals intact: yes no

Thermometer Used N/A Type of Ice: Wet Blue None

Cooler Temperature Observed Temp N/A °C Correction Factor: - °C Final Temp: - °C
Temp should be above freezing to 6°C

Comments:	Yes	No	N/A	pH paper Lot#	Date and initials of person examining contents:
				<u>1004281</u>	<u>BLM 11-5-19</u>
Chain of Custody Present:	/			1.	
Chain of Custody Filled Out:	/			2.	
Chain of Custody Relinquished:	/			3.	
Sampler Name & Signature on COC:	/			4.	
Sample Labels match COC:	/			5.	
-Includes date/time/ID Matrix: <u>WT</u>					
Samples Arrived within Hold Time:	/			6.	
Short Hold Time Analysis (<72hr remaining):		/		7.	
Rush Turn Around Time Requested:		/		8.	
Sufficient Volume:	/			9.	
Correct Containers Used:	/			10.	
-Pace Containers Used:	/				
Containers Intact:	/	/	<u>BLM</u>	<u>11-5-19</u>	
Orthophosphate field filtered			/	12.	
Hex Cr Aqueous sample field filtered			/	13.	
Organic Samples checked for dechlorination:			/	14.	
Filtered volume received for Dissolved tests			/	15.	
All containers have been checked for preservation.	/			16.	
exceptions: VOA, coliform, TOC, O&G, Phenolics, Radon, Non-aqueous matrix					<u>Phl2</u>
All containers meet method preservation requirements.	/			Initial when completed	<u>BLM</u> Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):			/	17.	
Trip Blank Present:			/	18.	
Trip Blank Custody Seals Present			/		
Rad Samples Screened < 0.5 mrem/hr	/			Initial when completed:	<u>BLM</u> Date: <u>11-5-19</u>

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

A check in this box indicates that additional information has been stored in ereports.

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.