

2018 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 30, 2019



15650 36th Ave N. Suite 110
Plymouth, MN 55446
Tel 952-346-3900
Fax 952-346-3901
www.carlsonmccain.com

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2018 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 30, 2019

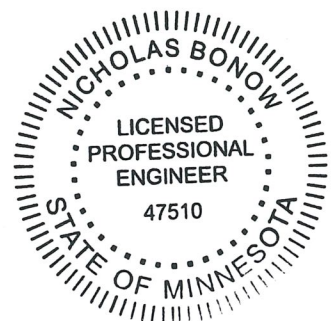


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1. INTRODUCTION

This report presents the documentation of the status of groundwater monitoring and corrective action for the year 2018 (YR2018) 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 YR2018.

This report has been prepared in general accordance with the reporting procedures outlined in the Sherco Bottom Ash Pond CCR Groundwater Sampling Plan (NSPM, 2017b). Any deviations from the requirements of the Groundwater Sampling Plan are described in subsequent sections of this report.

1.1 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.*

Section 3.6.2 of the CCR Groundwater Sampling Plan (NSPM, 2017b) 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 YR2018, describes any problems reported in YR2018 and the actions to resolve the problems, and key activities projected for 2019.

2. 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.

2.1 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, where it discharges into the Mississippi River. 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 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.

3. MONITORING RESULTS

Section 3.1 below presents the monitoring results obtained during YR2018 in terms of the specific requirements of §257.90(e) that are to be included in this report.

3.1 Compliance with §257.90(e)

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

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

3.1.2 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 YR2018.

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

Monitoring data collected during YR2018 is summarized in Tables 2 and 3. 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.

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. Pursuant to the assessment monitoring requirements listed in §257.95, the following groundwater sampling events were conducted during YR2018:

- Pursuant to §257.95(b), the initial assessment monitoring samples were collected within 90 days of triggering the assessment monitoring program. These samples were collected during the spring monitoring event, which occurred between April 17 and April 18, 2018. The samples were analyzed for Appendix IV constituents, as required by §257.95(b), as well as Appendix III constituents. Laboratory reports and field datasheets for the spring monitoring event are included in this report as Appendix A.
- Pursuant to §257.95(d)(1), all wells in the groundwater monitoring system were resampled within 90 days of obtaining the validated results of the initial assessment monitoring sampling. The results of the initial assessment monitoring sampling were received from the laboratory on May 16, 2018 and resampling was conducted between July 31 and August 2, 2018 (summer monitoring event). The resampling included analyzing for all Appendix III

constituents and only those Appendix IV constituents that were detected during the initial assessment monitoring event. Laboratory reports and field datasheets for the summer monitoring event are included in this report as Appendix B.

- Pursuant to the semiannual sampling requirement in §257.95(d)(1), all wells in the groundwater monitoring system were resampled between October 29 and November 1, 2018 (fall monitoring event) and analyzed for the same constituents as the summer event (i.e. all Appendix III constituents and only those Appendix IV constituents detected during the initial assessment monitoring event). Laboratory reports and field datasheets for the fall monitoring event are included in this report as Appendix C.

Background Concentrations and Groundwater Protection Standards

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

- 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 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 has 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 YR2018 monitoring data using the procedures described in the BAP's Statistical Analysis Plan (NSPM, 2017a), 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 2018 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.

3.1.4 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 a 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 identified, and the constituent which exhibited the SSI:

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

In response to the SSIs, multiple rounds of assessment monitoring sampling occurred during YR2018, as described in Section 3.1.3 of this report.

3.1.5 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.

4. 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 4.1 below discusses the key actions completed for the groundwater monitoring program at the BAP; Section 4.2 discusses the any problems encountered with the groundwater monitoring and actions to resolve such problems; and Section 4.3 discusses key activities that may occur in the upcoming year.

4.1 Key Actions Completed

Key actions that were completed during YR2018 include the following items:

- Within 90 days after completing sampling and analysis as required by §257.93(h)(2), NSPM reported in a Technical Memorandum, dated January 15, 2018 (Carlson McCain, 2018a), that one or more monitoring wells exhibited an SSI for one or more Appendix III constituents; and that NSPM will establish an assessment monitoring program or document that the SSI resulted from an alternative source. The Technical Memorandum was placed on the BAP’s publicly available website on January 15, 2018.
- The 2017 Annual CCR Groundwater Monitoring and Corrective Report (Carlson McCain, 2018b) was completed and placed on the BAP’s publicly available website by January 31, 2018.
- A Technical Memorandum dated April 13, 2018 (Carlson McCain, 2018c), which documented that an alternate source demonstration (ASD) for the BAP was initiated but was not completed by April 15, 2018, was placed in the BAP’s operating record on April 13, 2018.
- Initiation of the assessment monitoring program including sampling and analyzing for all Appendix IV constituents at each background and downgradient well during the spring monitoring event in April 2018 as required by §257.95(b);
- Monitoring wells were resampled during the summer between July 31 and August 2, 2018 and analyzed for all Appendix III constituents and only those Appendix IV constituents that were detected during the initial assessment monitoring event (i.e. spring 2018 event) as required by §257.95(d)(1);
- Monitoring wells were resampled during the fall between October 29 and November 1, 2018 and analyzed for all Appendix III constituents and only those Appendix IV constituents that were detected during the spring 2018 event as part of semiannual sampling required by §257.95(d)(1);
- Laboratory reports and field datasheets for the spring, summer and fall sampling events were placed in the operating record on July 27, 2018, August 29, 2018 and December 6, 2018, respectively;
- Pursuant to §257.95(d)(2), groundwater protection standards were established for all Appendix IV constituents;
- Statistical evaluation of the monitoring data was conducted to demonstrate compliance with §257.95(e) through (g); and

- The CCR Groundwater Sampling Plan for the BAP (NSPM, 2018) was revised on December 27, 2018.

4.2 Problems

4.2.1 Problems Encountered

Water level measurements and samples were obtained as many as two days apart during the summer monitoring event and three days apart during the fall event due to scheduling constraints with the sampling contractor. This is a deviation from the CCR Groundwater Sampling Plan (NSPM, 2017b), which states that the sampling crew will take initial water level measurements within a 24-hour timeframe to provide comparable numbers by which to calculate the groundwater gradient.

The primary objective of the water level measurements is to ensure an accurate computation of the groundwater gradient in order to verify monitoring assumptions regarding background and downgradient well locations. The groundwater elevation and flow direction at the BAP is well-understood based on the decades-long history of groundwater monitoring at the BAP, and provides baseline water levels that can be readily compared with new observations to identify anomalies that may result from more widely spaced measurements. Time concentration plots were reviewed for YR2018 static water levels and water table elevations and no anomalies were observed, suggesting that the more widely spaced water level measurements did not impact the calculation of the groundwater gradient during YR2018.

No other significant problems with the groundwater monitoring system, or deviations from the CCR Groundwater Sampling Plan were reported at the facility during YR2018. No corrective action was required at the facility during YR2018.

4.2.2 Resolution of Problems

The schedule of the sampling crew and the desire to minimize repeated trips to the individual wells during the summer and fall sampling events played a role in number of days apart water level measurements were obtained and wells were sampled. A meeting is planned with sampling crew prior to the spring of 2019 monitoring event to discuss specifically how to ensure water level measurements will be obtained within an appropriate timeframe to achieve the monitoring objectives.

4.3 Key Activities for 2019

The following key actions are anticipated at the BAP in the year 2019:

1. Routine, semi-annual assessment monitoring events at monitoring system wells are planned in the spring between March 15 and May 15, 2019 and in the fall between September 15 and November 15, 2019.
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.

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

NSPM, 2017b. Bottom Ash Pond CCR Ground Water Sampling Plan. Northern States Power Company, a Minnesota Corporation, October 17, 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 2018 ¹	Summer 2018 ²	Fall 2018 ³
P-17	3	4/17/2018	7/31/2018	10/31/2018
P-23	3	4/18/2018	8/2/2018	10/29/2018
P-152A	3	4/18/2018	8/1/2018	10/31/2018
P-157	3	4/18/2018	8/2/2018	10/31/2018
P-158	3	4/18/2018	8/1/2018	10/31/2018

Downgradient Wells				
Well ID	Number of Samples	Sample Dates		
		Spring 2018 ¹	Summer 2018 ²	Fall 2018 ³
P-01A-1	3	4/18/2018	8/2/2018	10/31/2018
P-22	3	4/18/2018	8/2/2018	10/30/2018
P-155	3	4/18/2018	8/2/2018	11/1/2018
P-156	3	4/18/2018	8/2/2018	11/1/2018

¹ Initial assessment monitoring event sampled and analyzed for appendix IV of §257 constituents as required by §257.95(b). Appendix III of §257 constituents were also analyzed.

² Assessment monitoring 90-day resample event sampled and analyzed for appendix III of §257 and those appendix IV of §257 constituents detected during Spring 2018 as required by §257.95(d)(1).

³ Assessment monitoring semiannual resample event sampled and analyzed for appendix III of §257 and those appendix IV of §257 constituents detected during Spring 2018 as required by §257.95(d)(1).

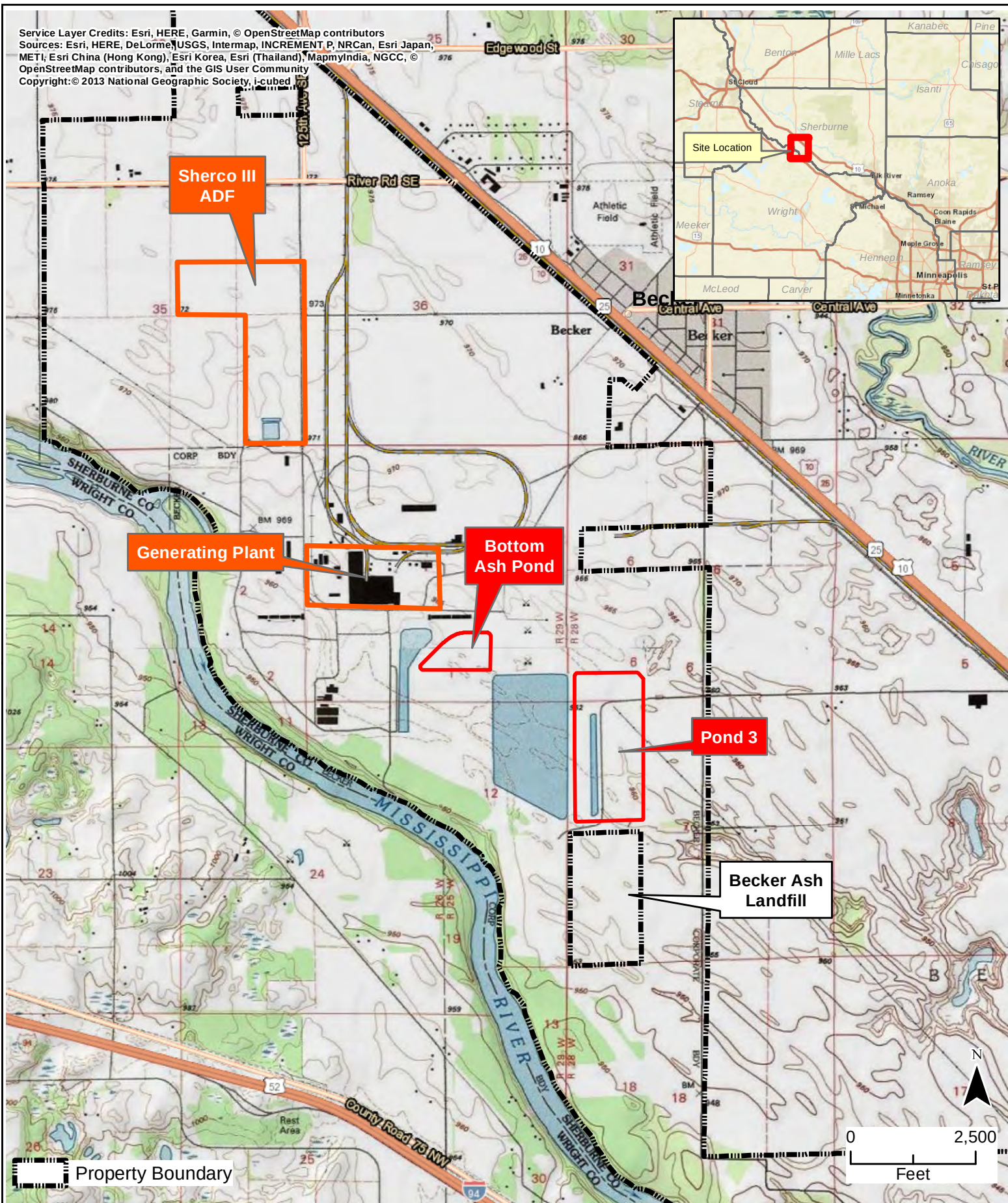
Table 3
Count of Parameters Analyzed by Well
Bottom Ash Pond

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)	3	3	3	3	3	3	3	3	3
Calcium, total (mg/L)	3	3	3	3	3	3	3	3	3
Chloride, total (mg/L)	3	3	3	3	3	3	3	3	3
Fluoride, total (mg/L)	3	3	3	3	3	3	3	3	3
pH (lab) (pH)	3	3	3	3	3	3	3	3	3
Sulfate, total (mg/L)	3	3	3	3	3	3	3	3	3
Total Dissolved Solids (mg/L)	3	3	3	3	3	3	3	3	3

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	1	1	1	1
Arsenic, total (mg/L)	3	3	3	3	3	3	3	3	3
Barium, total (mg/L)	3	3	3	3	3	3	3	3	3
Beryllium, total (mg/L)	1	1	1	1	1	1	1	1	1
Cadmium, total (mg/L)	1	1	1	1	1	1	1	1	1
Chromium, total (mg/L)	3	3	3	3	3	3	3	3	3
Cobalt, total (mg/L)	3	3	3	3	3	3	3	3	3
Lead, total (mg/L)	1	1	1	1	1	1	1	1	1
Lithium Total (mg/L)	1	1	1	1	1	1	1	1	1
Mercury, total (mg/L)	1	1	1	1	1	1	1	1	1
Molybdenum, total (mg/L)	3	3	3	3	3	3	3	3	3
Selenium, total (mg/L)	3	3	3	3	3	3	3	3	3
Thallium, total (mg/L)	1	1	1	1	1	1	1	1	1
Radium, 226 and 228 combined (pCi/L)	3	3	3	3	3	3	3	3	3

Figures

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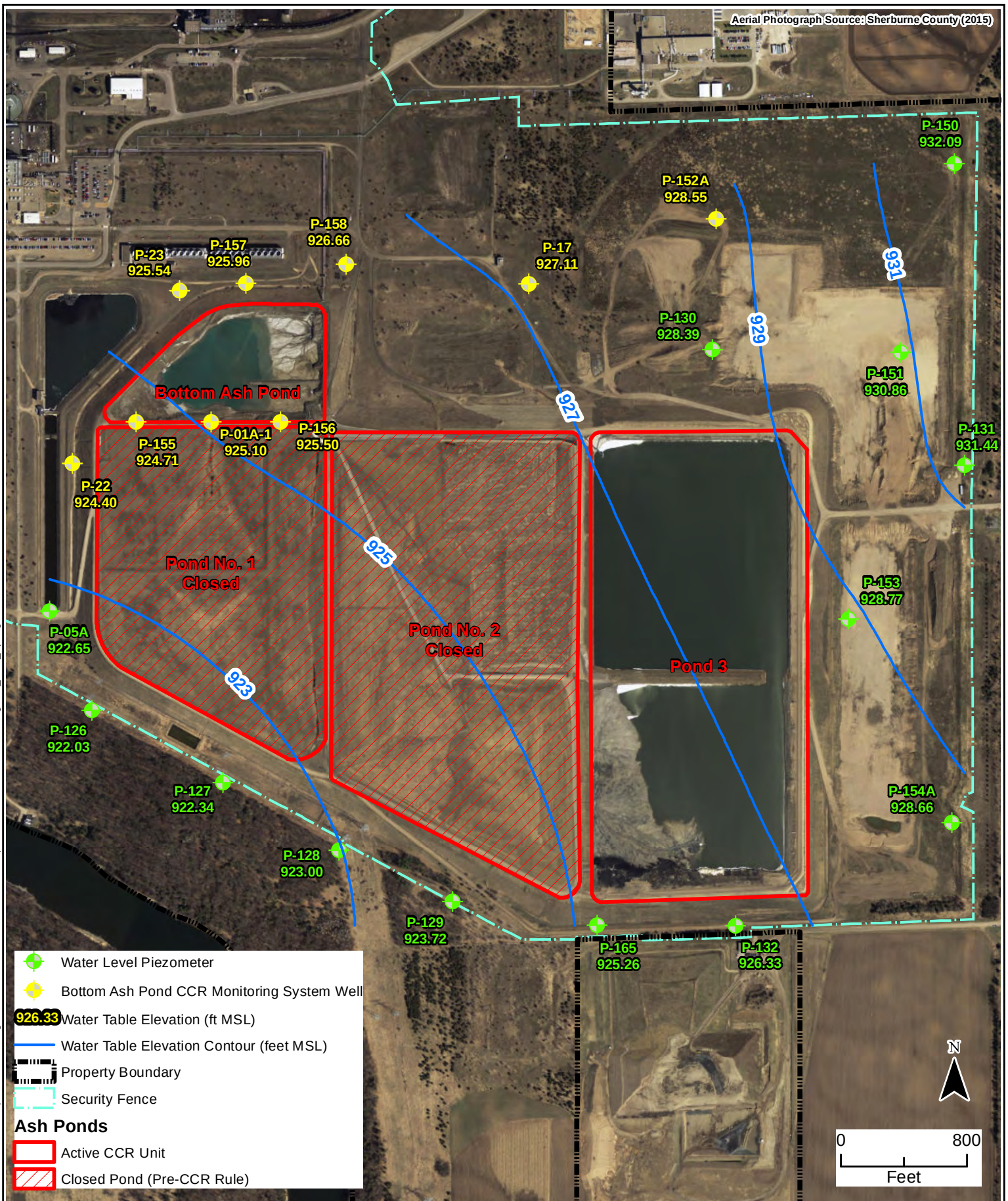
**CCR ANNUAL GROUNDWATER
 MONITORING REPORT**
 Bottom Ash Pond
 Sherburne County Generating Plant
 Becker, Minnesota

**FIGURE 1
 SITE
 LOCATION MAP**





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



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

FIGURE 3
WATER TABLE
ELEVATION CONTOUR
MAP (04/16-18/2018)



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

FIGURE 4
WATER TABLE
ELEVATION CONTOUR
MAP (10/29-11/1/2018)

Appendix A

Spring 2018 Initial Assessment Monitoring Sampling Event Field Datasheets and Laboratory Reports

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Shetco CCR, April Project No. 18-00455

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) 77.70 Feet

Static water level measurement at time of sampling (Final Depth) 77.70 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump

Pump ID PC-6

Date Purged 4-18-18

Water Column 3.28 Feet

Time Purged 1605-1617

One Casing Volume 0.5 Gallons

Pump Rate 0.15 GPM / LPM

Volume Purged 1.8 Gallons

Field Sampling Data

Date Sampled 4-18-18

Time Sampled 1640

Sampling Equip. above pump

Meter ID mps-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.4 (units) D.O. 7.9 (mg/l)

Spec. Cond. 710 (µmhos/cm) Turbidity 4.7 (NTU)

Temp. 8.0 (°C) Eh 110 (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 NE 20

Sample Description: clear + odorless

Observations: DJA 4/18/18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1609	7.4	710	8.0	8.2	NA	104	0.6
1613	7.4	710	8.0	7.9	NA	108	1.2
1617	7.4	710	8.0	7.9	NA	110	1.8

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: 4-18-18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Sherco CCR, April Project No. 18-00455

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) 37.23 Feet

Static water level measurement at time of sampling (Final Depth) 37.23 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 4-17-18 Water Column 21.53 Feet

Time Purged 1715-1809 One Casing Volume 3.5 Gallons

Pump Rate 0.2 GPM / LPM Volume Purged 10.8 Gallons

Field Sampling Data

Date Sampled 4-17-18

Time Sampled 1820

Sampling Equip. above pump

Meter ID mps-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.4 (units) D.O. 7.7 (mg/l)

Spec. Cond. 560 (umhos/cm) Turbidity 4.4 (NTU)

Temp. 10.0 (°C) Eh 105 (mV)

Other NA

Field Measurements Temp. Corrected: ☒ Yes ☐ No ☐ NA

Sample for Soluble Metals Filtered in Field: ☒ Yes ☐ No ☐ NA

Weather Conditions During Sampling: 39° + sunny, wind NE 10

Sample Description: clear + odorless

Observations: DJA 4/17/18

Stabilization Test

Time	pH (units)	Specific Conductance (umhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1733	7.4	560	9.5	7.7	NA	107	3.6
1751	7.4	560	10.0	7.7	NA	106	7.2
1809	7.4	560	10.0	7.7	NA	105	10.8
<u>DJA 4/17/18</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: 4-17-18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Sherco CCR, April Project No. 18-00455

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) 39.93 Feet

Static water level measurement at time of sampling (Final Depth) 39.93 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump

Pump ID PC-6

Date Purged 4-18-18

Water Column 17.92 Feet

Time Purged 1245-1330

One Casing Volume 2.9 Gallons

Pump Rate 0.2 GPM / LPM

Volume Purged 9.0 Gallons

Field Sampling Data

Date Sampled 4-18-18

Time Sampled 1340

Sampling Equip. above pump

Meter ID mps-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.5 (units) D.O. 6.7 (mg/l)

Spec. Cond. 870 (µmhos/cm) Turbidity 3.9 (NTU)

Temp. 10.0 (°C) Eh 108 (mV)

Other NA

Field Measurements Temp. Corrected: ☒ Yes ☐ No ☐ NA

Sample for Soluble Metals Filtered in Field: ☒ Yes ☐ No ☐ NA

Weather Conditions During Sampling: 35° + cloudy, wind NE 15

Sample Description: clear + odorless

Observations: DJA 4/18/18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (Cumulative gal)
1300	7.5	870	10.0	6.7	NA	105	3.0
1315	7.5	870	10.0	6.7	NA	107	6.0
1330	7.5	870	10.0	6.7	NA	108	9.0

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: 4/18/18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Shelco CCR, April Project No. 18-00455

Monitoring Point ID P-23 Labeled P-23

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) 41.72 Feet

Static water level measurement at time of sampling (Final Depth) 41.72 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 4-18-18 Water Column 25.62 Feet

Time Purged 1120 - 1223 One Casing Volume 4.2 Gallons

Pump Rate 0.2 GPM / LPM Volume Purged 12.6 Gallons

Field Sampling Data

Date Sampled 4-18-18

Time Sampled 1230

Sampling Equip. above pump

Meter ID mps-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.6 (units) D.O. 6.6 (mg/l)

Spec. Cond. 610 (µmhos/cm) Turbidity 4.8 (NTU)

Temp. 12.5 (°C) Eh 93 (mV)

Other NA

Field Measurements Temp. Corrected: ☒ Yes ☐ No ☐ NA

Sample for Soluble Metals Filtered in Field: ☒ Yes ☐ No ☐ NA

Weather Conditions During Sampling: 35° + cloudy, wind NE 10-15

Sample Description: clear + odorless

Observations: collected duplicate 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)
1141	7.6	610	12.5	6.6	NA	93	4.2
1202	7.6	610	12.5	6.6	NA	93	8.4
1223	7.6	610	12.5	6.6	NA	93	12.6
<u>DJA 4/18/18</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: 4/18/18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Sherco CCR, April Project No. 18-00455

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) 37.32 Feet

Static water level measurement at time of sampling (Final Depth) 37.32 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump

Pump ID PC-6

Date Purged 4-18-18

Water Column 4.86 Feet

Time Purged 0820-0832

One Casing Volume 0.8 Gallons

Pump Rate 0.2 GPM / LPM

Volume Purged 2.4 Gallons

Field Sampling Data

Date Sampled 4-18-18

Time Sampled 0840

Sampling Equip. above pump

Meter ID mps-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.6 (units) D.O. 4.5 (mg/l)

Spec. Cond. 390 (umhos/cm) Turbidity 5.2 (NTU)

Temp. 9.5 (°C) Eh 107 (mV)

Other NA

Field Measurements Temp. Corrected: ☒ Yes ☐ No ☐ NA

Sample for Soluble Metals Filtered in Field: ☒ Yes ☐ No ☐ NA

Weather Conditions During Sampling: 32° + cloudy, wind 10

Sample Description: clear + odorless

Observations: DJA 4/18/18

Stabilization Test

Time	pH (units)	Specific Conductance (umhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
0824	7.6	390	9.5	4.7	NA	93	0.8
0828	7.6	390	9.5	4.6	NA	100	1.6
0832	7.6	390	9.5	4.5	NA	107	2.4

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: 4/18/18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Sherco CCR, April Project No. 18-00455

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) 78.01 Feet

Static water level measurement at time of sampling (Final Depth) 78.01 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 4-18-18 Water Column 7.46 Feet

Time Purged 1705-1729 One Casing Volume 1.2 Gallons

Pump Rate 0.15 GPM / LPM Volume Purged 3.6 Gallons

Field Sampling Data

Date Sampled 4-18-18

Time Sampled 1740

Sampling Equip. above pump

Meter ID mps-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.5 (units) D.O. 6.8 (mg/l)

Spec. Cond. 780 (µmhos/cm) Turbidity 8.7 (NTU)

Temp. 10.0 (°C) Eh 37 (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 NE 20

Sample Description: clear + odorless

Observations: DJA 4/18/18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1713	7.5	780	10.0	6.8	NA	5	1.2
1721	7.5	780	10.0	6.8	NA	26	2.4
1729	7.5	780	10.0	6.8	NA	37	3.6
<u>DJA 4/18/18</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: 4/18/18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Shetco CCR, April Project No. 18-00455

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) 76.89 Feet

Static water level measurement at time of sampling (Final Depth) 76.89 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump

Pump ID PC-6

Date Purged 4-18-18

Water Column 8.64 Feet

Time Purged 1435-1456

One Casing Volume 1.4 Gallons

Pump Rate 0.2

GPM / LPM

Volume Purged 4.2 Gallons

Field Sampling Data

Date Sampled 4-18-18

Time Sampled 1510

Sampling Equip. above pump

Meter ID mps-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.6 (units) D.O. 7.3 (mg/l)

Spec. Cond. 440 (µmhos/cm) Turbidity 13.0 (NTU)

Temp. 9.5 (°C) Eh 102 (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 NE, 15

Sample Description: clear + odorless

Observations: DJA 4-18-18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1442	7.6	440	9.5	7.0	NA	99	1.4
1449	7.6	440	9.5	7.2	NA	100	2.8
1456	7.6	440	9.5	7.3	NA	102	4.2
<u>DJA 4/18/18</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: 4/18/18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Shetco CCR, April Project No. 18-00455

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) 42.21 Feet

Static water level measurement at time of sampling (Final Depth) 42.21 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump

Pump ID PC-6

Date Purged 4-18-18

Water Column 6.85 Feet

Time Purged 1035-1053

One Casing Volume 1.1 Gallons

Pump Rate 0.2

GPM / LPM

Volume Purged 3.6 Gallons

Field Sampling Data

Date Sampled 4-18-18

Time Sampled 1100

Sampling Equip. above pump

Meter ID mps-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.4 (units) D.O. 6.3 (mg/l)

Spec. Cond. 700 (umhos/cm) Turbidity 14.6 (NTU)

Temp. 10.0 (°C) Eh 109 (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° + cloudy, wind N10

Sample Description: clear + odorless

Observations: DJA 4/18/18

Stabilization Test

Time	pH (units)	Specific Conductance (umhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1041	7.4	700	10.0	6.4	NA	109	1.2
1047	7.4	700	10.0	6.3	NA	109	2.4
1053	7.4	700	10.0	6.3	NA	109	3.6

Samples chilled immediately after collection:

☒ Yes ☐ Other

Form Revised: 01/25/2013

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

Lead Technician Signature: David Anderson

Date: 4/18/18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Sherco CCR, April Project No. 18-00455

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) 39.89 Feet

Static water level measurement at time of sampling (Final Depth) 39.89 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 4-18-18 Water Column 9.27 Feet

Time Purged 0925-0949 One Casing Volume 1.5 Gallons

Pump Rate 0.2 GPM/LPM Volume Purged 4.8 Gallons

Field Sampling Data

Date Sampled 4-18-18

Time Sampled 1000

Sampling Equip. above pump

Meter ID mps-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.5 (units) D.O. 7.1 (mg/l)

Spec. Cond. 570 (µmhos/cm) Turbidity 10.7 (NTU)

Temp. 9.5 (°C) Eh 113 (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° + cloudy, wind N 10

Sample Description: clear + odorless

Observations: DJA 4/18/18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
0933	7.5	570	9.5	7.1	NA	107	1.6
0941	7.5	570	9.5	7.1	NA	110	3.2
0949	7.5	570	9.5	7.1	NA	113	4.8
<u>DJA 4/18/18</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: 4-18-18



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

27 July 2018

Charles A Donkers

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 04/19/2018 06:00-04/20/2018 09:30. 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	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Sample Qualifier	Laboratory ID	Matrix	Sampled	Received
P-17		MDD0177-12	Water	04/17/2018 18:20	04/19/2018 6:00
P-152a		MDD0177-13	Water	04/18/2018 8:40	04/19/2018 6:00
P-158		MDD0177-14	Water	04/18/2018 10:00	04/19/2018 6:00
P-157		MDD0177-15	Water	04/18/2018 11:00	04/19/2018 6:00
P-23		MDD0177-16	Water	04/18/2018 12:30	04/19/2018 6:00
Duplicate		MDD0177-17	Water	04/18/2018 12:30	04/19/2018 6:00
P-22		MDD0177-18	Water	04/18/2018 13:40	04/19/2018 6:00
P-156		MDD0184-01	Water	04/18/2018 15:10	04/20/2018 9:30
P-01A-1		MDD0184-02	Water	04/18/2018 16:40	04/20/2018 9:30
P-155		MDD0184-03	Water	04/18/2018 17:40	04/20/2018 9:30

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

P-17
MDD0177-12 (Water) - Chain of Custody Number: 2201222/2201225

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

Chloride	21.6	1.00	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 17:10	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 17:10	EPA 300.0	CRL
Sulfate	26.2	1.00	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 17:10	EPA 300.0	CRL

Wet Chemistry

pH	7.98		pH Units	M_TTT	1	BDD0376	4/19/18 8:09	4/19/18 10:38	SM 4500-H+ B	CRL
Total Dissolved Solids	306	20.0	mg/L		1	BDD0406	4/20/18 9:00	4/20/18 9:00	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDD0405	4/20/18 7:00	4/20/18 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 12:07	EPA 200.8	CRL
Barium	42.2	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 12:07	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 12:07	EPA 200.8	CRL
Cadmium	< 0.100	0.100	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 12:07	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 12:07	EPA 200.8	CRL
Chromium	0.875	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 12:07	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 12:07	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 12:07	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 12:07	EPA 200.8	CRL
Selenium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 12:07	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 12:07	EPA 200.8	CRL

Total Metals by ICP

Boron	< 0.0500	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 13:52	EPA 200.7	HRD
Calcium	72.2	0.500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 13:50	EPA 200.7	HRD
Lithium	< 0.0500	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 13:50	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

P-17

MDD0177-12 (Water) - Chain of Custody Number: 2201222/2201225

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Mercury

Mercury	< 0.200	0.200	ug/L		1	BDE0115	5/7/18 9:13	5/7/18 14:39	EPA 245.1, 7470A	HRD
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Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

P-152a

MDD0177-13 (Water) - Chain of Custody Number: 2201222/2201225

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	BDD0375	4/19/18 8:04	4/19/18 17:31	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 17:31	EPA 300.0	CRL
Sulfate	6.12	1.00	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 17:31	EPA 300.0	CRL

Wet Chemistry

pH	7.95		pH Units	M_TTT	1	BDD0376	4/19/18 8:09	4/19/18 10:41	SM 4500-H+ B	CRL
Total Dissolved Solids	222	20.0	mg/L		1	BDD0406	4/20/18 9:00	4/20/18 9:00	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDD0405	4/20/18 7:00	4/20/18 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:09	EPA 200.8	CRL
Barium	38.6	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:09	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:09	EPA 200.8	CRL
Cadmium	< 0.100	0.100	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:09	EPA 200.8	CRL
Cobalt	0.621	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:09	EPA 200.8	CRL
Chromium	0.672	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:09	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:09	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:09	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:09	EPA 200.8	CRL
Selenium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:09	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:09	EPA 200.8	CRL

Total Metals by ICP

Boron	< 0.0500	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 13:57	EPA 200.7	HRD
Calcium	55.6	0.500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 13:55	EPA 200.7	HRD
Lithium	< 0.0500	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 13:55	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

P-152a

MDD0177-13 (Water) - Chain of Custody Number: 2201222/2201225

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Mercury

Mercury	< 0.200	0.200	ug/L		1	BDE0115	5/7/18 9:13	5/7/18 14:40	EPA 245.1, 7470A	HRD
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Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

P-158

MDD0177-14 (Water) - Chain of Custody Number: 2201222/2201225

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

Chloride	9.03	1.00	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 17:51	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 17:51	EPA 300.0	CRL
Sulfate	65.5	1.00	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 17:51	EPA 300.0	CRL

Wet Chemistry

pH	7.85		pH Units	M_TTT	1	BDD0376	4/19/18 8:09	4/19/18 10:45	SM 4500-H+ B	CRL
Total Dissolved Solids	348	20.0	mg/L		1	BDD0406	4/20/18 9:00	4/20/18 9:00	SM 2540C	HSD
Total Suspended Solids	4.80	4.00	mg/L		1	BDD0405	4/20/18 7:00	4/20/18 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:12	EPA 200.8	CRL
Barium	61.8	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:12	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:12	EPA 200.8	CRL
Cadmium	< 0.100	0.100	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:12	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:12	EPA 200.8	CRL
Chromium	1.30	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:12	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:12	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:12	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:12	EPA 200.8	CRL
Selenium	1.04	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:12	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:12	EPA 200.8	CRL

Total Metals by ICP

Boron	0.417	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:02	EPA 200.7	HRD
Calcium	75.8	0.500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:00	EPA 200.7	HRD
Lithium	< 0.0500	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:00	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

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MDD0177-14 (Water) - Chain of Custody Number: 2201222/2201225

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Mercury

Mercury	< 0.200	0.200	ug/L		1	BDE0115	5/7/18 9:13	5/7/18 14:42	EPA 245.1, 7470A	HRD
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Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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MDD0177-15 (Water) - Chain of Custody Number: 2201222/2201225

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

Chloride	7.77	1.00	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 18:11	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 18:11	EPA 300.0	CRL
Sulfate	79.3	1.00	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 18:11	EPA 300.0	CRL

Wet Chemistry

pH	7.76		pH Units	M_TTT	1	BDD0376	4/19/18 8:09	4/19/18 10:48	SM 4500-H+ B	CRL
Total Dissolved Solids	428	20.0	mg/L		1	BDD0406	4/20/18 9:00	4/20/18 9:00	SM 2540C	HSD
Total Suspended Solids	10.0	4.00	mg/L		1	BDD0405	4/20/18 7:00	4/20/18 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.580	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:16	EPA 200.8	CRL
Barium	61.1	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:16	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:16	EPA 200.8	CRL
Cadmium	< 0.100	0.100	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:16	EPA 200.8	CRL
Cobalt	0.804	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:16	EPA 200.8	CRL
Chromium	4.67	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:16	EPA 200.8	CRL
Molybdenum	0.502	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:16	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:16	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:16	EPA 200.8	CRL
Selenium	2.49	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:16	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:16	EPA 200.8	CRL

Total Metals by ICP

Boron	0.226	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:07	EPA 200.7	HRD
Calcium	87.6	0.500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:05	EPA 200.7	HRD
Lithium	< 0.0500	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:05	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

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MDD0177-15 (Water) - Chain of Custody Number: 2201222/2201225

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Mercury

Mercury	< 0.200	0.200	ug/L		1	BDE0115	5/7/18 9:13	5/7/18 14:44	EPA 245.1, 7470A	HRD
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Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

P-23

MDD0177-16 (Water) - Chain of Custody Number: 2201222/2201225

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

Chloride	22.7	1.00	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 18:32	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 18:32	EPA 300.0	CRL
Sulfate	55.7	1.00	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 18:32	EPA 300.0	CRL

Wet Chemistry

pH	7.93		pH Units	M_TTT	1	BDD0376	4/19/18 8:09	4/19/18 10:55	SM 4500-H+ B	CRL
Total Dissolved Solids	350	20.0	mg/L		1	BDD0406	4/20/18 9:00	4/20/18 9:00	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDD0405	4/20/18 7:00	4/20/18 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:20	EPA 200.8	CRL
Barium	52.7	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:20	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:20	EPA 200.8	CRL
Cadmium	< 0.100	0.100	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:20	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:20	EPA 200.8	CRL
Chromium	2.33	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:20	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:20	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:20	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:20	EPA 200.8	CRL
Selenium	0.597	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:20	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:20	EPA 200.8	CRL

Total Metals by ICP

Boron	0.247	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:12	EPA 200.7	HRD
Calcium	75.2	0.500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:10	EPA 200.7	HRD
Lithium	< 0.0500	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:10	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

P-23

MDD0177-16 (Water) - Chain of Custody Number: 2201222/2201225

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Mercury

Mercury	< 0.200	0.200	ug/L		1	BDE0115	5/7/18 9:13	5/7/18 14:45	EPA 245.1, 7470A	HRD
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Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

Duplicate

MDD0177-17 (Water) - Chain of Custody Number: 2201222/2201225

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

Chloride	22.1	1.00	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 18:52	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 18:52	EPA 300.0	CRL
Sulfate	56.2	1.00	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 18:52	EPA 300.0	CRL

Wet Chemistry

pH	7.92		pH Units	M_TTT	1	BDD0376	4/19/18 8:09	4/19/18 11:02	SM 4500-H+ B	CRL
Total Dissolved Solids	356	20.0	mg/L		1	BDD0406	4/20/18 9:00	4/20/18 9:00	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDD0405	4/20/18 7:00	4/20/18 7:00	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:24	EPA 200.8	CRL
Barium	55.2	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:24	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:24	EPA 200.8	CRL
Cadmium	< 0.100	0.100	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:24	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:24	EPA 200.8	CRL
Chromium	2.29	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:24	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:24	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:24	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:24	EPA 200.8	CRL
Selenium	0.611	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:24	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:24	EPA 200.8	CRL

Total Metals by ICP

Boron	0.249	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:17	EPA 200.7	HRD
Calcium	78.1	0.500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:15	EPA 200.7	HRD
Lithium	< 0.0500	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:15	EPA 200.7	HRD

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

Duplicate

MDD0177-17 (Water) - Chain of Custody Number: 2201222/2201225

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Mercury

Mercury	< 0.200	0.200	ug/L		1	BDE0115	5/7/18 9:13	5/7/18 14:47	EPA 245.1, 7470A	HRD
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Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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MDD0177-18 (Water) - Chain of Custody Number: 2201222/2201225

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

Chloride	16.1	1.00	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 19:13	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 19:13	EPA 300.0	CRL
Sulfate	193	1.00	mg/L		1	BDD0375	4/19/18 8:04	4/19/18 19:13	EPA 300.0	CRL

Wet Chemistry

pH	7.87		pH Units	M_TTT	1	BDD0376	4/19/18 8:09	4/19/18 11:09	SM 4500-H+ B	CRL
Total Dissolved Solids	580	20.0	mg/L		1	BDD0434	4/23/18 9:03	4/23/18 9:03	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDD0433	4/23/18 6:58	4/23/18 6:58	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:36	EPA 200.8	CRL
Barium	77.1	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:36	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:36	EPA 200.8	CRL
Cadmium	< 0.100	0.100	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:36	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:36	EPA 200.8	CRL
Chromium	0.971	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:36	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:36	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:36	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:36	EPA 200.8	CRL
Selenium	9.60	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:36	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:36	EPA 200.8	CRL

Total Metals by ICP

Boron	1.28	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:32	EPA 200.7	HRD
Calcium	116	0.500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:31	EPA 200.7	HRD
Lithium	< 0.0500	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:31	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

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MDD0177-18 (Water) - Chain of Custody Number: 2201222/2201225

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Mercury

Mercury	< 0.200	0.200	ug/L		1	BDE0115	5/7/18 9:13	5/7/18 14:49	EPA 245.1, 7470A	HRD
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Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

P-156

MDD0184-01 (Water) - Chain of Custody Number: 2201229

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

Chloride	1.29	1.00	mg/L		1	BDD0432	4/23/18 5:47	4/23/18 17:11	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDD0432	4/23/18 5:47	4/23/18 17:11	EPA 300.0	CRL
Sulfate	11.6	1.00	mg/L		1	BDD0432	4/23/18 5:47	4/23/18 17:11	EPA 300.0	CRL

Wet Chemistry

pH	7.92		pH Units	M_TTT	1	BDD0424	4/20/18 10:21	4/20/18 12:19	SM 4500-H+ B	CRL
Total Dissolved Solids	246	20.0	mg/L		1	BDD0453	4/24/18 9:02	4/24/18 9:02	SM 2540C	HSD
Total Suspended Solids	12.8	4.00	mg/L		1	BDD0452	4/24/18 6:53	4/24/18 6:53	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.615	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:40	EPA 200.8	CRL
Barium	57.3	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:40	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:40	EPA 200.8	CRL
Cadmium	< 0.100	0.100	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:40	EPA 200.8	CRL
Cobalt	0.680	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:40	EPA 200.8	CRL
Chromium	1.50	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:40	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:40	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:40	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:40	EPA 200.8	CRL
Selenium	1.05	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:40	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:40	EPA 200.8	CRL

Total Metals by ICP

Boron	0.176	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:38	EPA 200.7	HRD
Calcium	64.1	0.500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:36	EPA 200.7	HRD
Lithium	< 0.0500	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:36	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

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MDD0184-01 (Water) - Chain of Custody Number: 2201229

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Mercury

Mercury	< 0.200	0.200	ug/L		1	BDE0137	5/8/18 6:10	5/8/18 12:41	EPA 245.1, 7470A	HSD
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Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

P-01A-1

MDD0184-02 (Water) - Chain of Custody Number: 2201229

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

Chloride	11.6	1.00	mg/L		1	BDD0432	4/23/18 5:47	4/23/18 19:13	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDD0432	4/23/18 5:47	4/23/18 19:13	EPA 300.0	CRL
Sulfate	124	1.00	mg/L		1	BDD0432	4/23/18 5:47	4/23/18 19:13	EPA 300.0	CRL

Wet Chemistry

pH	7.73		pH Units	M_TTT	1	BDD0424	4/20/18 10:21	4/20/18 12:33	SM 4500-H+ B	CRL
Total Dissolved Solids	460	20.0	mg/L		1	BDD0453	4/24/18 9:02	4/24/18 9:02	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDD0452	4/24/18 6:53	4/24/18 6:53	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:44	EPA 200.8	CRL
Barium	43.5	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:44	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:44	EPA 200.8	CRL
Cadmium	< 0.100	0.100	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:44	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:44	EPA 200.8	CRL
Chromium	1.11	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:44	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:44	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:44	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:44	EPA 200.8	CRL
Selenium	6.22	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:44	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:44	EPA 200.8	CRL

Total Metals by ICP

Boron	0.792	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:42	EPA 200.7	HRD
Calcium	93.8	0.500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:41	EPA 200.7	HRD
Lithium	< 0.0500	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:41	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

P-01A-1

MDD0184-02 (Water) - Chain of Custody Number: 2201229

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Mercury

Mercury	< 0.200	0.200	ug/L		1	BDE0137	5/8/18 6:10	5/8/18 12:43	EPA 245.1, 7470A	HSD
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Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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MDD0184-03 (Water) - Chain of Custody Number: 2201229

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

Chloride	16.7	1.00	mg/L		1	BDD0432	4/23/18 5:47	4/23/18 19:34	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDD0432	4/23/18 5:47	4/23/18 19:34	EPA 300.0	CRL
Sulfate	156	1.00	mg/L		1	BDD0432	4/23/18 5:47	4/23/18 19:34	EPA 300.0	CRL

Wet Chemistry

pH	7.82		pH Units	M_TTT	1	BDD0424	4/20/18 10:21	4/20/18 12:36	SM 4500-H+ B	CRL
Total Dissolved Solids	494	20.0	mg/L		1	BDD0453	4/24/18 9:02	4/24/18 9:02	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDD0452	4/24/18 6:53	4/24/18 6:53	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:48	EPA 200.8	CRL
Barium	65.4	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:48	EPA 200.8	CRL
Beryllium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:48	EPA 200.8	CRL
Cadmium	< 0.100	0.100	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:48	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:48	EPA 200.8	CRL
Chromium	1.78	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:48	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:48	EPA 200.8	CRL
Lead	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:48	EPA 200.8	CRL
Antimony	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:48	EPA 200.8	CRL
Selenium	4.28	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:48	EPA 200.8	CRL
Thallium	< 0.500	0.500	ug/L		1	BDD0438	4/23/18 9:23	4/24/18 11:48	EPA 200.8	CRL

Total Metals by ICP

Boron	1.53	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:47	EPA 200.7	HRD
Calcium	86.8	0.500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:46	EPA 200.7	HRD
Lithium	< 0.0500	0.0500	mg/L		1	BDD0437	4/23/18 9:19	4/25/18 14:46	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

P-155

MDD0184-03 (Water) - Chain of Custody Number: 2201229

Analyte	Result	Reporting Limit	Units	Analyte Qualifier	Dilution	Batch	Prepared	Analyzed	Method	Analyst
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Mercury

Mercury	< 0.200	0.200	ug/L		1	BDE0137	5/8/18 6:10	5/8/18 12:44	EPA 245.1, 7470A	HSD
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Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

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 BDD0375 - Wet Prep

Blank (BDD0375-BLK1)				Prepared & Analyzed: 04/19/2018						
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

Blank (BDD0375-BLK2)				Prepared & Analyzed: 04/19/2018						
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

LCS (BDD0375-BS1)				Prepared & Analyzed: 04/19/2018						
Chloride	22.9	1.00	mg/L	25.000		91.7	90-110			
Fluoride	4.85	0.750	mg/L	5.0000		96.9	90-110			
Sulfate	95.9	1.00	mg/L	100.00		95.9	90-110			

LCS (BDD0375-BS2)				Prepared & Analyzed: 04/19/2018						
Chloride	22.8	1.00	mg/L	25.000		91.2	90-110			
Fluoride	4.60	0.750	mg/L	5.0000		92.0	90-110			
Sulfate	94.7	1.00	mg/L	100.00		94.7	90-110			

LCS (BDD0375-BS3)				Prepared & Analyzed: 04/19/2018						
Chloride	23.7	1.00	mg/L	25.000		94.9	90-110			
Fluoride	4.53	0.750	mg/L	5.0000		90.6	90-110			
Sulfate	95.2	1.00	mg/L	100.00		95.2	90-110			

Duplicate (BDD0375-DUP1)				Source: MDD0177-10		Prepared & Analyzed: 04/19/2018				
Chloride	0.478	1.00	mg/L		0.491			2.68	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	2.74	1.00	mg/L		2.73			0.293	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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 BDD0375 - Wet Prep

Duplicate (BDD0375-DUP2)		Source: MDD0177-13		Prepared & Analyzed: 04/19/2018						
Chloride	0.800	1.00	mg/L		0.783			2.15	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	6.08	1.00	mg/L		6.12			0.656	20	

Matrix Spike (BDD0375-MS1)		Source: MDD0177-10		Prepared & Analyzed: 04/19/2018						
Chloride	11.6	1.00	mg/L	12.500	0.491	88.8	80-120			
Fluoride	2.39	0.750	mg/L	2.5000	<0.750	95.4	80-120			
Sulfate	50.2	1.00	mg/L	50.000	2.73	94.9	80-120			

Matrix Spike (BDD0375-MS2)		Source: MDD0177-13		Prepared & Analyzed: 04/19/2018						
Chloride	11.7	1.00	mg/L	12.500	0.783	87.6	80-120			
Fluoride	2.25	0.750	mg/L	2.5000	<0.750	90.2	80-120			
Sulfate	52.6	1.00	mg/L	50.000	6.12	92.9	80-120			

Matrix Spike Dup (BDD0375-MSD1)		Source: MDD0177-10		Prepared & Analyzed: 04/19/2018						
Chloride	11.6	1.00	mg/L	12.500	0.491	89.0	80-120	0.276	20	
Fluoride	2.40	0.750	mg/L	2.5000	<0.750	95.8	80-120	0.376	20	
Sulfate	50.2	1.00	mg/L	50.000	2.73	94.9	80-120	0.0618	20	

Matrix Spike Dup (BDD0375-MSD2)		Source: MDD0177-13		Prepared & Analyzed: 04/19/2018						
Chloride	11.9	1.00	mg/L	12.500	0.783	89.0	80-120	1.40	20	
Fluoride	2.31	0.750	mg/L	2.5000	<0.750	92.2	80-120	2.28	20	
Sulfate	53.7	1.00	mg/L	50.000	6.12	95.2	80-120	2.12	20	

Batch BDD0432 - Wet Prep

Blank (BDD0432-BLK1)		Prepared & Analyzed: 04/23/2018								
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	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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 BDD0432 - Wet Prep

Blank (BDD0432-BLK2)				Prepared & Analyzed: 04/23/2018						
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

LCS (BDD0432-BS1)				Prepared & Analyzed: 04/23/2018						
Chloride	23.8	1.00	mg/L	25.000		95.1	90-110			
Fluoride	4.76	0.750	mg/L	5.0000		95.1	90-110			
Sulfate	95.9	1.00	mg/L	100.00		95.9	90-110			

LCS (BDD0432-BS2)				Prepared & Analyzed: 04/23/2018						
Chloride	23.4	1.00	mg/L	25.000		93.6	90-110			
Fluoride	4.54	0.750	mg/L	5.0000		90.9	90-110			
Sulfate	93.9	1.00	mg/L	100.00		93.9	90-110			

LCS (BDD0432-BS3)				Prepared & Analyzed: 04/23/2018						
Chloride	23.4	1.00	mg/L	25.000		93.4	90-110			
Fluoride	4.72	0.750	mg/L	5.0000		94.4	90-110			
Sulfate	97.1	1.00	mg/L	100.00		97.1	90-110			

Duplicate (BDD0432-DUP1)				Source: MDD0183-06		Prepared & Analyzed: 04/23/2018				
Chloride	11.8	1.00	mg/L		11.8			0.161	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	22.7	1.00	mg/L		22.8			0.0615	20	

Duplicate (BDD0432-DUP2)				Source: MDD0183-08		Prepared & Analyzed: 04/23/2018				
Chloride	11.5	1.00	mg/L		11.6			0.364	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	11.7	1.00	mg/L		11.8			1.15	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

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 BDD0432 - Wet Prep

Matrix Spike (BDD0432-MS1)		Source: MDD0183-06		Prepared & Analyzed: 04/23/2018						
Chloride	23.6	1.00	mg/L	12.500	11.8	94.1	80-120			
Fluoride	2.34	0.750	mg/L	2.5000	<0.750	93.6	80-120			
Sulfate	70.1	1.00	mg/L	50.000	22.8	94.6	80-120			
Matrix Spike (BDD0432-MS2)		Source: MDD0183-08		Prepared & Analyzed: 04/23/2018						
Chloride	22.9	1.00	mg/L	12.500	11.6	90.4	80-120			
Fluoride	2.28	0.750	mg/L	2.5000	<0.750	91.0	80-120			
Sulfate	57.6	1.00	mg/L	50.000	11.8	91.6	80-120			
Matrix Spike Dup (BDD0432-MSD1)		Source: MDD0183-06		Prepared & Analyzed: 04/23/2018						
Chloride	23.6	1.00	mg/L	12.500	11.8	94.2	80-120	0.0425	20	
Fluoride	2.26	0.750	mg/L	2.5000	<0.750	90.6	80-120	3.30	20	
Sulfate	69.1	1.00	mg/L	50.000	22.8	92.7	80-120	1.35	20	
Matrix Spike Dup (BDD0432-MSD2)		Source: MDD0183-08		Prepared & Analyzed: 04/23/2018						
Chloride	23.2	1.00	mg/L	12.500	11.6	92.8	80-120	1.33	20	
Fluoride	2.26	0.750	mg/L	2.5000	<0.750	90.6	80-120	0.485	20	
Sulfate	58.2	1.00	mg/L	50.000	11.8	92.7	80-120	0.921	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

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 BDD0373 - Wet Prep

Blank (BDD0373-BLK1)	Prepared & Analyzed: 04/19/2018									
Total Suspended Solids	<4.00	4.00	mg/L							
Duplicate (BDD0373-DUP1)	Source: MDD0177-01 Prepared & Analyzed: 04/19/2018									
Total Suspended Solids	<4.00	4.00	mg/L		0.400				20	

Batch BDD0374 - Wet Prep

Blank (BDD0374-BLK1)	Prepared & Analyzed: 04/19/2018									
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BDD0374-DUP1)	Source: MDD0177-01 Prepared & Analyzed: 04/19/2018									
Total Dissolved Solids	506	20.0	mg/L		520			2.73	20	

Batch BDD0376 - Wet Prep

LCS (BDD0376-BS1)	Prepared & Analyzed: 04/19/2018									
pH	7.16		pH Units	7.0000		102	90-110			
Duplicate (BDD0376-DUP1)	Source: MDD0177-01 Prepared & Analyzed: 04/19/2018									
pH	7.74		pH Units	7.80				0.772	20	
Duplicate (BDD0376-DUP2)	Source: MDD0177-11 Prepared & Analyzed: 04/19/2018									
pH	7.54		pH Units	7.57				0.397	20	

Batch BDD0405 - Wet Prep

Blank (BDD0405-BLK1)	Prepared & Analyzed: 04/20/2018									
Total Suspended Solids	<4.00	4.00	mg/L							

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

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 BDD0405 - Wet Prep

Duplicate (BDD0405-DUP1)	Source: MDD0177-08	Prepared & Analyzed: 04/20/2018								
Total Suspended Solids	0.800	4.00	mg/L		0.400			66.7	20	M_D-RL

Batch BDD0406 - Wet Prep

Blank (BDD0406-BLK1)		Prepared & Analyzed: 04/20/2018								
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BDD0406-DUP1)	Source: MDD0177-08	Prepared & Analyzed: 04/20/2018								
Total Dissolved Solids	258	20.0	mg/L		242			6.40	20	

Batch BDD0424 - Wet Prep

LCS (BDD0424-BS1)		Prepared & Analyzed: 04/20/2018								
pH	7.08		pH Units	7.0000		101	90-110			
Duplicate (BDD0424-DUP1)	Source: MDD0183-01	Prepared & Analyzed: 04/20/2018								
pH	7.52		pH Units	7.55				0.398	20	
Duplicate (BDD0424-DUP2)	Source: MDD0184-02	Prepared & Analyzed: 04/20/2018								
pH	7.73		pH Units	7.73				0.00	20	

Batch BDD0433 - Wet Prep

Blank (BDD0433-BLK1)		Prepared & Analyzed: 04/23/2018								
Total Suspended Solids	<4.00	4.00	mg/L							

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
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Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

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 BDD0433 - Wet Prep

Duplicate (BDD0433-DUP1)	Source: MDD0177-18		Prepared & Analyzed: 04/23/2018							
Total Suspended Solids	0.400	4.00	mg/L		<4.00				20	

Batch BDD0434 - Wet Prep

Blank (BDD0434-BLK1)			Prepared & Analyzed: 04/23/2018							
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BDD0434-DUP1)	Source: MDD0177-18		Prepared & Analyzed: 04/23/2018							
Total Dissolved Solids	580	20.0	mg/L		580			0.00	20	

Batch BDD0452 - Wet Prep

Blank (BDD0452-BLK1)			Prepared & Analyzed: 04/24/2018							
Total Suspended Solids	<4.00	4.00	mg/L							
Duplicate (BDD0452-DUP1)	Source: MDD0184-01		Prepared & Analyzed: 04/24/2018							
Total Suspended Solids	12.8	4.00	mg/L		12.8			0.00	20	

Batch BDD0453 - Wet Prep

Blank (BDD0453-BLK1)			Prepared & Analyzed: 04/24/2018							
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BDD0453-DUP1)	Source: MDD0184-01		Prepared & Analyzed: 04/24/2018							
Total Dissolved Solids	238	20.0	mg/L		246			3.31	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
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Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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 BDD0438 - EPA 200.2, EPA 3005

Blank (BDD0438-BLK1)

Prepared: 04/23/2018 Analyzed: 04/24/2018

Barium	<0.500	0.500	ug/L
Cadmium	<0.100	0.100	ug/L
Cobalt	<0.500	0.500	ug/L
Antimony	<0.500	0.500	ug/L
Molybdenum	<0.500	0.500	ug/L
Selenium	<0.500	0.500	ug/L
Lead	<0.500	0.500	ug/L
Arsenic	<0.500	0.500	ug/L
Chromium	<0.500	0.500	ug/L
Beryllium	<0.500	0.500	ug/L
Thallium	<0.500	0.500	ug/L

Blank (BDD0438-BLK2)

Prepared: 04/23/2018 Analyzed: 04/24/2018

Lead	<0.500	0.500	ug/L
Beryllium	<0.500	0.500	ug/L
Molybdenum	<0.500	0.500	ug/L
Cobalt	<0.500	0.500	ug/L
Barium	<0.500	0.500	ug/L
Antimony	<0.500	0.500	ug/L
Selenium	<0.500	0.500	ug/L
Cadmium	<0.100	0.100	ug/L
Chromium	<0.500	0.500	ug/L
Arsenic	<0.500	0.500	ug/L
Thallium	<0.500	0.500	ug/L

LCS (BDD0438-BS1)

Prepared: 04/23/2018 Analyzed: 04/24/2018

Arsenic	97.4	0.500	ug/L	100.00	97.4	85-115
Cadmium	101	0.100	ug/L	100.00	101	85-115
Beryllium	94.1	0.500	ug/L	100.00	94.1	85-115
Chromium	101	0.500	ug/L	100.00	101	85-115
Barium	97.9	0.500	ug/L	100.00	97.9	85-115
Selenium	97.9	0.500	ug/L	100.00	97.9	85-115
Molybdenum	97.2	0.500	ug/L	100.00	97.2	85-115
Lead	97.9	0.500	ug/L	100.00	97.9	85-115
Thallium	98.3	0.500	ug/L	100.00	98.3	85-115
Cobalt	99.3	0.500	ug/L	100.00	99.3	85-115
Antimony	98.5	0.500	ug/L	100.00	98.5	85-115

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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 BDD0438 - EPA 200.2, EPA 3005

LCS (BDD0438-BS2)				Prepared: 04/23/2018 Analyzed: 04/24/2018						
Cobalt	97.9	0.500	ug/L	100.00		97.9	85-115			
Lead	104	0.500	ug/L	100.00		104	85-115			
Antimony	104	0.500	ug/L	100.00		104	85-115			
Molybdenum	103	0.500	ug/L	100.00		103	85-115			
Chromium	98.8	0.500	ug/L	100.00		98.8	85-115			
Selenium	96.9	0.500	ug/L	100.00		96.9	85-115			
Barium	104	0.500	ug/L	100.00		104	85-115			
Arsenic	100	0.500	ug/L	100.00		100	85-115			
Beryllium	101	0.500	ug/L	100.00		101	85-115			
Cadmium	99.6	0.100	ug/L	100.00		99.6	85-115			
Thallium	104	0.500	ug/L	100.00		104	85-115			

Duplicate (BDD0438-DUP1)				Source: MDD0177-04		Prepared: 04/23/2018 Analyzed: 04/24/2018				
Lead	0.0715	0.500	ug/L		0.0324			75.3	20	M_D-RL
Antimony	0.0736	0.500	ug/L		<0.500				20	
Thallium	0.0755	0.500	ug/L		<0.500				20	
Selenium	0.292	0.500	ug/L		0.314			7.24	20	
Molybdenum	0.277	0.500	ug/L		0.195			34.9	20	M_D-RL
Chromium	0.783	0.500	ug/L		0.740			5.63	20	
Barium	77.7	0.500	ug/L		79.3			2.01	20	
Cadmium	<0.100	0.100	ug/L		<0.100				20	
Beryllium	0.144	0.500	ug/L		<0.500				20	
Cobalt	0.0541	0.500	ug/L		0.0444			19.6	20	
Arsenic	0.630	0.500	ug/L		0.585			7.34	20	

Duplicate (BDD0438-DUP2)				Source: MDD0177-05		Prepared: 04/23/2018 Analyzed: 04/24/2018				
Thallium	<0.500	0.500	ug/L		<0.500				20	
Molybdenum	0.417	0.500	ug/L		0.436			4.46	20	
Lead	0.257	0.500	ug/L		0.255			0.778	20	
Antimony	0.0547	0.500	ug/L		0.0338			47.2	20	M_D-RL
Chromium	4.71	0.500	ug/L		4.77			1.30	20	
Selenium	0.629	0.500	ug/L		0.679			7.65	20	
Arsenic	0.502	0.500	ug/L		0.497			0.876	20	
Barium	39.3	0.500	ug/L		39.0			0.688	20	
Beryllium	0.0229	0.500	ug/L		0.0254			10.1	20	
Cobalt	0.548	0.500	ug/L		0.640			15.5	20	
Cadmium	<0.100	0.100	ug/L		<0.100				20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
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Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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 BDD0438 - EPA 200.2, EPA 3005

Duplicate (BDD0438-DUP3)	Source: MDD0177-06			Prepared: 04/23/2018 Analyzed: 04/24/2018						
Chromium	3.86	0.500	ug/L		3.68			4.89	20	
Barium	46.7	0.500	ug/L		46.2			1.04	20	
Beryllium	<0.500	0.500	ug/L		0.00572				20	
Cadmium	<0.100	0.100	ug/L		<0.100				20	
Arsenic	0.396	0.500	ug/L		0.385			2.65	20	
Cobalt	0.214	0.500	ug/L		0.201			6.07	20	
Thallium	<0.500	0.500	ug/L		<0.500				20	
Molybdenum	0.379	0.500	ug/L		0.384			1.40	20	
Lead	0.0851	0.500	ug/L		0.0876			2.96	20	
Antimony	<0.500	0.500	ug/L		<0.500				20	
Selenium	0.842	0.500	ug/L		0.870			3.26	20	

Matrix Spike (BDD0438-MS1)	Source: MDD0177-04			Prepared: 04/23/2018 Analyzed: 04/24/2018						
Molybdenum	104	0.500	ug/L	100.00	0.195	104	70-130			
Chromium	106	0.500	ug/L	100.00	0.740	105	70-130			
Lead	97.5	0.500	ug/L	100.00	0.0324	97.4	70-130			
Cadmium	102	0.100	ug/L	100.00	<0.100	102	70-130			
Antimony	105	0.500	ug/L	100.00	<0.500	105	70-130			
Barium	185	0.500	ug/L	100.00	79.3	106	70-130			
Thallium	99.7	0.500	ug/L	100.00	<0.500	99.7	70-130			
Beryllium	105	0.500	ug/L	100.00	<0.500	105	70-130			
Selenium	99.9	0.500	ug/L	100.00	0.314	99.6	70-130			
Arsenic	105	0.500	ug/L	100.00	0.585	105	70-130			
Cobalt	103	0.500	ug/L	100.00	0.0444	103	70-130			

Matrix Spike (BDD0438-MS2)	Source: MDD0177-05			Prepared: 04/23/2018 Analyzed: 04/24/2018						
Cobalt	103	0.500	ug/L	100.00	0.640	102	70-130			
Lead	97.7	0.500	ug/L	100.00	0.255	97.5	70-130			
Thallium	100	0.500	ug/L	100.00	<0.500	100	70-130			
Cadmium	102	0.100	ug/L	100.00	<0.100	102	70-130			
Selenium	100	0.500	ug/L	100.00	0.679	99.8	70-130			
Beryllium	101	0.500	ug/L	100.00	0.0254	101	70-130			
Barium	145	0.500	ug/L	100.00	39.0	106	70-130			
Arsenic	103	0.500	ug/L	100.00	0.497	103	70-130			
Antimony	105	0.500	ug/L	100.00	0.0338	105	70-130			
Chromium	109	0.500	ug/L	100.00	4.77	104	70-130			
Molybdenum	102	0.500	ug/L	100.00	0.436	102	70-130			

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
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Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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 BDD0438 - EPA 200.2, EPA 3005

Matrix Spike (BDD0438-MS3)		Source: MDD0177-06		Prepared: 04/23/2018 Analyzed: 04/24/2018						
Cadmium	101	0.100	ug/L	100.00	<0.100	101	70-130			
Lead	93.2	0.500	ug/L	100.00	0.0876	93.1	70-130			
Thallium	96.4	0.500	ug/L	100.00	<0.500	96.4	70-130			
Cobalt	99.7	0.500	ug/L	100.00	0.201	99.5	70-130			
Beryllium	99.2	0.500	ug/L	100.00	0.00572	99.2	70-130			
Chromium	105	0.500	ug/L	100.00	3.68	102	70-130			
Molybdenum	101	0.500	ug/L	100.00	0.384	101	70-130			
Arsenic	103	0.500	ug/L	100.00	0.385	103	70-130			
Selenium	101	0.500	ug/L	100.00	0.870	99.7	70-130			
Antimony	101	0.500	ug/L	100.00	<0.500	101	70-130			
Barium	149	0.500	ug/L	100.00	46.2	103	70-130			

Matrix Spike Dup (BDD0438-MSD1)		Source: MDD0177-04		Prepared: 04/23/2018 Analyzed: 04/24/2018						
Lead	97.6	0.500	ug/L	100.00	0.0324	97.5	70-130	0.0785	20	
Antimony	104	0.500	ug/L	100.00	<0.500	104	70-130	0.695	20	
Selenium	99.0	0.500	ug/L	100.00	0.314	98.6	70-130	0.997	20	
Thallium	99.2	0.500	ug/L	100.00	<0.500	99.2	70-130	0.520	20	
Beryllium	102	0.500	ug/L	100.00	<0.500	102	70-130	2.70	20	
Chromium	103	0.500	ug/L	100.00	0.740	103	70-130	2.18	20	
Cadmium	101	0.100	ug/L	100.00	<0.100	101	70-130	1.18	20	
Cobalt	101	0.500	ug/L	100.00	0.0444	101	70-130	2.11	20	
Barium	184	0.500	ug/L	100.00	79.3	105	70-130	0.478	20	
Arsenic	106	0.500	ug/L	100.00	0.585	105	70-130	0.556	20	
Molybdenum	104	0.500	ug/L	100.00	0.195	104	70-130	0.518	20	

Matrix Spike Dup (BDD0438-MSD2)		Source: MDD0177-05		Prepared: 04/23/2018 Analyzed: 04/24/2018						
Beryllium	104	0.500	ug/L	100.00	0.0254	104	70-130	2.77	20	
Antimony	107	0.500	ug/L	100.00	0.0338	107	70-130	1.52	20	
Lead	101	0.500	ug/L	100.00	0.255	101	70-130	3.64	20	
Cadmium	100	0.100	ug/L	100.00	<0.100	100	70-130	1.42	20	
Selenium	101	0.500	ug/L	100.00	0.679	100	70-130	0.652	20	
Chromium	109	0.500	ug/L	100.00	4.77	104	70-130	0.238	20	
Arsenic	108	0.500	ug/L	100.00	0.497	107	70-130	3.89	20	
Thallium	103	0.500	ug/L	100.00	<0.500	103	70-130	2.75	20	
Barium	148	0.500	ug/L	100.00	39.0	109	70-130	2.08	20	
Cobalt	103	0.500	ug/L	100.00	0.640	103	70-130	0.377	20	
Molybdenum	106	0.500	ug/L	100.00	0.436	106	70-130	4.02	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
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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 BDD0438 - EPA 200.2, EPA 3005

Matrix Spike Dup (BDD0438-MSD3)	Source: MDD0177-06			Prepared: 04/23/2018 Analyzed: 04/24/2018						
Cadmium	104	0.100	ug/L	100.00	<0.100	104	70-130	2.72	20	
Selenium	101	0.500	ug/L	100.00	0.870	99.6	70-130	0.0309	20	
Chromium	109	0.500	ug/L	100.00	3.68	105	70-130	3.35	20	
Cobalt	103	0.500	ug/L	100.00	0.201	102	70-130	2.81	20	
Molybdenum	103	0.500	ug/L	100.00	0.384	103	70-130	1.87	20	
Barium	152	0.500	ug/L	100.00	46.2	106	70-130	2.08	20	
Antimony	104	0.500	ug/L	100.00	<0.500	104	70-130	2.83	20	
Thallium	98.1	0.500	ug/L	100.00	<0.500	98.1	70-130	1.72	20	
Lead	95.3	0.500	ug/L	100.00	0.0876	95.2	70-130	2.21	20	
Arsenic	106	0.500	ug/L	100.00	0.385	106	70-130	2.78	20	
Beryllium	102	0.500	ug/L	100.00	0.00572	102	70-130	3.07	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
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Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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 BDD0437 - EPA 200.2, EPA 3005

Blank (BDD0437-BLK1)				Prepared: 04/23/2018 Analyzed: 04/25/2018						
Lithium	<0.0500	0.0500	mg/L							
Boron	<0.0500	0.0500	mg/L							
Calcium	<0.500	0.500	mg/L							

Blank (BDD0437-BLK2)				Prepared: 04/23/2018 Analyzed: 04/25/2018						
Boron	<0.0500	0.0500	mg/L							
Lithium	<0.0500	0.0500	mg/L							
Calcium	<0.500	0.500	mg/L							

LCS (BDD0437-BS1)				Prepared: 04/23/2018 Analyzed: 04/25/2018						
Boron	1.01	0.0500	mg/L	1.0000		101	85-115			
Lithium	1.00	0.0500	mg/L	1.0000		100	85-115			
Calcium	104	0.500	mg/L	100.00		104	85-115			

LCS (BDD0437-BS2)				Prepared: 04/23/2018 Analyzed: 04/25/2018						
Calcium	101	0.500	mg/L	100.00		101	85-115			
Boron	0.976	0.0500	mg/L	1.0000		97.6	85-115			
Lithium	0.977	0.0500	mg/L	1.0000		97.7	85-115			

Duplicate (BDD0437-DUP1)				Source: MDD0177-01		Prepared: 04/23/2018 Analyzed: 04/25/2018				
Lithium	<0.0500	0.0500	mg/L		<0.0500				20	
Boron	0.170	0.0500	mg/L		0.168			1.16	20	
Calcium	98.5	0.500	mg/L		98.8			0.371	20	

Duplicate (BDD0437-DUP2)				Source: MDD0177-02		Prepared: 04/23/2018 Analyzed: 04/25/2018				
Lithium	<0.0500	0.0500	mg/L		<0.0500				20	
Boron	0.403	0.0500	mg/L		0.408			1.12	20	
Calcium	144	0.500	mg/L		145			0.827	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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 BDD0437 - EPA 200.2, EPA 3005

Duplicate (BDD0437-DUP3)	Source: MDD0177-03			Prepared: 04/23/2018 Analyzed: 04/25/2018						
Boron	0.0360	0.0500	mg/L		0.0381			5.53	20	
Lithium	<0.0500	0.0500	mg/L		<0.0500				20	
Calcium	76.5	0.500	mg/L		76.3			0.331	20	

Matrix Spike (BDD0437-MS1)	Source: MDD0177-01			Prepared: 04/23/2018 Analyzed: 04/25/2018						
Boron	1.20	0.0500	mg/L	1.0000	0.168	103	70-130			
Calcium	207	0.500	mg/L	100.00	98.8	109	70-130			
Lithium	1.01	0.0500	mg/L	1.0000	<0.0500	101	75-125			

Matrix Spike (BDD0437-MS2)	Source: MDD0177-02			Prepared: 04/23/2018 Analyzed: 04/25/2018						
Boron	1.44	0.0500	mg/L	1.0000	0.408	104	70-130			
Lithium	0.993	0.0500	mg/L	1.0000	<0.0500	99.3	75-125			
Calcium	254	0.500	mg/L	100.00	145	108	70-130			

Matrix Spike (BDD0437-MS3)	Source: MDD0177-03			Prepared: 04/23/2018 Analyzed: 04/25/2018						
Lithium	0.971	0.0500	mg/L	1.0000	<0.0500	97.1	75-125			
Boron	1.04	0.0500	mg/L	1.0000	0.0381	100	70-130			
Calcium	175	0.500	mg/L	100.00	76.3	99.2	70-130			

Matrix Spike Dup (BDD0437-MSD1)	Source: MDD0177-01			Prepared: 04/23/2018 Analyzed: 04/25/2018						
Boron	1.19	0.0500	mg/L	1.0000	0.168	103	70-130	0.624	20	
Calcium	204	0.500	mg/L	100.00	98.8	106	70-130	1.46	20	
Lithium	0.996	0.0500	mg/L	1.0000	<0.0500	99.6	75-125	1.10	20	

Matrix Spike Dup (BDD0437-MSD2)	Source: MDD0177-02			Prepared: 04/23/2018 Analyzed: 04/25/2018						
Lithium	0.967	0.0500	mg/L	1.0000	<0.0500	96.7	75-125	2.67	20	
Boron	1.43	0.0500	mg/L	1.0000	0.408	102	70-130	1.13	20	
Calcium	246	0.500	mg/L	100.00	145	100	70-130	3.22	20	

Christine Keefe, Supervisor (612) 630-4506

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	07/27/2018 13:03

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 BDD0437 - EPA 200.2, EPA 3005

Matrix Spike Dup (BDD0437-MSD3)	Source: MDD0177-03			Prepared: 04/23/2018 Analyzed: 04/25/2018						
Lithium	0.967	0.0500	mg/L	1.0000	<0.0500	96.7	75-125	0.427	20	
Boron	1.03	0.0500	mg/L	1.0000	0.0381	99.3	70-130	1.17	20	
Calcium	174	0.500	mg/L	100.00	76.3	98.2	70-130	0.558	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

Mercury - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BDE0115 - EPA 245.1, EPA 7470A

Blank (BDE0115-BLK1)				Prepared & Analyzed: 05/07/2018						
Mercury	<0.200	0.200	ug/L							
LCS (BDE0115-BS1)				Prepared & Analyzed: 05/07/2018						
Mercury	2.63	0.200	ug/L	3.0000		87.5	85-115			
Duplicate (BDE0115-DUP1)				Source: MDD0177-07		Prepared & Analyzed: 05/07/2018				
Mercury	<0.200	0.200	ug/L		<0.200				20	
Duplicate (BDE0115-DUP2)				Source: MDD0177-08		Prepared & Analyzed: 05/07/2018				
Mercury	<0.200	0.200	ug/L		<0.200				20	
Matrix Spike (BDE0115-MS1)				Source: MDD0177-07		Prepared & Analyzed: 05/07/2018				
Mercury	2.60	0.200	ug/L	3.0000	<0.200	86.5	70-130			
Matrix Spike (BDE0115-MS2)				Source: MDD0177-08		Prepared & Analyzed: 05/07/2018				
Mercury	2.50	0.200	ug/L	3.0000	<0.200	83.2	70-130			
Matrix Spike Dup (BDE0115-MSD1)				Source: MDD0177-07		Prepared & Analyzed: 05/07/2018				
Mercury	2.56	0.200	ug/L	3.0000	<0.200	85.4	70-130	1.24	20	
Matrix Spike Dup (BDE0115-MSD2)				Source: MDD0177-08		Prepared & Analyzed: 05/07/2018				
Mercury	2.60	0.200	ug/L	3.0000	<0.200	86.7	70-130	4.07	20	

Batch BDE0137 - EPA 245.1, EPA 7470A

Blank (BDE0137-BLK1)				Prepared & Analyzed: 05/08/2018						
Mercury	<0.200	0.200	ug/L							

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		07/27/2018 13:03
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

Mercury - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch BDE0137 - EPA 245.1, EPA 7470A

LCS (BDE0137-BS1)				Prepared & Analyzed: 05/08/2018						
Mercury	2.73	0.200	ug/L	3.0000		91.1	85-115			
LCS (BDE0137-BS2)				Prepared & Analyzed: 05/08/2018						
Mercury	2.62	0.200	ug/L	3.0000		87.3	85-115			
LCS (BDE0137-BS3)				Prepared & Analyzed: 05/08/2018						
Mercury	2.66	0.200	ug/L	3.0000		88.7	85-115			
LCS (BDE0137-BS4)				Prepared & Analyzed: 05/08/2018						
Mercury	2.75	0.200	ug/L	3.0000		91.8	85-115			
Duplicate (BDE0137-DUP1)				Source: MDD0184-06		Prepared & Analyzed: 05/08/2018				
Mercury	<0.200	0.200	ug/L		<0.200				20	
Duplicate (BDE0137-DUP2)				Source: MDD0227-03		Prepared & Analyzed: 05/08/2018				
Mercury	<0.200	0.200	ug/L		<0.200				20	
Matrix Spike (BDE0137-MS1)				Source: MDD0184-06		Prepared & Analyzed: 05/08/2018				
Mercury	2.76	0.200	ug/L	3.0000	<0.200	91.9	70-130			
Matrix Spike (BDE0137-MS2)				Source: MDD0227-03		Prepared & Analyzed: 05/08/2018				
Mercury	2.65	0.200	ug/L	3.0000	<0.200	88.3	70-130			
Matrix Spike Dup (BDE0137-MSD1)				Source: MDD0184-06		Prepared & Analyzed: 05/08/2018				
Mercury	2.64	0.200	ug/L	3.0000	<0.200	88.0	70-130	4.28	20	
Matrix Spike Dup (BDE0137-MSD2)				Source: MDD0227-03		Prepared & Analyzed: 05/08/2018				
Mercury	2.63	0.200	ug/L	3.0000	<0.200	87.6	70-130	0.781	20	

Environmental Services-Water Minneapolis
250 Marquette Plaza
Minneapolis MN, 55401

Project Name/Location: Sherco BAP CCR

Project Manager: Charles A Donkers

Reported:

07/27/2018 13:03

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.
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 Requested Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Xcel Energy	Report To:	chuck bankers	Attention:	Steve Davis
Address:	Environmental Services	Copy To:		Company Name:	
	MP-7			Address:	
Email To:		Purchase Order No.:		Pace Quote Reference:	
Phone:		Project Name:	Shelco cck April 2018	Pace Project Manager:	
Fax:		Project Number:		Pace Profile #:	
Requested Due Date/TAT:				REGULATORY AGENCY	
				☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER	
				Site Location STATE:	

[illegible]

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
Shercoll III well also, analyzed for GW-11st in the Spring.	David Anderson / DCEI	4/20/18	0925	David Anderson / DCEI	4/20/18	0630	Received on Ice (Y/N) ☒ Custody Sealed Cooler (Y/N) ☒ Samples Intact (Y/N) ☒ Temp in °C 41.2
Sherco NPDES well also, analyzed for GW-B 11st in the Spring. voted next to Item #	David Anderson / DCEI	4/20/18	0925	David Anderson / DCEI	4/20/18	0630	Received on Ice (Y/N) ☒ Custody Sealed Cooler (Y/N) ☒ Samples Intact (Y/N) ☒ Temp in °C 41.2

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.

Page: 2 of 2
 2201225

Section A Required Client Information:

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

Report To: Chuck Donkers
 Copy To: _____
 Purchase Order No.: _____
 Project Name: Sherco
 Project Number: April 2018

Section B 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: _____

ITEM #	Section D Required Client Information		Matrix Codes MATRIX / CODE		Matrix Codes DW WT WW P SL OL WP AR TS OT		MATRIX CODE (see valid codes to left)		SAMPLE TYPE (G=GRAB C=COMP)		COLLECTED				SAMPLE TEMP AT COLLECTION		# OF CONTAINERS		Preservatives								Analysis Test ↑		Y/N ↓	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
	SAMPLE ID (A-Z, 0-9 / -) Sample IDs MUST BE UNIQUE										COMPOSITE START		COMPOSITE END/GRAB						Unpreserved H ₂ SO ₄ HCl NaOH Na ₂ S ₂ O ₃ Methanol Other								↑				
1	P-1524						WT						4/18/18 0840		4		4		112								✓				
2	P-158												1000		4		4		112								✓				
3	P-157												1100		4		4		112								✓				
4	P-23												1230		4		4		112								✓				
5	Duplicate												1230		4		4		112								✓				
6	P-22												1340		4		4		112								✓				
7																															
8																															
9																															
10																															
11																															
12																															

ADDITIONAL COMMENTS: 1) Sherco 111 well also, analyzed for GW-A list in the spring.
2) Sherco NPDES well also, analyzed for GW-B list in the spring. Noted next to Item #.

RELINQUISHED BY / AFFILIATION: David Anderson / Pace DATE: 4/18/18 TIME: 1350
 ACCEPTED BY / AFFILIATION: David Anderson DATE: 4/18/18 TIME: 1350
 SAMPLE CONDITIONS: Received on: 4/18/18 Temp in °C: 4.2 Ice (Y/N): Y Sealed Cooler (Y/N): Y Custody (Y/N): Y Samples Intact (Y/N): Y

SAMPLER NAME AND SIGNATURE: David Anderson PRINT Name of SAMPLER: David Anderson SIGNATURE of SAMPLER: David Anderson DATE Signed (MM/DD/YY): 4/18/18

*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.

May 15, 2018

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

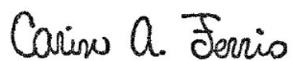
RE: Project: 18-00455,Xcel Energy
Pace Project No.: 30250570

Dear Dave Anderson:

Enclosed are the analytical results for sample(s) received by the laboratory on April 24, 2018. 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: Harry S. Davis III, Xcel Energy
Charles A. Donkers, 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: 18-00455,Xcel Energy

Pace Project No.: 30250570

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

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: 18-00455,Xcel Energy

Pace Project No.: 30250570

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30250570001	P-120	Water	04/02/18 12:35	04/24/18 10:30
30250570002	P-98	Water	04/02/18 13:40	04/24/18 10:30
30250570003	P-97	Water	04/02/18 14:50	04/24/18 10:30
30250570004	P-75-1	Water	04/02/18 15:35	04/24/18 10:30
30250570005	P-117	Water	04/02/18 16:50	04/24/18 10:30
30250570006	P-74-1	Water	04/02/18 17:40	04/24/18 10:30
30250570007	P-73a-1	Water	04/02/18 18:40	04/24/18 10:30
30250570008	P-125	Water	04/03/18 09:15	04/24/18 10:30
30250570009	P-162	Water	04/16/18 14:10	04/24/18 10:30
30250570010	P-163	Water	04/16/18 15:10	04/24/18 10:30
30250570011	P-164	Water	04/16/18 16:30	04/24/18 10:30
30250570012	P-131	Water	04/16/18 17:50	04/24/18 10:30
30250570013	P-165	Water	04/17/18 12:05	04/24/18 10:30
30250570014	P-132	Water	04/17/18 09:45	04/24/18 10:30
30250570015	P-154a	Water	04/17/18 11:00	04/24/18 10:30
30250570016	P-150	Water	04/17/18 13:15	04/24/18 10:30
30250570017	P-151	Water	04/17/18 15:00	04/24/18 10:30
30250570018	P-153	Water	04/17/18 15:50	04/24/18 10:30
30250570019	P-130	Water	04/17/18 17:00	04/24/18 10:30
30250570020	P-17	Water	04/17/18 18:20	04/24/18 10:30
30250570021	P-152a	Water	04/18/18 08:40	04/24/18 10:30
30250570022	P-158	Water	04/18/18 10:00	04/24/18 10:30
30250570023	P-157	Water	04/18/18 11:00	04/24/18 10:30
30250570024	P-23	Water	04/18/18 12:30	04/24/18 10:30
30250570025	P-22	Water	04/18/18 13:40	04/24/18 10:30
30250570026	P-156	Water	04/18/18 15:10	04/24/18 10:30
30250570027	P-01a-1	Water	04/18/18 16:40	04/24/18 10:30
30250570028	P-155	Water	04/18/18 17:40	04/24/18 10:30
30250570029	P-134	Water	04/19/18 10:15	04/24/18 10:30
30250570030	P-141	Water	04/19/18 11:10	04/24/18 10:30
30250570031	P-138A	Water	04/19/18 12:30	04/24/18 10:30
30250570032	P-137A	Water	04/19/18 14:25	04/24/18 10:30

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 18-00455,Xcel Energy

Pace Project No.: 30250570

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30250570001	P-120	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570002	P-98	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570003	P-97	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570004	P-75-1	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570005	P-117	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570006	P-74-1	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570007	P-73a-1	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570008	P-125	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570009	P-162	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570010	P-163	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570011	P-164	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570012	P-131	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570013	P-165	EPA 903.1	KAC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 18-00455,Xcel Energy

Pace Project No.: 30250570

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30250570014	P-132	EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
30250570015	P-154a	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570016	P-150	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
30250570017	P-151	EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
30250570018	P-153	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570019	P-130	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
30250570020	P-17	EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
30250570021	P-152a	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570022	P-158	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
30250570023	P-157	EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
30250570024	P-23	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30250570025	P-22	EPA 903.1	KAC	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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SAMPLE ANALYTE COUNT

Project: 18-00455,Xcel Energy

Pace Project No.: 30250570

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30250570026	P-156	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
30250570027	P-01a-1	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
30250570028	P-155	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
30250570029	P-134	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
30250570030	P-141	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
30250570031	P-138A	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
30250570032	P-137A	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA

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PROJECT NARRATIVE

Project: 18-00455,Xcel Energy

Pace Project No.: 30250570

Method: EPA 903.1

Description: 903.1 Radium 226

Client: Pace-MN Field Services Division

Date: May 15, 2018

General Information:

32 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: 18-00455,Xcel Energy

Pace Project No.: 30250570

Method: EPA 904.0

Description: 904.0 Radium 228

Client: Pace-MN Field Services Division

Date: May 15, 2018

General Information:

32 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: 18-00455,Xcel Energy

Pace Project No.: 30250570

Method: Total Radium Calculation

Description: Total Radium 228+226

Client: Pace-MN Field Services Division

Date: May 15, 2018

General Information:

32 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: 18-00455,Xcel Energy

Pace Project No.: 30250570

Sample: P-120 **Lab ID: 30250570001** Collected: 04/02/18 12:35 Received: 04/24/18 10:30 Matrix: Water

PWS: Site ID: Sample Type:

Comments: • Sample IDs were not present on the sample containers, collection dates and times match.

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.631 ± 0.544 (0.809) C:NA T:94%	pCi/L	05/08/18 19:59	13982-63-3	
Radium-228	EPA 904.0	0.719 ± 0.358 (0.617) C:77% T:90%	pCi/L	05/11/18 11:18	15262-20-1	
Total Radium	Total Radium Calculation	1.35 ± 0.902 (1.43)	pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-98 **Lab ID: 30250570002** Collected: 04/02/18 13:40 Received: 04/24/18 10:30 Matrix: Water

PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.059 ± 0.385 (0.836) C:NA T:88%	pCi/L	05/08/18 19:59	13982-63-3	
Radium-228	EPA 904.0	0.361 ± 0.341 (0.698) C:77% T:89%	pCi/L	05/11/18 14:25	15262-20-1	
Total Radium	Total Radium Calculation	0.361 ± 0.726 (1.53)	pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-97 **Lab ID: 30250570003** Collected: 04/02/18 14:50 Received: 04/24/18 10:30 Matrix: Water

PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.240 ± 0.276 (0.163) C:NA T:88%	pCi/L	05/08/18 19:59	13982-63-3	
Radium-228	EPA 904.0	0.0561 ± 0.293 (0.671) C:79% T:82%	pCi/L	05/11/18 14:25	15262-20-1	
Total Radium	Total Radium Calculation	0.296 ± 0.569 (0.834)	pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-75-1 **Lab ID: 30250570004** Collected: 04/02/18 15:35 Received: 04/24/18 10:30 Matrix: Water

PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.179 ± 0.311 (0.555) C:NA T:89%	pCi/L	05/08/18 19:59	13982-63-3	
Radium-228	EPA 904.0	-0.271 ± 0.237 (0.624) C:78% T:84%	pCi/L	05/11/18 14:26	15262-20-1	
Total Radium	Total Radium Calculation	0.179 ± 0.548 (1.18)	pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-117 **Lab ID: 30250570005** Collected: 04/02/18 16:50 Received: 04/24/18 10:30 Matrix: Water

PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.172 ± 0.297 (0.531) C:NA T:90%	pCi/L	05/08/18 19:59	13982-63-3	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-00455,Xcel Energy

Pace Project No.: 30250570

Sample: P-117		Lab ID: 30250570005	Collected: 04/02/18 16:50	Received: 04/24/18 10:30	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-228	EPA 904.0	0.291 ± 0.325 (0.679) C:75% T:84%		pCi/L	05/11/18 14:26	15262-20-1	
Total Radium	Total Radium Calculation	0.463 ± 0.622 (1.21)		pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-74-1		Lab ID: 30250570006	Collected: 04/02/18 17:40	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.310 ± 0.324 (0.875) C:NA T:83%	pCi/L	05/08/18 20:13	13982-63-3	
Radium-228	EPA 904.0	0.711 ± 0.352 (0.596) C:79% T:85%	pCi/L	05/11/18 14:26	15262-20-1	
Total Radium	Total Radium Calculation	0.711 ± 0.676 (1.47)	pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-73a-1		Lab ID: 30250570007	Collected: 04/02/18 18:40	Received: 04/24/18 10:30	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0551 ± 0.252 (0.512)		pCi/L	05/08/18 20:13	13982-63-3	
		C:NA T:93%					
Radium-228	EPA 904.0	0.369 ± 0.282 (0.546)		pCi/L	05/11/18 14:26	15262-20-1	
		C:80% T:89%					
Total Radium	Total Radium Calculation	0.424 ± 0.534 (1.06)		pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-125		Lab ID: 30250570008	Collected: 04/03/18 09:15	Received: 04/24/18 10:30	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 (0.155) C:NA T:94%	pCi/L	05/08/18 20:13	13982-63-3	
Radium-228	EPA 904.0	0.608 ± 0.377 (0.710) C:81% T:83%	pCi/L	05/11/18 11:57	15262-20-1	
Total Radium	Total Radium Calculation	0.665 ± 0.639 (0.865)	pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-162		Lab ID: 30250570009	Collected: 04/16/18 14:10	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.183 ± 0.279 (0.449) C:NA T:91%	pCi/L	05/08/18 20:13	13982-63-3	
Radium-228	EPA 904.0	0.379 ± 0.367 (0.757) C:82% T:85%	pCi/L	05/11/18 12:53	15262-20-1	
Total Radium	Total Radium Calculation	0.562 ± 0.646 (1.21)	pCi/L	05/15/18 10:42	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-00455,Xcel Energy
Pace Project No.: 30250570

Sample: P-163		Lab ID: 30250570010	Collected: 04/16/18 15:10	Received: 04/24/18 10:30	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.193 ± 0.294 (0.174) C:NA T:83%		pCi/L	05/08/18 20:13	13982-63-3	
Radium-228	EPA 904.0	0.348 ± 0.340 (0.700) C:82% T:83%		pCi/L	05/11/18 12:29	15262-20-1	
Total Radium	Total Radium Calculation	0.541 ± 0.634 (0.874)		pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-164		Lab ID: 30250570011	Collected: 04/16/18 16:30	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.554 ± 0.440 (0.572) C:NA T:85%	pCi/L	05/08/18 20:13	13982-63-3	
Radium-228	EPA 904.0	0.235 ± 0.349 (0.753) C:84% T:88%	pCi/L	05/11/18 13:30	15262-20-1	
Total Radium	Total Radium Calculation	0.789 ± 0.789 (1.33)	pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-131		Lab ID: 30250570012	Collected: 04/16/18 17:50	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.060 ± 0.312 (0.722) C:NA T:86%	pCi/L	05/08/18 20:27	13982-63-3	
Radium-228	EPA 904.0	0.807 ± 0.379 (0.650) C:83% T:89%	pCi/L	05/11/18 11:57	15262-20-1	
Total Radium	Total Radium Calculation	0.807 ± 0.691 (1.37)	pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-165		Lab ID: 30250570013	Collected: 04/17/18 12:05	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.105 ± 0.291 (0.564) C:NA T:96%	pCi/L	05/08/18 20:27	13982-63-3	
Radium-228	EPA 904.0	0.354 ± 0.372 (0.774) C:79% T:85%	pCi/L	05/11/18 12:29	15262-20-1	
Total Radium	Total Radium Calculation	0.459 ± 0.663 (1.34)	pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-132		Lab ID: 30250570014	Collected: 04/17/18 09:45	Received: 04/24/18 10:30	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.414 ± 0.388 (0.550) C:NA T:85%		pCi/L	05/08/18 20:27	13982-63-3	
Radium-228	EPA 904.0	0.291 ± 0.330 (0.694) C:81% T:91%		pCi/L	05/11/18 11:57	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-00455,Xcel Energy

Pace Project No.: 30250570

Sample: P-132		Lab ID: 30250570014	Collected: 04/17/18 09:45	Received: 04/24/18 10:30	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Total Radium	Total Radium Calculation	0.705 ± 0.718 (1.24)		pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-154a		Lab ID: 30250570015	Collected: 04/17/18 11:00	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.296 ± 0.350 (0.551) C:NA T:88%	pCi/L	05/08/18 20:27	13982-63-3	
Radium-228	EPA 904.0	0.682 ± 0.415 (0.777) C:82% T:81%	pCi/L	05/11/18 15:06	15262-20-1	
Total Radium	Total Radium Calculation	0.978 ± 0.765 (1.33)	pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-150		Lab ID: 30250570016	Collected: 04/17/18 13:15	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.166 ± 0.325 (0.594) C:NA T:91%	pCi/L	05/08/18 20:27	13982-63-3	
Radium-228	EPA 904.0	0.610 ± 0.456 (0.905) C:79% T:78%	pCi/L	05/11/18 15:07	15262-20-1	
Total Radium	Total Radium Calculation	0.776 ± 0.781 (1.50)	pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-151		Lab ID: 30250570017	Collected: 04/17/18 15:00	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.281 ± 0.332 (0.522) C:NA T:92%	pCi/L	05/08/18 20:27	13982-63-3	
Radium-228	EPA 904.0	0.165 ± 0.327 (0.720) C:83% T:87%	pCi/L	05/11/18 15:07	15262-20-1	
Total Radium	Total Radium Calculation	0.446 ± 0.659 (1.24)	pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-153		Lab ID: 30250570018	Collected: 04/17/18 15:50	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.375 ± 0.389 (0.580) C:NA T:87%	pCi/L	05/08/18 20:41	13982-63-3	
Radium-228	EPA 904.0	-0.166 ± 0.329 (0.796) C:81% T:85%	pCi/L	05/11/18 15:07	15262-20-1	
Total Radium	Total Radium Calculation	0.375 ± 0.718 (1.38)	pCi/L	05/15/18 10:42	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-00455,Xcel Energy
Pace Project No.: 30250570

Sample: P-130 **Lab ID: 30250570019** Collected: 04/17/18 17:00 Received: 04/24/18 10:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.238 ± 0.287 (0.438) C:NA T:93%	pCi/L	05/08/18 20:41	13982-63-3	
Radium-228	EPA 904.0	0.227 ± 0.373 (0.810) C:84% T:83%	pCi/L	05/11/18 15:07	15262-20-1	
Total Radium	Total Radium Calculation	0.465 ± 0.660 (1.25)	pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-17 **Lab ID: 30250570020** Collected: 04/17/18 18:20 Received: 04/24/18 10:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.168 ± 0.291 (0.521) C:NA T:88%	pCi/L	05/08/18 20:41	13982-63-3	
Radium-228	EPA 904.0	0.416 ± 0.369 (0.751) C:81% T:86%	pCi/L	05/11/18 15:07	15262-20-1	
Total Radium	Total Radium Calculation	0.584 ± 0.660 (1.27)	pCi/L	05/15/18 10:42	7440-14-4	

Sample: P-152a **Lab ID: 30250570021** Collected: 04/18/18 08:40 Received: 04/24/18 10:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.660 ± 0.490 (0.613) C:NA T:90%	pCi/L	05/08/18 20:56	13982-63-3	
Radium-228	EPA 904.0	0.797 ± 0.447 (0.840) C:84% T:86%	pCi/L	05/11/18 11:15	15262-20-1	
Total Radium	Total Radium Calculation	1.46 ± 0.937 (1.45)	pCi/L	05/15/18 10:56	7440-14-4	

Sample: P-158 **Lab ID: 30250570022** Collected: 04/18/18 10:00 Received: 04/24/18 10:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.244 ± 0.294 (0.449) C:NA T:90%	pCi/L	05/08/18 20:56	13982-63-3	
Radium-228	EPA 904.0	0.246 ± 0.319 (0.679) C:85% T:88%	pCi/L	05/11/18 11:15	15262-20-1	
Total Radium	Total Radium Calculation	0.490 ± 0.613 (1.13)	pCi/L	05/15/18 10:56	7440-14-4	

Sample: P-157 **Lab ID: 30250570023** Collected: 04/18/18 11:00 Received: 04/24/18 10:30 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.259 ± 0.313 (0.477) C:NA T:81%	pCi/L	05/08/18 20:56	13982-63-3	
Radium-228	EPA 904.0	0.471 ± 0.348 (0.679) C:80% T:82%	pCi/L	05/11/18 11:15	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-00455,Xcel Energy
Pace Project No.: 30250570

Sample: P-157		Lab ID: 30250570023	Collected: 04/18/18 11:00	Received: 04/24/18 10:30	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Total Radium	Total Radium Calculation	0.730 ± 0.661 (1.16)		pCi/L	05/15/18 10:56	7440-14-4	

Sample: P-23		Lab ID: 30250570024	Collected: 04/18/18 12:30	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.130 ± 0.296 (0.477) C:NA T:90%	pCi/L	05/08/18 20:56	13982-63-3	
Radium-228	EPA 904.0	0.264 ± 0.368 (0.789) C:80% T:82%	pCi/L	05/11/18 11:15	15262-20-1	
Total Radium	Total Radium Calculation	0.394 ± 0.664 (1.36)	pCi/L	05/15/18 10:56	7440-14-4	

Sample: P-22		Lab ID: 30250570025	Collected: 04/18/18 13:40	Received: 04/24/18 10:30	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 ± 0.442 (0.904) C:NA T:95%	pCi/L	05/08/18 20:56	13982-63-3	
Radium-228	EPA 904.0	0.00902 ± 0.328 (0.762) C:79% T:78%	pCi/L	05/11/18 11:16	15262-20-1	
Total Radium	Total Radium Calculation	0.00902 ± 0.770 (1.67)	pCi/L	05/15/18 10:56	7440-14-4	

Sample: P-156		Lab ID: 30250570026	Collected: 04/18/18 15:10	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.063 ± 0.410 (0.889) C:NA T:88%	pCi/L	05/08/18 20:56	13982-63-3	
Radium-228	EPA 904.0	-0.00613 ± 0.361 (0.836) C:81% T:79%	pCi/L	05/11/18 11:16	15262-20-1	
Total Radium	Total Radium Calculation	0.000 ± 0.771 (1.73)	pCi/L	05/15/18 10:56	7440-14-4	

Sample: P-01a-1		Lab ID: 30250570027	Collected: 04/18/18 16:40	Received: 04/24/18 10:30	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.130 ± 0.297 (0.479) C:NA T:86%		pCi/L	05/08/18 21:09	13982-63-3	
Radium-228	EPA 904.0	0.291 ± 0.350 (0.738) C:82% T:77%		pCi/L	05/11/18 11:16	15262-20-1	
Total Radium	Total Radium Calculation	0.421 ± 0.647 (1.22)		pCi/L	05/15/18 10:56	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-00455,Xcel Energy
Pace Project No.: 30250570

Sample: P-155		Lab ID: 30250570028	Collected: 04/18/18 17:40	Received: 04/24/18 10:30	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.321 ± 0.418 (0.690) C:NA T:92%		pCi/L	05/08/18 21:09	13982-63-3	
Radium-228	EPA 904.0	0.316 ± 0.393 (0.834) C:82% T:72%		pCi/L	05/11/18 11:16	15262-20-1	
Total Radium	Total Radium Calculation	0.637 ± 0.811 (1.52)		pCi/L	05/15/18 10:56	7440-14-4	

Sample: P-134		Lab ID: 30250570029	Collected: 04/19/18 10:15	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0711 ± 0.325 (0.523) C:NA T:81%	pCi/L	05/08/18 21:09	13982-63-3	
Radium-228	EPA 904.0	0.445 ± 0.323 (0.627) C:82% T:84%	pCi/L	05/11/18 11:16	15262-20-1	
Total Radium	Total Radium Calculation	0.516 ± 0.648 (1.15)	pCi/L	05/15/18 10:56	7440-14-4	

Sample: P-141		Lab ID: 30250570030	Collected: 04/19/18 11:10	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.260 ± 0.313 (0.478) C:NA T:83%	pCi/L	05/08/18 21:09	13982-63-3	
Radium-228	EPA 904.0	0.574 ± 0.377 (0.716) C:77% T:81%	pCi/L	05/11/18 11:16	15262-20-1	
Total Radium	Total Radium Calculation	0.834 ± 0.690 (1.19)	pCi/L	05/15/18 10:56	7440-14-4	

Sample: P-138A		Lab ID: 30250570031	Collected: 04/19/18 12:30	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.215 ± 0.329 (0.528) C:NA T:79%	pCi/L	05/08/18 21:09	13982-63-3	
Radium-228	EPA 904.0	0.262 ± 0.302 (0.633) C:79% T:88%	pCi/L	05/11/18 11:16	15262-20-1	
Total Radium	Total Radium Calculation	0.477 ± 0.631 (1.16)	pCi/L	05/15/18 10:56	7440-14-4	

Sample: P-137A		Lab ID: 30250570032	Collected: 04/19/18 14:25	Received: 04/24/18 10:30	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.264 ± 0.319 (0.486) C:NA T:86%	pCi/L	05/08/18 21:09	13982-63-3	
Radium-228	EPA 904.0	0.101 ± 0.309 (0.696) C:82% T:79%	pCi/L	05/11/18 11:17	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-00455,Xcel Energy

Pace Project No.: 30250570

Sample: P-137A		Lab ID: 30250570032	Collected: 04/19/18 14:25	Received: 04/24/18 10:30	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Total Radium	Total Radium Calculation	0.365 ± 0.628 (1.18)		pCi/L	05/15/18 10:56	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 18-00455,Xcel Energy

Pace Project No.: 30250570

QC Batch:	296005	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	30250570021, 30250570022, 30250570023, 30250570024, 30250570025, 30250570026, 30250570027, 30250570028, 30250570029, 30250570030, 30250570031, 30250570032		

METHOD BLANK:	1449102	Matrix:	Water
Associated Lab Samples:	30250570021, 30250570022, 30250570023, 30250570024, 30250570025, 30250570026, 30250570027, 30250570028, 30250570029, 30250570030, 30250570031, 30250570032		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.0211 ± 0.300 (0.695) C:85% T:77%	pCi/L	05/11/18 11:15	

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: 18-00455,Xcel Energy

Pace Project No.: 30250570

QC Batch:	295990	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
Associated Lab Samples:	30250570021, 30250570022, 30250570023, 30250570024, 30250570025, 30250570026, 30250570027, 30250570028, 30250570029, 30250570030, 30250570031, 30250570032		

METHOD BLANK:	1449069	Matrix:	Water
Associated Lab Samples:	30250570021, 30250570022, 30250570023, 30250570024, 30250570025, 30250570026, 30250570027, 30250570028, 30250570029, 30250570030, 30250570031, 30250570032		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.133 ± 0.303 (0.488) C:NA T:82%	pCi/L	05/08/18 20:41	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 18-00455,Xcel Energy

Pace Project No.: 30250570

QC Batch:	296004	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	30250570001, 30250570002, 30250570003, 30250570004, 30250570005, 30250570006, 30250570007, 30250570008, 30250570009, 30250570010, 30250570011, 30250570012, 30250570013, 30250570014, 30250570015, 30250570016, 30250570017, 30250570018, 30250570019, 30250570020		

METHOD BLANK:	1449100	Matrix:	Water
Associated Lab Samples:	30250570001, 30250570002, 30250570003, 30250570004, 30250570005, 30250570006, 30250570007, 30250570008, 30250570009, 30250570010, 30250570011, 30250570012, 30250570013, 30250570014, 30250570015, 30250570016, 30250570017, 30250570018, 30250570019, 30250570020		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.139 ± 0.351 (0.783) C:76% T:79%	pCi/L	05/11/18 11:18	

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: 18-00455,Xcel Energy

Pace Project No.: 30250570

QC Batch:	295989	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
Associated Lab Samples:	30250570001, 30250570002, 30250570003, 30250570004, 30250570005, 30250570006, 30250570007, 30250570008, 30250570009, 30250570010, 30250570011, 30250570012, 30250570013, 30250570014, 30250570015, 30250570016, 30250570017, 30250570018, 30250570019, 30250570020		

METHOD BLANK:	1449066	Matrix:	Water
Associated Lab Samples:	30250570001, 30250570002, 30250570003, 30250570004, 30250570005, 30250570006, 30250570007, 30250570008, 30250570009, 30250570010, 30250570011, 30250570012, 30250570013, 30250570014, 30250570015, 30250570016, 30250570017, 30250570018, 30250570019, 30250570020		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.288 ± 0.375 (0.619) C:NA T:88%	pCi/L	05/08/18 19:59	

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: 18-00455,Xcel Energy

Pace Project No.: 30250570

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.

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: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(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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Section A
Required Client Information:

Company: Xcel Energy
Address: 40 PaceMN 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: 18-00455, Xcel Energy -
Project Number: Shoreco CCR, April 2018

Attention: Eiera Ruikkie
Company Name: PaceMN Field Services
Address: _____
Pace Quote Reference: Tom Halverson
Pace Project Manager: Cathie Ferris
Pace Profile #: _____

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RORA ☐ 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			SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives								Y/N	Requested Analysis Filtered (Y/N)												Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
					DATE	TIME	DATE			TIME	COMPOSITE START	COMPOSITE END/GRAB	Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH		Na ₂ S ₂ O ₃	Methanol	Other	Analysis Test	RA-226EPA90.3	RA-228EPA90.4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					

ADDITIONAL COMMENTS
① client needs to analyze for: Radium 226 + 228 pCi/L
combined.
② combined.

RELINQUISHED BY / AFFILIATION David Anderson **DATE** 4/3/18

ACCEPTED BY / AFFILIATION David Anderson **DATE** 4/3/18

SAMPLE CONDITIONS
Received on _____
Sealed Cooler (Y/N) _____
Custody (Y/N) _____
Temp in °C _____

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: David Anderson
SIGNATURE of SAMPLER: David Anderson **DATE Signed** 4/3/18
(MM/DD/YYYY)

ORIGINAL
② RA-226 EPA 903.1
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.

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: <u>Xcel Energy</u>		Report To: <u>David Anderson</u>		Attention: <u>Clara Runkle</u>	
Address: <u>c/o Pace MNL Field</u>		Copy To:		Company Name: <u>Pace MNL Field Services</u>	
Email To:		Purchase Order No.:		Address:	
Phone:		Project Name: <u>18-00455, Xcel Energy -</u>		Pace Quote Reference: <u>Tom Halverson</u>	
Fax:		Project Number: <u>Shenandoah, April 2018</u>		Pace Project Manager: <u>Carla Fetris</u>	
Requested Due Date/TAT:				Pace Profile #:	

Section C
30 250 570

Section B
Invoice Information:

Section A
Required Client Information:

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

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE DW Water WT Waste Water WW Product P Soil/Solid SL Oil OL Wipe WP Air AR Tissue TS Other OT	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-162				WT								
2	P-163												
3	P-164												
4	P-131												
5	P-165												
6	P-132												
7	P-154												
8	P-150												
9	P-151												
10	P-153												
11	P-130												
12	P-17												

ADDITIONAL COMMENTS		DATE		TIME	
① client needs to analyze for:		4/20/18		1200	
Radium 226 + 228 pCi/L combined.					

SAMPLER NAME AND SIGNATURE		Temp in °C		Received on		Custody		Sealed Cooler		Samples Inlet	
PRINT Name of SAMPLER: <u>David Anderson</u>											
SIGNATURE of SAMPLER: <u>David Anderson</u>											
DATE Signed (MM/DD/YYYY): <u>4-17-18</u>											

CHAIN-OF-CUSTODY / Analytical Request Document

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

30 250 570

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: Xcel Energy		Report To: David Anderson		Attention: Clara Ruikkie	
Address: c/o Pace MN Field		Copy To:		Company Name: Pace MN Field Services	
Email To:		Purchase Order No.:		Address:	
Phone:		Project Name: 18-00455, Xcel Energy -		Pace Quote Reference: Tom Halverson	
Requested Due Date/TAT:		Policy Number: Shoreco CCR, April 2018		Pace Project Manager: Catin Feltis	

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	SAMPLE ID (A-Z, 0-9 / -)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Analysis Test	Requested Analysis Filtered (Y/N)		Residual Chlorine (Y/N)	Pace Project No. / Lab I.D.
					COMPOSITE START	COMPOSITE END/GRAB					Y	N		
1		DW	P-1524	WT			4/18/18 0846	2	Unpreserved	RA-226 EPA 903.1				021
2		WW	P-158				1000	2	H ₂ SO ₄	RA-228 EPA 904.0				022
3		P	P-157				1100	2	HCl					023
4		SL	P-23				1230	2	HNO ₃					024
5		OL	P-23				1340	2	NaOH					025
6		WP	P-156				1510	2	Na ₂ S ₂ O ₃					026
7		AR	P-014-1				1640	2	Other					027
8		TS	P-155				1740	2						028
9		OT	P-134				4/19/18 1015	2						029
10			P-141				1110	2						030
11			P-138A				1230	2						031
12			P-137A				1425	2						032

ADDITIONAL COMMENTS		RELINQUISHED BY / AFFILIATION		DATE		TIME		ACCEPTED BY / AFFILIATION		DATE		TIME		SAMPLE CONDITIONS	
① Client needs to analyze for:		David Anderson / Pace		4/20/18		1200		Yahel / Pace		4/20/18		1200		N	
Radium 226 + 228 pCi/L combined.															

Section E Required Client Information:		Section F Required Project Information:		Section G Invoice Information:	
Company: Xcel Energy		Report To: David Anderson		Attention: Clara Ruikkie	
Address: c/o Pace MN Field		Copy To:		Company Name: Pace MN Field Services	
Email To:		Purchase Order No.:		Address:	
Phone:		Project Name: 18-00455, Xcel Energy -		Pace Quote Reference: Tom Halverson	
Requested Due Date/TAT:		Policy Number: Shoreco CCR, April 2018		Pace Project Manager: Catin Feltis	

Pittsburgh Lab Sample Condition Upon Receipt

Face Analytical

Client Name: Xcel Energy

Project #

30250570

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other

Tracking #: 7475 9639 3415

Label <u>DS</u>
LIMS Login <u>BLM</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:	Yes	No	N/A	pH paper Lot# <u>10D3G71</u>	Date and Initials of person examining contents: <u>DS 4-24-18</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.	<u>sample 1 - one bottle no id or date but time matches</u>
-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:	☒	☐	☐	11.	
Orthophosphate field filtered	☐	☐	☒	12.	
Hex Cr Aqueous Compliance/NPDES 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.	<u>pH 6.2</u>
All containers needing preservation are found to be in compliance with EPA recommendation.	☒	☐	☐		
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed <u>DS</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 Aqueous Samples Screened > 0.5 mrem/hr	☒	☐	☐	Initial when completed: <u>DS</u>	Date: <u>4-24-18</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

Summer 2018 90-day Assessment Monitoring Resample Event Field Datasheets and Laboratory Reports

Well Description and Presampling Information

Client Xcel Energy Project Sherco BAP / Pond 3 Project No. 18-00929

Monitoring Point ID P-014-1 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) 77.40 Feet

Static water level measurement at time of sampling (Final Depth) 77.40 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 8-2-18 Water Column 3.58 Feet

Time Purged 1125-1137 One Casing Volume 0.6 Gallons

Pump Rate 0.15 GPM / LPM Volume Purged 1.8 Gallons

Field Sampling Data

Date Sampled 8-2-18

Time Sampled 1150

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.4 (units) D.O. 7.2 (mg/l)

Spec. Cond. 710 (µmhos/cm) Turbidity 3.4 (NTU)

Temp. 12.5 (°C) Eh 160 (mV)

Other NA

Field Measurements Temp. Corrected: ☒ Yes ☐ No ☐ NA

Sample for Soluble Metals Filtered in Field: ☐ Yes ☒ No ☐ NA

Weather Conditions During Sampling: 62° + cloudy, wind E10

Sample Description: clear + odorless

Observations: DJA 8/2/18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1129	7.5	710	12.5	7.4	NA	157	0.6
1133	7.4	710	12.5	7.3	NA	159	1.2
1137	7.4	710	12.5	7.2	NA	160	1.8
<u>DJA 8/2/18</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: 8/2/18

Well Description and Presampling Information

Client Xcel Energy Project Sherco BAP / Pond 3 Project No. 18-00929

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) 37.60 Feet

Static water level measurement at time of sampling (Final Depth) 37.60 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 7-31-18 Water Column 21.16 Feet

Time Purged 0710-0819 One Casing Volume 3.4 Gallons

Pump Rate 0.15 GPM / LPM Volume Purged 10.35 Gallons

Field Sampling Data

Date Sampled 7-31-18

Time Sampled 0840

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DTA

Field Parameter Measurements of Sample

pH 7.0 (units) D.O. 8.4 (mg/l)

Spec. Cond. 550 (µmhos/cm) Turbidity 3.9 (NTU)

Temp. 11.0 (°C) Eh 202 (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° + sunny, wind W 5

Sample Description: clear + odorless

Observations: DTA 7-31-18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
0733	7.0	550	11.0	9.5	NA	234	3.45
0756	7.0	550	11.0	9.4	NA	203	6.90
0819	7.0	550	11.0	8.4	NA	202	10.35
<u>DTA 7/31/18</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: 7/31/18

Well Description and Presampling Information

Client Xcel Energy Project Sherco BAP / Pond 3 CCR, Summer 2018 Project No. 18-00929

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) 39.40 Feet

Static water level measurement at time of sampling (Final Depth) 39.40 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 8-2-18 Water Column 18.45 Feet

Time Purged 0915-1000 One Casing Volume 3.0 Gallons

Pump Rate 0.2 **GPM / LPM** Volume Purged 9.0 Gallons

Field Sampling Data

Date Sampled 8-2-18

Time Sampled 1010

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.2 (units) D.O. 6.6 (mg/l)

Spec. Cond. 770 (µmhos/cm) Turbidity 1.9 (NTU)

Temp. 11.0 (°C) Eh 190 (mV)

Other NA

Field Measurements Temp. Corrected: ☒ Yes ☐ No ☐ NA

Sample for Soluble Metals Filtered in Field: ☐ Yes ☒ No ☐ NA

Weather Conditions During Sampling: 58° + cloudy, wind E10

Sample Description: clear + odorless

Observations: DJA 8/2/18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
0930	7.3	770	11.0	6.7	NA	197	3.0
0945	7.2	770	11.0	6.6	NA	193	6.0
1000	7.2	770	11.0	6.6	NA	190	9.0
<u>DJA 8/2/18</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: 8/2/18

Well Description and Presampling Information

Client Xcel Energy Project Sherco BAP / Pond 3 Project No. 18-00929

Monitoring Point ID P-23 Labeled P-23

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) 41.45 Feet

Static water level measurement at time of sampling (Final Depth) 41.45 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 8-2-18 Water Column 25.89 Feet

Time Purged 0750-0853 One Casing Volume 4.2 Gallons

Pump Rate 0.2 GPM / LPM Volume Purged 12.6 Gallons

Field Sampling Data

Date Sampled 8-2-18

Time Sampled 0900

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DTA

Field Parameter Measurements of Sample

pH 7.2 (units) D.O. 6.9 (mg/l)

Spec. Cond. 600 (µmhos/cm) Turbidity 1.5 (NTU)

Temp. 12.0 (°C) Eh 191 (mV)

Other NA

Field Measurements Temp. Corrected: ☒ Yes ☐ No ☐ NA

Sample for Soluble Metals Filtered in Field: ☐ Yes ☒ No ☐ NA

Weather Conditions During Sampling: 57° + cloudy, wind E10

Sample Description: clear + odorless

Observations: DTA 8-2-18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
0811	7.2	600	12.0	7.0	NA	198	4.2
0832	7.2	600	12.0	6.9	NA	195	8.4
0853	7.2	600	12.0	6.9	NA	191	12.6
<u>DTA 8/2/18</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: 8/2/18

Well Description and Presampling Information

Client Xcel Energy Project Sherco BAP / Pond 3 CCR, Summer 2018 Project No. 18-00929

Monitoring Point ID P-152d 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) 38.14 Feet

Static water level measurement at time of sampling (Final Depth) 38.14 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 8-1-18 Water Column 4.04 Feet

Time Purged 1600-1615 One Casing Volume 0.7 Gallons

Pump Rate 0.15 GPM / PM Volume Purged 2.25 Gallons

Field Sampling Data

Date Sampled 8-1-18

Time Sampled 1640

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DTA

Field Parameter Measurements of Sample

pH 7.4 (units) D.O. 8.6 (mg/l)

Spec. Cond. 380 (µmhos/cm) Turbidity 2.3 (NTU)

Temp. 12.0 (°C) Eh 181 (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° + cloudy, wind NW 10

Sample Description: clear + odorless

Observations: collected duplicate 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)
1605	7.5	380	12.0	8.6	NA	167	0.75
1610	7.4	380	12.0	8.6	NA	173	1.50
1615	7.4	380	12.0	8.6	NA	181	2.25
DTA 8-1-18							

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: 8-1-18

Well Description and Presampling Information

Client Xcel Energy Project Sherco BAP / Pond 3 CCR, Summer 2018 Project No. 18-00929

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) 77.56 Feet

Static water level measurement at time of sampling (Final Depth) 77.56 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 8-2-18 Water Column 7.91 Feet

Time Purged 1030 - 1057 One Casing Volume 1.3 Gallons

Pump Rate 0.15 GPM / LPM Volume Purged 4.05 Gallons

Field Sampling Data

Date Sampled 8-2-18

Time Sampled 1110

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DTA

Field Parameter Measurements of Sample

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

Spec. Cond. 760 (µmhos/cm) Turbidity 3.5 (NTU)

Temp. 12.5 (°C) Eh 130 (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° + cloudy, wind E 5-10

Sample Description: clear + odorless

Observations: DTA 8/2/18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1039	7.3	760	12.5	6.8	NA	123	1.35
1048	7.3	760	12.5	6.9	NA	126	2.70
1057	7.3	760	12.5	6.9	NA	130	4.05
<u>DTA 8/2/18</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: 8/2/18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Sherco BAP / Pond 3 Project No. 18-00929

Monitoring Point ID P-156 Labeled 8/2965

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) 76.73 Feet

Static water level measurement at time of sampling (Final Depth) 76.73 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 8-2-18 Water Column 8.80 Feet

Time Purged 1205-1226 One Casing Volume 1.4 Gallons

Pump Rate 0.2 GPM / LPM Volume Purged 4.2 Gallons

Field Sampling Data

Date Sampled 8-2-18

Time Sampled 1240

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DTA

Field Parameter Measurements of Sample

pH 7.4 (units) D.O. 7.2 (mg/l)

Spec. Cond. 420 (µmhos/cm) Turbidity 3.7 (NTU)

Temp. 13.0 (°C) Eh 163 (mV)

Other NA

Field Measurements Temp. Corrected: ☒ Yes ☐ No ☐ NA

Sample for Soluble Metals Filtered in Field: ☐ Yes ☒ No ☐ NA

Weather Conditions During Sampling: 64° + cloudy, wind E10

Sample Description: clear + odorless

Observations: DTA 8/2/18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1212	7.4	430	13.0	6.9	NA	168	1.4
1219	7.4	420	13.0	7.2	NA	165	2.8
1226	7.4	420	13.0	7.2	NA	163	4.2
<u>DTA 8/2/18</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: 8/2/18

Well Description and Presampling Information

Client Xcel Energy Project Sherco BAP / Pond 3 Project No. 18-00929

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) 42.13 Feet

Static water level measurement at time of sampling (Final Depth) 42.13 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 8-2-18 Water Column 6.93 Feet

Time Purged 0705-0729 One Casing Volume 1.1 Gallons

Pump Rate 0.15 GPM / 1 PM Volume Purged 3.6 Gallons

Field Sampling Data

Date Sampled 8-2-18

Time Sampled 0740

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DTA

Field Parameter Measurements of Sample

pH 7.0 (units) D.O. 6.5 (mg/l)

Spec. Cond. 670 (µmhos/cm) Turbidity 2.1 (NTU)

Temp. 11.0 (°C) Eh 214 (mV)

Other NA

Field Measurements Temp. Corrected: ☒ Yes ☐ No ☐ NA

Sample for Soluble Metals Filtered in Field: ☐ Yes ☒ No ☐ NA

Weather Conditions During Sampling: 57° + cloudy, wind E 10

Sample Description: clear + odorless

Observations: DTA 8/2/18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
0713	6.9	670	11.0	6.7	NA	224	1.2
0721	7.0	670	11.0	6.6	NA	220	2.4
0729	7.0	670	11.0	6.5	NA	214	3.6
<u>DTA 8/2/18</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: 8/2/18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Sherco BAP / Pond 3 Project No. 18-00929

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) 40.13 Feet

Static water level measurement at time of sampling (Final Depth) 40.03 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 8-1-18 Water Column 9.13 Feet

Time Purged 1745-1809 One Casing Volume 1.5 Gallons

Pump Rate 0.2 GPM / LPM Volume Purged 4.8 Gallons

Field Sampling Data

Date Sampled 8-1-18

Time Sampled 1820

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.2 (units) D.O. 9.0 (mg/l)

Spec. Cond. 550 (µmhos/cm) Turbidity 2.3 (NTU)

Temp. 11.0 (°C) 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: 67° + cloudy, wind NW 10

Sample Description: clear + odorless

Observations: DJA 8-1-18

Stabilization Test

Time	pH (Units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative, gal)
1753	7.3	540	11.0	9.0	NA	190	1.6
1801	7.2	550	11.0	9.0	NA	192	3.2
1809	7.2	550	11.0	9.0	NA	194	4.8
<u>NA 8-1-18</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: 8-1-18



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

29 August 2018
Charles A Donkers
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 08/01/2018 06:40-08/03/2018 09:43. 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	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Sample Qualifier	Laboratory ID	Matrix	Sampled	Received
P-17		MDH0009-01	Water	07/31/2018 8:40	08/01/2018 6:40
P-158		MDH0068-01	Water	08/01/2018 18:20	08/03/2018 9:43
P-157		MDH0068-02	Water	08/02/2018 7:40	08/03/2018 9:43
P-23		MDH0068-03	Water	08/02/2018 9:00	08/03/2018 9:43
P-22		MDH0068-04	Water	08/02/2018 10:10	08/03/2018 9:43
P-155		MDH0068-05	Water	08/02/2018 11:10	08/03/2018 9:43
P-01A-1		MDH0068-06	Water	08/02/2018 11:50	08/03/2018 9:43
P-156		MDH0068-07	Water	08/02/2018 12:40	08/03/2018 9:43
Rinse		MDH0071-01	Water	08/01/2018 11:10	08/03/2018 9:43
P-152A		MDH0071-05	Water	08/01/2018 16:40	08/03/2018 9:43
Duplicate		MDH0071-06	Water	08/01/2018 16:40	08/03/2018 9:43

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

P-17
MDH0009-01 (Water) - Chain of Custody Number: 2202851/2202850

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

Chloride	19.9	1.00	mg/L		1	BDH0056	8/2/18 7:57	8/2/18 18:01	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDH0056	8/2/18 7:57	8/2/18 18:01	EPA 300.0	CRL
Sulfate	26.7	1.00	mg/L		1	BDH0056	8/2/18 7:57	8/2/18 18:01	EPA 300.0	CRL

Wet Chemistry

pH	7.94		pH Units	M_TTT	1	BDH0014	8/1/18 9:37	8/1/18 13:10	SM 4500-H+ B	CRL
Total Dissolved Solids	290	20.0	mg/L		1	BDH0081	8/3/18 8:15	8/3/18 8:15	SM 2540C	CRL

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDH0029	8/1/18 12:26	8/2/18 9:59	EPA 200.8	CRL
Barium	41.9	0.500	ug/L		1	BDH0029	8/1/18 12:26	8/2/18 9:59	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDH0029	8/1/18 12:26	8/2/18 9:59	EPA 200.8	CRL
Chromium	1.07	0.500	ug/L		1	BDH0029	8/1/18 12:26	8/2/18 9:59	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDH0029	8/1/18 12:26	8/2/18 9:59	EPA 200.8	CRL
Selenium	< 0.500	0.500	ug/L		1	BDH0029	8/1/18 12:26	8/2/18 9:59	EPA 200.8	CRL

Total Metals by ICP

Boron	< 0.0500	0.0500	mg/L		1	BDH0028	8/1/18 12:23	8/6/18 13:52	EPA 200.7	HRD
Calcium	74.3	1.25	mg/L		1	BDH0028	8/1/18 12:23	8/6/18 13:50	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

P-158
MDH0068-01 (Water) - Chain of Custody Number: 2202849/2202848

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

Chloride	9.10	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 12:57	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 12:57	EPA 300.0	CRL
Sulfate	69.2	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 12:57	EPA 300.0	CRL

Wet Chemistry

pH	7.72		pH Units	M_TTT	1	BDH0105	8/3/18 10:36	8/3/18 12:00	SM 4500-H+ B	HRD
Total Dissolved Solids	342	20.0	mg/L		1	BDH0172	8/7/18 9:11	8/7/18 9:11	SM 2540C	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:23	EPA 200.8	CRL
Barium	53.9	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:23	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:23	EPA 200.8	CRL
Chromium	1.15	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:23	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:23	EPA 200.8	CRL
Selenium	1.26	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:23	EPA 200.8	CRL

Total Metals by ICP

Boron	0.363	0.0500	mg/L		1	BDH0213	8/7/18 12:22	8/13/18 13:36	EPA 200.7	HRD
Calcium	76.5	1.25	mg/L		1	BDH0213	8/7/18 12:22	8/13/18 13:35	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

P-157
MDH0068-02 (Water) - Chain of Custody Number: 2202849/2202848

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

Chloride	6.30	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 13:18	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 13:18	EPA 300.0	CRL
Sulfate	77.7	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 13:18	EPA 300.0	CRL

Wet Chemistry

pH	7.63		pH Units	M_TTT	1	BDH0105	8/3/18 10:36	8/3/18 12:04	SM 4500-H+ B	HRD
Total Dissolved Solids	414	20.0	mg/L		1	BDH0172	8/7/18 9:11	8/7/18 9:11	SM 2540C	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:27	EPA 200.8	CRL
Barium	45.4	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:27	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:27	EPA 200.8	CRL
Chromium	1.80	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:27	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:27	EPA 200.8	CRL
Selenium	2.37	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:27	EPA 200.8	CRL

Total Metals by ICP

Boron	0.237	0.0500	mg/L		1	BDH0213	8/7/18 12:22	8/13/18 13:42	EPA 200.7	HRD
Calcium	86.3	1.25	mg/L		1	BDH0213	8/7/18 12:22	8/13/18 13:40	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

P-23
MDH0068-03 (Water) - Chain of Custody Number: 2202849/2202848

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

Chloride	20.9	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 13:38	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 13:38	EPA 300.0	CRL
Sulfate	64.6	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 13:38	EPA 300.0	CRL

Wet Chemistry

pH	7.77		pH Units	M_TTT	1	BDH0105	8/3/18 10:36	8/3/18 12:08	SM 4500-H+ B	HRD
Total Dissolved Solids	364	20.0	mg/L		1	BDH0172	8/7/18 9:11	8/7/18 9:11	SM 2540C	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:31	EPA 200.8	CRL
Barium	51.4	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:31	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:31	EPA 200.8	CRL
Chromium	1.19	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:31	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:31	EPA 200.8	CRL
Selenium	0.784	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:31	EPA 200.8	CRL

Total Metals by ICP

Boron	0.245	0.0500	mg/L		1	BDH0213	8/7/18 12:22	8/13/18 13:47	EPA 200.7	HRD
Calcium	81.4	1.25	mg/L		1	BDH0213	8/7/18 12:22	8/13/18 13:45	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

P-22
MDH0068-04 (Water) - Chain of Custody Number: 2202849/2202848

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

Chloride	13.4	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 13:59	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 13:59	EPA 300.0	CRL
Sulfate	155	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 13:59	EPA 300.0	CRL

Wet Chemistry

pH	7.73		pH Units	M_TTT	1	BDH0105	8/3/18 10:36	8/3/18 12:11	SM 4500-H+ B	HRD
Total Dissolved Solids	518	20.0	mg/L		1	BDH0172	8/7/18 9:11	8/7/18 9:11	SM 2540C	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:35	EPA 200.8	CRL
Barium	61.1	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:35	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:35	EPA 200.8	CRL
Chromium	1.28	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:35	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:35	EPA 200.8	CRL
Selenium	6.76	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:35	EPA 200.8	CRL

Total Metals by ICP

Boron	1.43	0.0500	mg/L		1	BDH0213	8/7/18 12:22	8/13/18 13:51	EPA 200.7	HRD
Calcium	101	1.25	mg/L		1	BDH0213	8/7/18 12:22	8/13/18 13:50	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

P-155
MDH0068-05 (Water) - Chain of Custody Number: 2202849/2202848

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

Chloride	18.4	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 14:19	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 14:19	EPA 300.0	CRL
Sulfate	161	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 14:19	EPA 300.0	CRL

Wet Chemistry

pH	7.71		pH Units	M_TTT	1	BDH0105	8/3/18 10:36	8/3/18 12:15	SM 4500-H+ B	HRD
Total Dissolved Solids	524	20.0	mg/L		1	BDH0172	8/7/18 9:11	8/7/18 9:11	SM 2540C	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:39	EPA 200.8	CRL
Barium	58.6	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:39	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:39	EPA 200.8	CRL
Chromium	1.10	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:39	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:39	EPA 200.8	CRL
Selenium	3.79	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:39	EPA 200.8	CRL

Total Metals by ICP

Boron	1.38	0.0500	mg/L		1	BDH0213	8/7/18 12:22	8/13/18 13:56	EPA 200.7	HRD
Calcium	88.5	1.25	mg/L		1	BDH0213	8/7/18 12:22	8/13/18 13:55	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

P-01A-1

MDH0068-06 (Water) - Chain of Custody Number: 2202849/2202848

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

Chloride	11.1	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 14:39	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 14:39	EPA 300.0	CRL
Sulfate	84.4	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 14:39	EPA 300.0	CRL

Wet Chemistry

pH	7.67		pH Units	M_TTT	1	BDH0105	8/3/18 10:36	8/3/18 12:18	SM 4500-H+ B	HRD
Total Dissolved Solids	406	20.0	mg/L		1	BDH0172	8/7/18 9:11	8/7/18 9:11	SM 2540C	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:43	EPA 200.8	CRL
Barium	34.0	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:43	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:43	EPA 200.8	CRL
Chromium	1.21	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:43	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:43	EPA 200.8	CRL
Selenium	4.87	0.500	ug/L		1	BDH0214	8/7/18 12:25	8/13/18 10:43	EPA 200.8	CRL

Total Metals by ICP

Boron	0.570	0.0500	mg/L		1	BDH0213	8/7/18 12:22	8/13/18 14:01	EPA 200.7	HRD
Calcium	81.3	1.25	mg/L		1	BDH0213	8/7/18 12:22	8/13/18 14:00	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

P-156
MDH0068-07 (Water) - Chain of Custody Number: 2202849/2202848

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

Chloride	1.89	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 16:42	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 16:42	EPA 300.0	CRL
Sulfate	13.4	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 16:42	EPA 300.0	CRL

Wet Chemistry

pH	7.86		pH Units	M_TTT	1	BDH0105	8/3/18 10:36	8/3/18 12:22	SM 4500-H+ B	HRD
Total Dissolved Solids	258	20.0	mg/L		1	BDH0172	8/7/18 9:11	8/7/18 9:11	SM 2540C	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:26	EPA 200.8	CRL
Barium	45.8	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:26	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:26	EPA 200.8	CRL
Chromium	1.03	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:26	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:26	EPA 200.8	CRL
Selenium	1.00	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:26	EPA 200.8	CRL

Total Metals by ICP

Boron	0.152	0.0500	mg/L		1	BDH0228	8/8/18 12:05	8/9/18 8:42	EPA 200.7	HSD
Calcium	60.8	1.25	mg/L		1	BDH0228	8/8/18 12:05	8/9/18 8:40	EPA 200.7	HSD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

Rinse

MDH0071-01 (Water) - Chain of Custody Number: 2202848/2202849

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	BDH0353	8/13/18 9:33	8/14/18 17:02	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 17:02	EPA 300.0	CRL
Sulfate	< 1.00	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 17:02	EPA 300.0	CRL

Wet Chemistry

pH	6.31		pH Units	M_TTT	1	BDH0105	8/3/18 10:36	8/3/18 12:26	SM 4500-H+ B	HRD
Total Dissolved Solids	< 20.0	20.0	mg/L		1	BDH0172	8/7/18 9:11	8/7/18 9:11	SM 2540C	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:30	EPA 200.8	CRL
Barium	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:30	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:30	EPA 200.8	CRL
Chromium	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:30	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:30	EPA 200.8	CRL
Selenium	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:30	EPA 200.8	CRL

Total Metals by ICP

Boron	< 0.0500	0.0500	mg/L		1	BDH0228	8/8/18 12:05	8/9/18 8:48	EPA 200.7	HSD
Calcium	< 1.25	1.25	mg/L		1	BDH0228	8/8/18 12:05	8/9/18 8:46	EPA 200.7	HSD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

P-152A
MDH0071-05 (Water) - Chain of Custody Number: 2202848/2202849

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

Chloride	1.13	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 18:24	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 18:24	EPA 300.0	CRL
Sulfate	7.81	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 18:24	EPA 300.0	CRL

Wet Chemistry

pH	7.83		pH Units	M_TTT	1	BDH0105	8/3/18 10:36	8/3/18 12:40	SM 4500-H+ B	HRD
Total Dissolved Solids	218	20.0	mg/L		1	BDH0206	8/8/18 9:09	8/8/18 9:09	SM 2540C	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:53	EPA 200.8	CRL
Barium	35.3	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:53	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:53	EPA 200.8	CRL
Chromium	1.00	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:53	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:53	EPA 200.8	CRL
Selenium	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:53	EPA 200.8	CRL

Total Metals by ICP

Boron	0.0523	0.0500	mg/L		1	BDH0228	8/8/18 12:05	8/9/18 9:26	EPA 200.7	HSD
Calcium	57.8	1.25	mg/L		1	BDH0228	8/8/18 12:05	8/9/18 9:24	EPA 200.7	HSD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

Duplicate

MDH0071-06 (Water) - Chain of Custody Number: 2202848/2202849

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

Chloride	1.19	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 18:44	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 18:44	EPA 300.0	CRL
Sulfate	7.91	1.00	mg/L		1	BDH0353	8/13/18 9:33	8/14/18 18:44	EPA 300.0	CRL

Wet Chemistry

pH	7.83		pH Units	M_TTT	1	BDH0105	8/3/18 10:36	8/3/18 12:44	SM 4500-H+ B	HRD
Total Dissolved Solids	216	20.0	mg/L		1	BDH0206	8/8/18 9:09	8/8/18 9:09	SM 2540C	HSD

Total Metals by ICPMS

Arsenic	0.520	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:57	EPA 200.8	CRL
Barium	37.2	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:57	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:57	EPA 200.8	CRL
Chromium	0.982	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:57	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:57	EPA 200.8	CRL
Selenium	< 0.500	0.500	ug/L		1	BDH0229	8/8/18 12:10	8/13/18 11:57	EPA 200.8	CRL

Total Metals by ICP

Boron	0.0551	0.0500	mg/L		1	BDH0228	8/8/18 12:05	8/9/18 9:31	EPA 200.7	HSD
Calcium	58.5	1.25	mg/L		1	BDH0228	8/8/18 12:05	8/9/18 9:29	EPA 200.7	HSD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0056 - Wet Prep

Blank (BDH0056-BLK1)				Prepared & Analyzed: 08/02/2018						
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

Blank (BDH0056-BLK2)				Prepared & Analyzed: 08/02/2018						
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

LCS (BDH0056-BS1)				Prepared & Analyzed: 08/02/2018						
Chloride	24.2	1.00	mg/L	25.076		96.5	90-110			
Fluoride	2.50	0.750	mg/L	2.5076		99.5	90-110			
Sulfate	47.4	1.00	mg/L	48.144		98.4	90-110			

LCS (BDH0056-BS2)				Prepared & Analyzed: 08/02/2018						
Chloride	24.5	1.00	mg/L	25.076		97.7	90-110			
Fluoride	2.62	0.750	mg/L	2.5076		104	90-110			
Sulfate	47.7	1.00	mg/L	48.144		99.2	90-110			

LCS (BDH0056-BS3)				Prepared & Analyzed: 08/02/2018						
Chloride	24.5	1.00	mg/L	25.076		97.7	90-110			
Fluoride	2.51	0.750	mg/L	2.5076		100	90-110			
Sulfate	47.7	1.00	mg/L	48.144		99.1	90-110			

Duplicate (BDH0056-DUP1)				Source: MDH0008-11		Prepared & Analyzed: 08/02/2018				
Chloride	28.8	1.00	mg/L		28.9			0.194	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	13.5	1.00	mg/L		13.5			0.119	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	Reported:
250 Marquette Plaza		08/29/2018 07:50
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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 BDH0056 - Wet Prep

Duplicate (BDH0056-DUP2)	Source: MDH0008-16			Prepared & Analyzed: 08/02/2018						
Chloride	30.0	1.00	mg/L		30.0			0.150	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	26.7	1.00	mg/L		26.8			0.213	20	

Matrix Spike (BDH0056-MS1)	Source: MDH0008-11			Prepared & Analyzed: 08/02/2018						
Chloride	58.6	1.25	mg/L	31.345	28.9	95.0	80-120			
Fluoride	3.11	0.938	mg/L	3.1345	<0.938	99.2	80-120			
Sulfate	71.4	1.25	mg/L	60.180	13.5	96.2	80-120			

Matrix Spike (BDH0056-MS2)	Source: MDH0008-16			Prepared & Analyzed: 08/02/2018						
Chloride	60.1	1.25	mg/L	31.345	30.0	95.9	80-120			
Fluoride	3.20	0.938	mg/L	3.1345	<0.938	102	80-120			
Sulfate	85.7	1.25	mg/L	60.180	26.8	97.8	80-120			

Matrix Spike Dup (BDH0056-MSD1)	Source: MDH0008-11			Prepared & Analyzed: 08/02/2018						
Chloride	58.8	1.25	mg/L	31.345	28.9	95.5	80-120	0.294	20	
Fluoride	3.20	0.938	mg/L	3.1345	<0.938	102	80-120	2.81	20	
Sulfate	71.8	1.25	mg/L	60.180	13.5	97.0	80-120	0.670	20	

Matrix Spike Dup (BDH0056-MSD2)	Source: MDH0008-16			Prepared & Analyzed: 08/02/2018						
Chloride	60.3	1.25	mg/L	31.345	30.0	96.5	80-120	0.289	20	
Fluoride	3.28	0.938	mg/L	3.1345	<0.938	105	80-120	2.43	20	
Sulfate	86.0	1.25	mg/L	60.180	26.8	98.3	80-120	0.355	20	

Batch BDH0353 - Wet Prep

Blank (BDH0353-BLK1)	Prepared: 08/13/2018 Analyzed: 08/14/2018									
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	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0353 - Wet Prep

Blank (BDH0353-BLK2)				Prepared: 08/13/2018 Analyzed: 08/14/2018						
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

LCS (BDH0353-BS1)				Prepared: 08/13/2018 Analyzed: 08/14/2018						
Chloride	23.9	1.00	mg/L	25.076		95.1	90-110			
Fluoride	2.55	0.750	mg/L	2.5076		102	90-110			
Sulfate	46.3	1.00	mg/L	48.144		96.2	90-110			

LCS (BDH0353-BS2)				Prepared: 08/13/2018 Analyzed: 08/14/2018						
Chloride	23.9	1.00	mg/L	25.076		95.2	90-110			
Fluoride	2.56	0.750	mg/L	2.5076		102	90-110			
Sulfate	46.3	1.00	mg/L	48.144		96.1	90-110			

LCS (BDH0353-BS3)				Prepared: 08/13/2018 Analyzed: 08/14/2018						
Chloride	24.0	1.00	mg/L	25.076		95.9	90-110			
Fluoride	2.57	0.750	mg/L	2.5076		102	90-110			
Sulfate	46.6	1.00	mg/L	48.144		96.8	90-110			

Duplicate (BDH0353-DUP1)				Source: MDH0068-07		Prepared: 08/13/2018 Analyzed: 08/14/2018				
Chloride	1.88	1.00	mg/L		1.89			0.636	20	
Fluoride	0.121	0.750	mg/L		0.121			0.00	20	
Sulfate	13.4	1.00	mg/L		13.4			0.523	20	

Duplicate (BDH0353-DUP2)				Source: MDH0071-05		Prepared: 08/13/2018 Analyzed: 08/14/2018				
Chloride	1.16	1.00	mg/L		1.13			2.27	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	7.84	1.00	mg/L		7.81			0.332	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 BDH0353 - Wet Prep

Matrix Spike (BDH0353-MS1)	Source: MDH0068-07			Prepared: 08/13/2018 Analyzed: 08/14/2018						
Chloride	31.2	1.25	mg/L	31.345	1.89	93.4	80-120			
Fluoride	3.18	0.938	mg/L	3.1345	<0.938	101	80-120			
Sulfate	70.9	1.25	mg/L	60.180	13.4	95.5	80-120			

Matrix Spike (BDH0353-MS2)	Source: MDH0071-05			Prepared: 08/13/2018 Analyzed: 08/14/2018						
Chloride	30.1	1.25	mg/L	31.345	1.13	92.4	80-120			
Fluoride	3.13	0.938	mg/L	3.1345	<0.938	100	80-120			
Sulfate	64.8	1.25	mg/L	60.180	7.81	94.7	80-120			

Matrix Spike Dup (BDH0353-MSD1)	Source: MDH0068-07			Prepared: 08/13/2018 Analyzed: 08/14/2018						
Chloride	31.1	1.25	mg/L	31.345	1.89	93.1	80-120	0.265	20	
Fluoride	3.23	0.938	mg/L	3.1345	<0.938	103	80-120	1.83	20	
Sulfate	70.7	1.25	mg/L	60.180	13.4	95.3	80-120	0.212	20	

Matrix Spike Dup (BDH0353-MSD2)	Source: MDH0071-05			Prepared: 08/13/2018 Analyzed: 08/14/2018						
Chloride	30.9	1.25	mg/L	31.345	1.13	95.0	80-120	2.70	20	
Fluoride	3.28	0.938	mg/L	3.1345	<0.938	105	80-120	4.52	20	
Sulfate	66.4	1.25	mg/L	60.180	7.81	97.3	80-120	2.38	20	

Batch BDH0427 - Wet Prep

Blank (BDH0427-BLK1)	Prepared & Analyzed: 08/15/2018									
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

Blank (BDH0427-BLK2)	Prepared & Analyzed: 08/15/2018									
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	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0427 - Wet Prep

LCS (BDH0427-BS1)				Prepared & Analyzed: 08/15/2018						
Chloride	24.1	1.00	mg/L	25.076		96.1	90-110			
Fluoride	2.45	0.750	mg/L	2.5076		97.5	90-110			
Sulfate	46.6	1.00	mg/L	48.144		96.8	90-110			

LCS (BDH0427-BS2)				Prepared & Analyzed: 08/15/2018						
Chloride	24.4	1.00	mg/L	25.076		97.5	90-110			
Fluoride	2.49	0.750	mg/L	2.5076		99.5	90-110			
Sulfate	47.2	1.00	mg/L	48.144		98.0	90-110			

LCS (BDH0427-BS3)				Prepared & Analyzed: 08/15/2018						
Chloride	24.5	1.00	mg/L	25.076		97.6	90-110			
Fluoride	2.49	0.750	mg/L	2.5076		99.3	90-110			
Sulfate	47.2	1.00	mg/L	48.144		98.1	90-110			

Duplicate (BDH0427-DUP1)				Source: MDH0071-11		Prepared & Analyzed: 08/15/2018				
Chloride	4.88	1.00	mg/L		4.88			0.0205	20	
Fluoride	0.179	0.750	mg/L		0.179			0.00	20	
Sulfate	26.6	1.00	mg/L		26.6			0.218	20	

Duplicate (BDH0427-DUP2)				Source: MDH0071-13		Prepared & Analyzed: 08/15/2018				
Chloride	0.490	1.00	mg/L		0.484			1.23	20	
Fluoride	0.160	0.750	mg/L		0.160			0.00	20	
Sulfate	3.63	1.00	mg/L		3.59			1.22	20	

Matrix Spike (BDH0427-MS1)				Source: MDH0071-11		Prepared & Analyzed: 08/15/2018				
Chloride	34.5	1.25	mg/L	31.345	4.88	94.4	80-120			
Fluoride	3.30	0.938	mg/L	3.1345	0.179	99.4	80-120			
Sulfate	84.6	1.25	mg/L	60.180	26.6	96.4	80-120			

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
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Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0427 - Wet Prep

Matrix Spike (BDH0427-MS2)	Source: MDH0071-13			Prepared & Analyzed: 08/15/2018						
Chloride	30.5	1.25	mg/L	31.345	0.484	95.9	80-120			
Fluoride	3.39	0.938	mg/L	3.1345	0.160	103	80-120			
Sulfate	62.6	1.25	mg/L	60.180	3.59	98.1	80-120			

Matrix Spike Dup (BDH0427-MSD1)	Source: MDH0071-11			Prepared & Analyzed: 08/15/2018						
Chloride	34.7	1.25	mg/L	31.345	4.88	95.1	80-120	0.582	20	
Fluoride	3.19	0.938	mg/L	3.1345	0.179	96.1	80-120	3.16	20	
Sulfate	84.5	1.25	mg/L	60.180	26.6	96.3	80-120	0.117	20	

Matrix Spike Dup (BDH0427-MSD2)	Source: MDH0071-13			Prepared & Analyzed: 08/15/2018						
Chloride	30.4	1.25	mg/L	31.345	0.484	95.4	80-120	0.451	20	
Fluoride	3.26	0.938	mg/L	3.1345	0.160	98.9	80-120	3.84	20	
Sulfate	62.2	1.25	mg/L	60.180	3.59	97.3	80-120	0.729	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0014 - Wet Prep

LCS (BDH0014-BS1)		Prepared & Analyzed: 08/01/2018								
pH	7.06		pH Units	7.0000		101	90-110			
LCS (BDH0014-BS2)		Prepared & Analyzed: 08/01/2018								
pH	7.11		pH Units	7.0000		102	90-110			
Duplicate (BDH0014-DUP1)		Source: MDH0008-02		Prepared & Analyzed: 08/01/2018						
pH	7.47		pH Units		7.50			0.401	20	
Duplicate (BDH0014-DUP2)		Source: MDH0008-11		Prepared & Analyzed: 08/01/2018						
pH	7.90		pH Units		7.90			0.00	20	
Duplicate (BDH0014-DUP3)		Source: MDH0009-01		Prepared & Analyzed: 08/01/2018						
pH	7.94		pH Units		7.94			0.00	20	

Batch BDH0081 - Wet Prep

Blank (BDH0081-BLK1)		Prepared & Analyzed: 08/03/2018								
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BDH0081-DUP1)		Source: MDH0008-11		Prepared & Analyzed: 08/03/2018						
Total Dissolved Solids	262	20.0	mg/L		272			3.75	20	
Duplicate (BDH0081-DUP2)		Source: MDH0010-01		Prepared & Analyzed: 08/03/2018						
Total Dissolved Solids	272	20.0	mg/L		288			5.71	20	

Batch BDH0105 - Wet Prep

LCS (BDH0105-BS1)		Prepared & Analyzed: 08/03/2018								
pH	7.09		pH Units	7.0000		101	90-110			

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
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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 BDH0105 - Wet Prep

LCS (BDH0105-BS2)				Prepared & Analyzed: 08/03/2018						
pH	7.08		pH Units	7.0000		101	90-110			
Duplicate (BDH0105-DUP1)				Source: MDH0064-01		Prepared & Analyzed: 08/03/2018				
pH	7.66		pH Units		7.70			0.521	20	
Duplicate (BDH0105-DUP2)				Source: MDH0071-07		Prepared & Analyzed: 08/03/2018				
pH	7.46		pH Units		7.46			0.00	20	
Duplicate (BDH0105-DUP3)				Source: MDH0071-10		Prepared & Analyzed: 08/03/2018				
pH	8.01		pH Units		8.00			0.125	20	

Batch BDH0172 - Wet Prep

Blank (BDH0172-BLK1)				Prepared & Analyzed: 08/07/2018						
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BDH0172-DUP1)				Source: MDH0064-01		Prepared & Analyzed: 08/07/2018				
Total Dissolved Solids	360	20.0	mg/L		302			17.5	20	
Duplicate (BDH0172-DUP2)				Source: MDH0064-02		Prepared & Analyzed: 08/07/2018				
Total Dissolved Solids	322	20.0	mg/L		322			0.00	20	

Batch BDH0206 - Wet Prep

Blank (BDH0206-BLK1)				Prepared & Analyzed: 08/08/2018						
Total Dissolved Solids	<20.0	20.0	mg/L							

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
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Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0206 - Wet Prep

Duplicate (BDH0206-DUP1)	Source: MDH0071-02		Prepared & Analyzed: 08/08/2018							
Total Dissolved Solids	204	20.0	mg/L		198			2.99	20	
Duplicate (BDH0206-DUP2)	Source: MDH0071-03		Prepared & Analyzed: 08/08/2018							
Total Dissolved Solids	236	20.0	mg/L		244			3.33	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
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Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0029 - EPA 200.2, EPA 3005

Blank (BDH0029-BLK1)

Prepared: 08/01/2018 Analyzed: 08/02/2018

Arsenic	<0.500	0.500	ug/L							
Molybdenum	<0.500	0.500	ug/L							
Cobalt	<0.500	0.500	ug/L							
Chromium	<0.500	0.500	ug/L							
Selenium	<0.500	0.500	ug/L							
Barium	<0.500	0.500	ug/L							

LCS (BDH0029-BS1)

Prepared: 08/01/2018 Analyzed: 08/02/2018

Cobalt	95.6	0.500	ug/L	100.00		95.6	85-115			
Chromium	98.9	0.500	ug/L	100.00		98.9	85-115			
Barium	98.2	0.500	ug/L	100.00		98.2	85-115			
Arsenic	97.4	0.500	ug/L	100.00		97.4	85-115			
Molybdenum	102	0.500	ug/L	100.00		102	85-115			
Selenium	100	0.500	ug/L	100.00		100	85-115			

Duplicate (BDH0029-DUP1)

Source: MDG0361-02

Prepared: 08/01/2018 Analyzed: 08/02/2018

Barium	44.2	0.500	ug/L		44.7			1.19	20	
Selenium	0.188	0.500	ug/L		0.229			19.8	20	
Chromium	0.701	0.500	ug/L		0.692			1.24	20	
Arsenic	1.92	0.500	ug/L		2.07			7.50	20	
Molybdenum	0.605	0.500	ug/L		0.562			7.25	20	
Cobalt	0.231	0.500	ug/L		0.207			10.7	20	

Duplicate (BDH0029-DUP2)

Source: MDG0361-03

Prepared: 08/01/2018 Analyzed: 08/02/2018

Selenium	0.201	0.500	ug/L		0.182			9.86	20	
Chromium	0.623	0.500	ug/L		0.677			8.30	20	
Barium	44.7	0.500	ug/L		45.6			1.97	20	
Cobalt	0.193	0.500	ug/L		0.199			3.27	20	
Molybdenum	0.574	0.500	ug/L		0.558			2.81	20	
Arsenic	2.04	0.500	ug/L		2.02			0.819	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0029 - EPA 200.2, EPA 3005

Matrix Spike (BDH0029-MS1)		Source: MDG0361-02		Prepared: 08/01/2018 Analyzed: 08/02/2018						
Barium	146	0.500	ug/L	100.00	44.7	101	70-130			
Molybdenum	100	0.500	ug/L	100.00	0.562	99.8	70-130			
Chromium	105	0.500	ug/L	100.00	0.692	105	70-130			
Selenium	101	0.500	ug/L	100.00	0.229	100	70-130			
Arsenic	101	0.500	ug/L	100.00	2.07	98.6	70-130			
Cobalt	101	0.500	ug/L	100.00	0.207	101	70-130			
Matrix Spike (BDH0029-MS2)		Source: MDG0361-03		Prepared: 08/01/2018 Analyzed: 08/02/2018						
Arsenic	102	0.500	ug/L	100.00	2.02	100	70-130			
Molybdenum	103	0.500	ug/L	100.00	0.558	102	70-130			
Selenium	102	0.500	ug/L	100.00	0.182	101	70-130			
Cobalt	100	0.500	ug/L	100.00	0.199	99.8	70-130			
Barium	148	0.500	ug/L	100.00	45.6	102	70-130			
Chromium	102	0.500	ug/L	100.00	0.677	101	70-130			
Matrix Spike Dup (BDH0029-MSD1)		Source: MDG0361-02		Prepared: 08/01/2018 Analyzed: 08/02/2018						
Selenium	101	0.500	ug/L	100.00	0.229	101	70-130	0.744	20	
Cobalt	101	0.500	ug/L	100.00	0.207	101	70-130	0.110	20	
Chromium	103	0.500	ug/L	100.00	0.692	102	70-130	2.02	20	
Molybdenum	101	0.500	ug/L	100.00	0.562	101	70-130	0.883	20	
Barium	149	0.500	ug/L	100.00	44.7	104	70-130	1.87	20	
Arsenic	103	0.500	ug/L	100.00	2.07	101	70-130	2.32	20	
Matrix Spike Dup (BDH0029-MSD2)		Source: MDG0361-03		Prepared: 08/01/2018 Analyzed: 08/02/2018						
Chromium	104	0.500	ug/L	100.00	0.677	103	70-130	1.71	20	
Molybdenum	102	0.500	ug/L	100.00	0.558	102	70-130	0.335	20	
Selenium	103	0.500	ug/L	100.00	0.182	103	70-130	1.55	20	
Arsenic	105	0.500	ug/L	100.00	2.02	103	70-130	3.23	20	
Cobalt	102	0.500	ug/L	100.00	0.199	102	70-130	1.83	20	
Barium	149	0.500	ug/L	100.00	45.6	103	70-130	0.452	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0214 - EPA 200.2, EPA 3005

Blank (BDH0214-BLK1)

Prepared: 08/07/2018 Analyzed: 08/13/2018

Chromium	<0.500	0.500	ug/L							
Molybdenum	<0.500	0.500	ug/L							
Selenium	<0.500	0.500	ug/L							
Arsenic	<0.500	0.500	ug/L							
Cobalt	<0.500	0.500	ug/L							
Barium	<0.500	0.500	ug/L							

LCS (BDH0214-BS1)

Prepared: 08/07/2018 Analyzed: 08/13/2018

Molybdenum	96.4	0.500	ug/L	100.00		96.4	85-115			
Selenium	97.6	0.500	ug/L	100.00		97.6	85-115			
Cobalt	99.5	0.500	ug/L	100.00		99.5	85-115			
Arsenic	96.2	0.500	ug/L	100.00		96.2	85-115			
Chromium	102	0.500	ug/L	100.00		102	85-115			
Barium	93.7	0.500	ug/L	100.00		93.7	85-115			

Duplicate (BDH0214-DUP1)

Source: MDH0008-07

Prepared: 08/07/2018 Analyzed: 08/13/2018

Barium	86.4	0.500	ug/L		82.5			4.60	20	
Selenium	0.486	0.500	ug/L		0.516			6.03	20	
Molybdenum	0.217	0.500	ug/L						20	M_D-RL
Arsenic	0.706	0.500	ug/L		0.656			7.38	20	
Chromium	1.41	0.500	ug/L		1.39			1.44	20	
Cobalt	0.575	0.500	ug/L		0.596			3.56	20	

Duplicate (BDH0214-DUP2)

Source: MDH0008-08

Prepared: 08/07/2018 Analyzed: 08/13/2018

Arsenic	0.785	0.500	ug/L		0.836			6.27	20	
Cobalt	0.333	0.500	ug/L		0.325			2.51	20	
Barium	91.3	0.500	ug/L		88.9			2.75	20	
Selenium	0.425	0.500	ug/L		0.460			8.07	20	
Molybdenum	0.142	0.500	ug/L						20	
Chromium	0.721	0.500	ug/L		0.682			5.45	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0214 - EPA 200.2, EPA 3005

Matrix Spike (BDH0214-MS1)		Source: MDH0008-07		Prepared: 08/07/2018 Analyzed: 08/13/2018						
Selenium	99.4	0.500	ug/L	100.00	0.516	98.9	70-130			
Molybdenum	96.6	0.500	ug/L	100.00		96.6	70-130			
Chromium	105	0.500	ug/L	100.00	1.39	104	70-130			
Arsenic	102	0.500	ug/L	100.00	0.656	101	70-130			
Barium	179	0.500	ug/L	100.00	82.5	97.0	70-130			
Cobalt	99.7	0.500	ug/L	100.00	0.596	99.1	70-130			

Matrix Spike (BDH0214-MS2)		Source: MDH0008-08		Prepared: 08/07/2018 Analyzed: 08/13/2018						
Barium	188	0.500	ug/L	100.00	88.9	99.6	70-130			
Chromium	102	0.500	ug/L	100.00	0.682	101	70-130			
Cobalt	96.3	0.500	ug/L	100.00	0.325	96.0	70-130			
Molybdenum	101	0.500	ug/L	100.00		101	70-130			
Selenium	98.2	0.500	ug/L	100.00	0.460	97.7	70-130			
Arsenic	106	0.500	ug/L	100.00	0.836	105	70-130			

Matrix Spike Dup (BDH0214-MSD1)		Source: MDH0008-07		Prepared: 08/07/2018 Analyzed: 08/13/2018						
Selenium	101	0.500	ug/L	100.00	0.516	101	70-130	1.65	20	
Barium	183	0.500	ug/L	100.00	82.5	101	70-130	2.19	20	
Molybdenum	98.0	0.500	ug/L	100.00		98.0	70-130	1.52	20	
Cobalt	99.8	0.500	ug/L	100.00	0.596	99.2	70-130	0.109	20	
Arsenic	102	0.500	ug/L	100.00	0.656	102	70-130	0.365	20	
Chromium	103	0.500	ug/L	100.00	1.39	101	70-130	2.50	20	

Matrix Spike Dup (BDH0214-MSD2)		Source: MDH0008-08		Prepared: 08/07/2018 Analyzed: 08/13/2018						
Barium	186	0.500	ug/L	100.00	88.9	97.3	70-130	1.21	20	
Arsenic	103	0.500	ug/L	100.00	0.836	103	70-130	2.03	20	
Selenium	98.4	0.500	ug/L	100.00	0.460	97.9	70-130	0.164	20	
Cobalt	99.7	0.500	ug/L	100.00	0.325	99.4	70-130	3.41	20	
Chromium	105	0.500	ug/L	100.00	0.682	104	70-130	2.59	20	
Molybdenum	99.5	0.500	ug/L	100.00		99.5	70-130	1.11	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0229 - EPA 200.2, EPA 3005

Blank (BDH0229-BLK1)

Prepared: 08/08/2018 Analyzed: 08/13/2018

Barium	<0.500	0.500	ug/L							
Arsenic	<0.500	0.500	ug/L							
Cobalt	<0.500	0.500	ug/L							
Molybdenum	<0.500	0.500	ug/L							
Selenium	<0.500	0.500	ug/L							
Chromium	<0.500	0.500	ug/L							

LCS (BDH0229-BS1)

Prepared: 08/08/2018 Analyzed: 08/13/2018

Selenium	92.1	0.500	ug/L	100.00		92.1	85-115			
Molybdenum	101	0.500	ug/L	100.00		101	85-115			
Barium	95.4	0.500	ug/L	100.00		95.4	85-115			
Arsenic	98.6	0.500	ug/L	100.00		98.6	85-115			
Cobalt	99.7	0.500	ug/L	100.00		99.7	85-115			
Chromium	100	0.500	ug/L	100.00		100	85-115			

Duplicate (BDH0229-DUP1)

Source: MDH0071-04

Prepared: 08/08/2018 Analyzed: 08/13/2018

Molybdenum	0.978	0.500	ug/L		0.906			7.64	20	
Barium	47.3	0.500	ug/L		47.5			0.534	20	
Cobalt	0.0785	0.500	ug/L		0.0763			2.80	20	
Chromium	0.817	0.500	ug/L		0.763			6.91	20	
Selenium	0.314	0.500	ug/L		0.334			6.12	20	
Arsenic	1.21	0.500	ug/L		1.19			2.15	20	

Duplicate (BDH0229-DUP2)

Source: MDH0071-05

Prepared: 08/08/2018 Analyzed: 08/13/2018

Molybdenum	0.0868	0.500	ug/L		0.0910			4.67	20	
Barium	36.4	0.500	ug/L		35.3			2.99	20	
Arsenic	0.463	0.500	ug/L		0.418			10.2	20	
Chromium	0.994	0.500	ug/L		1.00			0.635	20	
Selenium	0.369	0.500	ug/L		0.423			13.6	20	
Cobalt	0.0818	0.500	ug/L		0.0796			2.73	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0229 - EPA 200.2, EPA 3005

Matrix Spike (BDH0229-MS1)		Source: MDH0071-04		Prepared: 08/08/2018 Analyzed: 08/13/2018						
Arsenic	101	0.500	ug/L	100.00	1.19	99.8	70-130			
Molybdenum	102	0.500	ug/L	100.00	0.906	101	70-130			
Chromium	101	0.500	ug/L	100.00	0.763	101	70-130			
Cobalt	98.2	0.500	ug/L	100.00	0.0763	98.2	70-130			
Barium	143	0.500	ug/L	100.00	47.5	95.5	70-130			
Selenium	92.2	0.500	ug/L	100.00	0.334	91.9	70-130			

Matrix Spike (BDH0229-MS2)		Source: MDH0071-05		Prepared: 08/08/2018 Analyzed: 08/13/2018						
Cobalt	99.7	0.500	ug/L	100.00	0.0796	99.6	70-130			
Arsenic	104	0.500	ug/L	100.00	0.418	103	70-130			
Chromium	103	0.500	ug/L	100.00	1.00	102	70-130			
Selenium	96.5	0.500	ug/L	100.00	0.423	96.1	70-130			
Molybdenum	95.8	0.500	ug/L	100.00	0.0910	95.7	70-130			
Barium	130	0.500	ug/L	100.00	35.3	94.8	70-130			

Matrix Spike Dup (BDH0229-MSD1)		Source: MDH0071-04		Prepared: 08/08/2018 Analyzed: 08/13/2018						
Arsenic	103	0.500	ug/L	100.00	1.19	102	70-130	2.10	20	
Chromium	102	0.500	ug/L	100.00	0.763	102	70-130	0.905	20	
Molybdenum	98.5	0.500	ug/L	100.00	0.906	97.5	70-130	3.07	20	
Selenium	98.9	0.500	ug/L	100.00	0.334	98.6	70-130	7.02	20	
Barium	144	0.500	ug/L	100.00	47.5	96.3	70-130	0.542	20	
Cobalt	99.1	0.500	ug/L	100.00	0.0763	99.0	70-130	0.901	20	

Matrix Spike Dup (BDH0229-MSD2)		Source: MDH0071-05		Prepared: 08/08/2018 Analyzed: 08/13/2018						
Molybdenum	97.7	0.500	ug/L	100.00	0.0910	97.6	70-130	1.96	20	
Arsenic	103	0.500	ug/L	100.00	0.418	103	70-130	0.368	20	
Cobalt	97.5	0.500	ug/L	100.00	0.0796	97.4	70-130	2.26	20	
Selenium	95.7	0.500	ug/L	100.00	0.423	95.2	70-130	0.922	20	
Barium	130	0.500	ug/L	100.00	35.3	94.7	70-130	0.116	20	
Chromium	101	0.500	ug/L	100.00	1.00	100	70-130	2.17	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0028 - EPA 200.2, EPA 3005

Blank (BDH0028-BLK1)				Prepared: 08/01/2018 Analyzed: 08/06/2018						
Boron	<0.0500	0.0500	mg/L							
Calcium	<1.25	1.25	mg/L							
LCS (BDH0028-BS1)				Prepared: 08/01/2018 Analyzed: 08/06/2018						
Boron	1.00	0.0500	mg/L	1.0000		100	85-115			
Calcium	105	1.25	mg/L	100.00		105	85-115			
Duplicate (BDH0028-DUP1)				Source: MDG0361-01		Prepared: 08/01/2018 Analyzed: 08/06/2018				
Boron	0.0206	0.0500	mg/L		0.0233			12.4	20	
Calcium	41.4	1.25	mg/L		42.1			1.66	20	
Duplicate (BDH0028-DUP2)				Source: MDG0362-01		Prepared: 08/01/2018 Analyzed: 08/06/2018				
Boron	0.0932	0.0500	mg/L		0.0958			2.82	20	
Calcium	120	1.25	mg/L		119			0.869	20	
Matrix Spike (BDH0028-MS1)				Source: MDG0361-01		Prepared: 08/01/2018 Analyzed: 08/06/2018				
Boron	1.08	0.0500	mg/L	1.0000	0.0233	105	70-130			
Calcium	150	1.25	mg/L	100.00	42.1	108	70-130			
Matrix Spike (BDH0028-MS2)				Source: MDG0362-01		Prepared: 08/01/2018 Analyzed: 08/06/2018				
Calcium	227	1.25	mg/L	100.00	119	108	70-130			
Boron	1.13	0.0500	mg/L	1.0000	0.0958	103	70-130			
Matrix Spike Dup (BDH0028-MSD1)				Source: MDG0361-01		Prepared: 08/01/2018 Analyzed: 08/06/2018				
Boron	1.06	0.0500	mg/L	1.0000	0.0233	104	70-130	1.52	20	
Calcium	149	1.25	mg/L	100.00	42.1	107	70-130	0.734	20	
Matrix Spike Dup (BDH0028-MSD2)				Source: MDG0362-01		Prepared: 08/01/2018 Analyzed: 08/06/2018				
Boron	1.15	0.0500	mg/L	1.0000	0.0958	105	70-130	1.91	20	
Calcium	231	1.25	mg/L	100.00	119	112	70-130	1.75	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0213 - EPA 200.2, EPA 3005

Blank (BDH0213-BLK1)				Prepared: 08/07/2018 Analyzed: 08/08/2018						
Calcium	<1.25	1.25	mg/L							
Boron	<0.0500	0.0500	mg/L							
LCS (BDH0213-BS1)				Prepared: 08/07/2018 Analyzed: 08/08/2018						
Calcium	98.6	1.25	mg/L	100.00		98.6	85-115			
Boron	0.956	0.0500	mg/L	1.0000		95.6	85-115			
Duplicate (BDH0213-DUP1)				Source: MDH0008-04		Prepared: 08/07/2018 Analyzed: 08/08/2018				
Calcium	76.0	1.25	mg/L		74.5			1.89	20	
Boron	0.0827	0.0500	mg/L		0.0811			1.88	20	
Duplicate (BDH0213-DUP2)				Source: MDH0008-05		Prepared: 08/07/2018 Analyzed: 08/08/2018				
Boron	0.0626	0.0500	mg/L		0.0619			1.03	20	
Calcium	67.1	1.25	mg/L		66.6			0.860	20	
Matrix Spike (BDH0213-MS1)				Source: MDH0008-04		Prepared: 08/07/2018 Analyzed: 08/08/2018				
Calcium	180	1.25	mg/L	100.00	74.5	105	70-130			
Boron	1.06	0.0500	mg/L	1.0000	0.0811	97.6	70-130			
Matrix Spike (BDH0213-MS2)				Source: MDH0008-05		Prepared: 08/07/2018 Analyzed: 08/08/2018				
Boron	1.04	0.0500	mg/L	1.0000	0.0619	98.2	70-130			
Calcium	171	1.25	mg/L	100.00	66.6	104	70-130			
Matrix Spike Dup (BDH0213-MSD1)				Source: MDH0008-04		Prepared: 08/07/2018 Analyzed: 08/08/2018				
Boron	1.06	0.0500	mg/L	1.0000	0.0811	98.1	70-130	0.493	20	
Calcium	175	1.25	mg/L	100.00	74.5	100	70-130	2.89	20	
Matrix Spike Dup (BDH0213-MSD2)				Source: MDH0008-05		Prepared: 08/07/2018 Analyzed: 08/08/2018				
Boron	1.03	0.0500	mg/L	1.0000	0.0619	96.5	70-130	1.57	20	
Calcium	167	1.25	mg/L	100.00	66.6	101	70-130	2.05	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco Pond 3 CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	08/29/2018 07:50

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 BDH0228 - EPA 200.2, EPA 3005

Blank (BDH0228-BLK1)				Prepared: 08/08/2018 Analyzed: 08/09/2018						
Boron	<0.0500	0.0500	mg/L							
Calcium	<1.25	1.25	mg/L							
LCS (BDH0228-BS1)				Prepared: 08/08/2018 Analyzed: 08/09/2018						
Calcium	106	1.25	mg/L	100.00		106	85-115			
Boron	0.994	0.0500	mg/L	1.0000		99.4	85-115			
Duplicate (BDH0228-DUP1)				Source: MDH0071-02		Prepared: 08/08/2018 Analyzed: 08/09/2018				
Calcium	52.1	1.25	mg/L		52.4			0.496	20	
Boron	0.0302	0.0500	mg/L		0.0323			6.71	20	
Duplicate (BDH0228-DUP2)				Source: MDH0071-03		Prepared: 08/08/2018 Analyzed: 08/09/2018				
Boron	0.0175	0.0500	mg/L		0.0178			2.13	20	
Calcium	54.8	1.25	mg/L		53.5			2.51	20	
Matrix Spike (BDH0228-MS1)				Source: MDH0071-02		Prepared: 08/08/2018 Analyzed: 08/09/2018				
Calcium	155	1.25	mg/L	100.00	52.4	103	70-130			
Boron	1.02	0.0500	mg/L	1.0000	0.0323	99.2	70-130			
Matrix Spike (BDH0228-MS2)				Source: MDH0071-03		Prepared: 08/08/2018 Analyzed: 08/09/2018				
Boron	1.03	0.0500	mg/L	1.0000	0.0178	101	70-130			
Calcium	157	1.25	mg/L	100.00	53.5	103	70-130			
Matrix Spike Dup (BDH0228-MSD1)				Source: MDH0071-02		Prepared: 08/08/2018 Analyzed: 08/09/2018				
Boron	1.04	0.0500	mg/L	1.0000	0.0323	100	70-130	1.24	20	
Calcium	157	1.25	mg/L	100.00	52.4	104	70-130	1.18	20	
Matrix Spike Dup (BDH0228-MSD2)				Source: MDH0071-03		Prepared: 08/08/2018 Analyzed: 08/09/2018				
Boron	1.04	0.0500	mg/L	1.0000	0.0178	102	70-130	1.14	20	
Calcium	159	1.25	mg/L	100.00	53.5	106	70-130	1.56	20	

Environmental Services-Water Minneapolis
250 Marquette Plaza
Minneapolis MN, 55401

Project Name/Location: Sherco Pond 3 CCR

Project Manager: Charles A Donkers

Reported:

08/29/2018 07:50

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.
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: <u>Xcel Energy</u> Address: <u>Environmental Services</u> Email To: _____ Phone: _____ Fax: _____ Requested Due Date/TAT: _____		Section B Required Project Information: Report To: <u>Chuck Denters</u> Copy To: _____ Purchase Order No.: _____ Project Name: <u>Shoreline BAP / Pond 3 NPDES</u> Project Number: <u>+ CCR, Summer 2018</u>		Section C Invoice Information: Attention: <u>Steve Davis</u> Company Name: _____ Address: _____ Pace Quote Reference: _____ Pace Project Manager: _____ Pace Profile #: _____		Page: <u>1</u> of <u>1</u> 2202852 REGULATORY AGENCY ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER _____ Site Location STATE: _____		
Section D Required Client Information Matrix Codes MATRIX CODE Drinking Water DW Water WW Waste Water P Product SL Soil/Solid OL Oil WP Wipe AR Air TS Tissue OT Other _____ SAMPLE ID (A-Z, 0-9 / -) Sample IDs MUST BE UNIQUE		MATRIX CODE (see valid codes to left) SAMPLE TYPE (G=GRAB C=COMP) COLLECTED COMPOSITE START COMPOSITE END/GRAB SAMPLE TEMP AT COLLECTION # OF CONTAINERS Preservatives Unpreserved H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ S ₂ O ₃ Methanol Other _____		Requested Analysis Filtered (Y/N) Y/N Analysis Test 6W-CCR-BAP 6W-CCR-P3		Pace Project No./ Lab I.D. Residual Chlorine (Y/N)		
ITEM #	ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
1	(1) HNO ₃ bottles are unfiltered. plus 5: NP30050P	David Anderson Pace 8-1-18 0640	8/1/18	0640	David Anderson Pace 8/1/18 0640	8/1/18	0640	Received on _____ Custody Sealed Cooler (Y/N) _____ Temp in °C _____
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

Section D Required Client Information										Requested Analysis Filtered (Y/N)										Pace Project No./ Lab I.D.					
Matrix Codes MATRIX / CODE		COLLECTED				SAMPLE TYPE (G=GRAB C=COMP)				MATRIX CODE (see valid codes to left)		DATE		TIME		RELINQUISHED BY / AFFILIATION		DATE		TIME		SAMPLE CONDITIONS			
Drinking Water	DW	Water	WT	Waste Water	WW	Product	P	Sludge/Solid	SL	Oil	OL	Wipe	WP	Air	AR	Tissue	TS	Other	OT						
SAMPLE ID (A-Z, 0-9 / .)		COMPOSITE START		COMPOSITE END/GRAB		DATE		TIME		DATE		TIME		# OF CONTAINERS		Preservatives		Analysis Test ↑		Y/N ↑		Residual Chlorine (Y/N)			
Sample IDs MUST BE UNIQUE																Unpreserved H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ O ₃ Methanol Other									
ITEM #																									
1	Rinse														2	1									
2	P-151														2	1									
3	P-150														2	1									
4	P-1544														2	1									
5	P-1524														2	1									
6	Duplicate														2	1									
7	P-130														2	1									
8	P-158														2	1									
9	P-157														2	1									
10	P-23														2	1									
11	P-22														2	1									
12	P-155														2	1									
ADDITIONAL COMMENTS										ACCEPTED BY / AFFILIATION										DATE		TIME		SAMPLE CONDITIONS	
① HNO ₃ bottles are unfiltered.										David Anderson / Pace										8/3/18		09:43		Temp = 3.0°C M100841 pH strips = M1000508	

ORIGINAL

PRINT Name of SAMPLER: David Anderson

SIGNATURE of SAMPLER: *David Anderson*

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

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</u> Address: <u>Environmental Services</u> Email To: _____ Phone: _____ Fax: _____ Requested Due Date/TAT: _____		Section B Required Project Information: Report To: <u>Chuck Donkers</u> Copy To: _____ Purchase Order No.: _____ Project Name: <u>Shetco BAP / Pond 3 NPDES</u> Project Number: <u>4 CCR, Summer 2018</u>		Section C Invoice Information: Attention: <u>Steve Davis</u> Company Name: _____ Address: _____ Pace Quote Reference: _____ Pace Project Manager: _____ Pace Profile #: _____	
Page: <u>1</u> of <u>2</u> 2202849		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 Codes DW WT WW P SL OL WP AR TS OT	COLLECTED		SAMPLE TYPE (G-GRAB C-COMP)	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	Requested Analysis Filtered (Y/N)	Pace Project No./ Lab I.D.
				COMPOSITE START	COMPOSITE END/GRAB							
1	Rinse			DATE	TIME							
2	P-151			8-1-18	1110				2			
3	P-150				1320				2			
4	P-1544				1425				2			
5	P-1524				1535				2			
6	Duplicate				1640				2			
7	P-130				1640				2			
8	P-158				1730				2			
9	P-157				1820				2			
10	P-23				8/2/18 8:20 AM				2			
11	P-22				0900				2			
12	P-155				1010				2			
					1110				2			

ADDITIONAL COMMENTS ① HNO ₃ bottles are unfiltered.		RELINQUISHED BY / AFFILIATION David Anderson / Pace		DATE 8/3/18		TIME 09:43		ACCEPTED BY / AFFILIATION [Signature]		DATE 8-2-18		TIME 09:43		SAMPLE CONDITIONS Received on _____ Temp in °C _____ Ice (Y/N) _____ Custody Sealed Cooler (Y/N) _____ Samples Intact (Y/N) _____	
---	--	--	--	----------------	--	---------------	--	--	--	----------------	--	---------------	--	--	--

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: <i>Xcel Energy</i>	Report To: <i>Chuck Dankers</i>	Attention: <i>Steve Davis</i>	Regulatory Agency:	Page: <i>2</i> of <i>2</i>	2202848
Address: <i>Environmental Services</i>	Copy To:	Company Name:	NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER _____		
Email To:	Purchase Order No.:	Address:	Place Quote Reference:	Site Location	STATE: _____
Phone: _____ Fax: _____	Project Name: <i>SHELTICO BAP/pand 3 NPDES</i>	Place Project Manager:	Place Profile #:	Requested Due Date/TAT:	
Project Number: <i>CCR summer 2018</i>					

[illegible]

ORIGINAL

SAMPLER NAME AND SIGNATURE	
PRINT NAME of SAMPLER: David Anderson	DATE Signed (MM/DD/YYYY): 8/2/18
SIGNATURE of SAMPLER: David Anderson	

*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:		Section B Required Project Information:		Section C Invoice Information:	
Company: Xcel Energy	Report To: Chuck Dankers	Attention: Steve Davis	Company Name:	Page: 2 of 2	
Address: Environmental Services	Copy To:			2202848	
Email To:	Purchase Order No.:				
Phone:	Project Name: Shelco BAP/pond 3 NPDES	Address:			
Requested Due Date/TAT:	Project Number: 4 CCR, summer 2018	Pace Quote Reference:			
		Pace Project Manager:			
		Pace Profile #:			

ITEM #	SAMPLE ID (A-Z, 0-9 / -)	Matrix Codes MATRIX / CODE	COLLECTED		SAMPLE TYPE (G=GRAB C=COMP)	MATRIX CODE (see valid codes to left)	# OF CONTAINERS	Preservatives	Requested Analysis Filtered (Y/N)	Pace Project No./ Lab I.D.
			COMPOSITE START	COMPOSITE END/GRAB						
1	P-014-1	Drinking Water	DATE	TIME						
2	P-156	Water	8/2/18	1150			2	Unpreserved		
3	P-162	Waste Water		1240			2	H ₂ SO ₄		
4	P-163	Product		1340			2	HCl		
5	P-164	Soil/Solid		1440			2	HNO ₃		
6	P-165	Oil		1535			2	NaOH		
7	P-132	Wipe		1640			2	Na ₂ S ₂ O ₃		
8	P-153	Alk		1735			2	Other		
9		Tissue		1815			2			
10		Other								
11										
12										

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
							Temp in °C	Received on	Custody	Sealed Cooler
① H ₂ O ₂ bottles are unfiltered.	David Amburn & Co	8/3/18	09:43	pH strips: 4.0-5.0	8/3/18	09:43	Temp in °C	Received on	Custody	Sealed Cooler

August 20, 2018

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

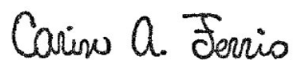
RE: Project: 18-00929, Xcel Energy-ShercoBA
Pace Project No.: 30261472

Dear Dave Anderson:

Enclosed are the analytical results for sample(s) received by the laboratory on August 07, 2018. 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: Harry S. Davis III, Xcel Energy
Charles A. Donkers, 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: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

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

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: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30261472001	P-17	Water	07/31/18 08:40	08/07/18 09:45
30261472002	P-131	Water	07/31/18 10:45	08/07/18 09:45
30261472003	Rinse	Water	08/01/18 11:10	08/07/18 09:45
30261472004	P-151	Water	08/01/18 13:20	08/07/18 09:45
30261472005	P-150	Water	08/01/18 14:25	08/07/18 09:45
30261472006	P-154a	Water	08/01/18 15:35	08/07/18 09:45
30261472007	P-152a	Water	08/01/18 16:40	08/07/18 09:45
30261472008	Duplicate	Water	08/01/18 16:40	08/07/18 09:45
30261472009	P-130	Water	08/01/18 17:30	08/07/18 09:45
30261472010	P-158	Water	08/01/18 18:20	08/07/18 09:45
30261472011	P-157	Water	08/02/18 07:40	08/07/18 09:45
30261472012	P-23	Water	08/02/18 09:00	08/07/18 09:45
30261472013	P-22	Water	08/02/18 10:10	08/07/18 09:45
30261472014	P-155	Water	08/02/18 11:10	08/07/18 09:45
30261472015	P-01a-1	Water	08/02/18 11:50	08/07/18 09:45
30261472016	P-156	Water	08/02/18 12:40	08/07/18 09:45
30261472017	P-162	Water	08/02/18 13:40	08/07/18 09:45
30261472018	P-163	Water	08/02/18 14:40	08/07/18 09:45
30261472019	P-164	Water	08/02/18 15:35	08/07/18 09:45
30261472020	P-165	Water	08/02/18 16:40	08/07/18 09:45
30261472021	P-132	Water	08/02/18 17:25	08/07/18 09:45
30261472022	P-153	Water	08/02/18 18:15	08/07/18 09:45

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30261472001	P-17	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472002	P-131	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472003	Rinse	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472004	P-151	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472005	P-150	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472006	P-154a	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472007	P-152a	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472008	Duplicate	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472009	P-130	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472010	P-158	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472011	P-157	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472012	P-23	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472013	P-22	EPA 903.1	MK1	1	PASI-PA

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30261472014	P-155	EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30261472015	P-01a-1	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472016	P-156	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30261472017	P-162	EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30261472018	P-163	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472019	P-164	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
30261472020	P-165	EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
30261472021	P-132	Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30261472022	P-153	EPA 903.1	KAC	1	PASI-PA
		EPA 904.0	VAL	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
		EPA 903.1	KAC	1	PASI-PA

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

Method: EPA 903.1

Description: 903.1 Radium 226

Client: Pace-MN Field Services Division

Date: August 20, 2018

General Information:

22 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: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

Method: EPA 904.0

Description: 904.0 Radium 228

Client: Pace-MN Field Services Division

Date: August 20, 2018

General Information:

22 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: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

Method: Total Radium Calculation

Description: Total Radium 228+226

Client: Pace-MN Field Services Division

Date: August 20, 2018

General Information:

22 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: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

Sample: P-17		Lab ID: 30261472001	Collected: 07/31/18 08:40	Received: 08/07/18 09:45	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC)	Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.085 ± 0.552	(1.20)	pCi/L	08/15/18 20:59	13982-63-3	
		C:NA T:74%					
Radium-228	EPA 904.0	0.397 ± 0.420	(0.877)	pCi/L	08/15/18 13:22	15262-20-1	
		C:72% T:85%					
Total Radium	Total Radium Calculation	0.397 ± 0.972	(2.08)	pCi/L	08/16/18 13:22	7440-14-4	

Sample: P-131		Lab ID: 30261472002	Collected: 07/31/18 10:45	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.072 ± 0.374 (0.866) C:NA T:84%	pCi/L	08/15/18 20:59	13982-63-3	
Radium-228	EPA 904.0	0.699 ± 0.415 (0.772) C:75% T:87%	pCi/L	08/15/18 13:22	15262-20-1	
Total Radium	Total Radium Calculation	0.699 ± 0.789 (1.64)	pCi/L	08/16/18 13:22	7440-14-4	

Sample: Rinse		Lab ID: 30261472003	Collected: 08/01/18 11:10	Received: 08/07/18 09:45	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 ± 0.452 (0.980) C:NA T:77%	pCi/L	08/15/18 20:59	13982-63-3	
Radium-228	EPA 904.0	0.581 ± 0.495 (1.00) C:71% T:77%	pCi/L	08/15/18 13:22	15262-20-1	
Total Radium	Total Radium Calculation	0.581 ± 0.947 (1.98)	pCi/L	08/16/18 13:22	7440-14-4	

Sample: P-151		Lab ID: 30261472004	Collected: 08/01/18 13:20	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.211 ± 0.498 (0.923) C:NA T:87%	pCi/L	08/15/18 20:59	13982-63-3	
Radium-228	EPA 904.0	0.685 ± 0.453 (0.873) C:76% T:80%	pCi/L	08/15/18 13:22	15262-20-1	
Total Radium	Total Radium Calculation	0.896 ± 0.951 (1.80)	pCi/L	08/16/18 13:22	7440-14-4	

Sample: P-150		Lab ID: 30261472005	Collected: 08/01/18 14:25	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	1.91 ± 0.852 (0.852) C:NA T:83%	pCi/L	08/15/18 21:15	13982-63-3	
Radium-228	EPA 904.0	0.261 ± 0.571 (1.26) C:73% T:77%	pCi/L	08/15/18 18:25	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

Sample: P-150		Lab ID: 30261472005	Collected: 08/01/18 14:25	Received: 08/07/18 09:45	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Total Radium	Total Radium Calculation	2.17 ± 1.42 (2.11)		pCi/L	08/16/18 13:22	7440-14-4	

Sample: P-154a		Lab ID: 30261472006	Collected: 08/01/18 15:35	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.706 ± 0.517 (0.577) C:NA T:79%	pCi/L	08/15/18 21:15	13982-63-3	
Radium-228	EPA 904.0	-0.609 ± 0.400 (1.06) C:69% T:87%	pCi/L	08/15/18 18:25	15262-20-1	
Total Radium	Total Radium Calculation	0.706 ± 0.917 (1.64)	pCi/L	08/16/18 13:22	7440-14-4	

Sample: P-152a		Lab ID: 30261472007	Collected: 08/01/18 16:40	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.252 ± 0.495 (0.904) C:NA T:75%	pCi/L	08/15/18 21:15	13982-63-3	
Radium-228	EPA 904.0	0.261 ± 0.534 (1.18) C:73% T:78%	pCi/L	08/15/18 18:25	15262-20-1	
Total Radium	Total Radium Calculation	0.513 ± 1.03 (2.08)	pCi/L	08/16/18 13:22	7440-14-4	

Sample: Duplicate		Lab ID: 30261472008	Collected: 08/01/18 16:40	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.149 ± 0.357 (0.691) C:NA T:81%	pCi/L	08/15/18 21:15	13982-63-3	
Radium-228	EPA 904.0	0.406 ± 0.560 (1.20) C:66% T:74%	pCi/L	08/15/18 18:25	15262-20-1	
Total Radium	Total Radium Calculation	0.555 ± 0.917 (1.89)	pCi/L	08/16/18 14:15	7440-14-4	

Sample: P-130		Lab ID: 30261472009	Collected: 08/01/18 17:30	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.308 ± 0.428 (0.715) C:NA T:80%	pCi/L	08/15/18 21:25	13982-63-3	
Radium-228	EPA 904.0	-0.113 ± 0.380 (0.912) C:78% T:87%	pCi/L	08/15/18 18:25	15262-20-1	
Total Radium	Total Radium Calculation	0.308 ± 0.808 (1.63)	pCi/L	08/16/18 14:15	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

Sample: P-158		Lab ID: 30261472010	Collected: 08/01/18 18:20	Received: 08/07/18 09:45	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC)	Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.526 ± 0.535	(0.809)	pCi/L	08/15/18 21:15	13982-63-3	
		C:NA T:79%					
Radium-228	EPA 904.0	0.0583 ± 0.516	(1.19)	pCi/L	08/15/18 18:25	15262-20-1	
		C:70% T:78%					
Total Radium	Total Radium Calculation	0.584 ± 1.05	(2.00)	pCi/L	08/16/18 14:15	7440-14-4	

Sample: P-157		Lab ID: 30261472011	Collected: 08/02/18 07:40	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.646 ± 0.596 (0.869) C:NA T:77%	pCi/L	08/15/18 21:15	13982-63-3	
Radium-228	EPA 904.0	0.449 ± 0.529 (1.11) C:70% T:74%	pCi/L	08/15/18 18:26	15262-20-1	
Total Radium	Total Radium Calculation	1.10 ± 1.13 (1.98)	pCi/L	08/16/18 14:15	7440-14-4	

Sample: P-23		Lab ID: 30261472012	Collected: 08/02/18 09:00	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0834 ± 0.432 (0.897) C:NA T:79%	pCi/L	08/15/18 21:30	13982-63-3	
Radium-228	EPA 904.0	0.109 ± 0.470 (1.07) C:73% T:78%	pCi/L	08/15/18 18:26	15262-20-1	
Total Radium	Total Radium Calculation	0.192 ± 0.902 (1.97)	pCi/L	08/16/18 14:15	7440-14-4	

Sample: P-22		Lab ID: 30261472013	Collected: 08/02/18 10:10	Received: 08/07/18 09:45	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0815 ± 0.372 (0.600)		pCi/L	08/15/18 21:41	13982-63-3	
		C:NA T:81%					
Radium-228	EPA 904.0	-0.397 ± 0.436 (1.11)		pCi/L	08/15/18 18:26	15262-20-1	
		C:72% T:76%					
Total Radium	Total Radium Calculation	0.0815 ± 0.808 (1.71)		pCi/L	08/16/18 14:15	7440-14-4	

Sample: P-155		Lab ID: 30261472014	Collected: 08/02/18 11:10	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.160 ± 0.444 (0.861) C:NA T:84%	pCi/L	08/15/18 21:30	13982-63-3	
Radium-228	EPA 904.0	0.0667 ± 0.530 (1.22) C:74% T:74%	pCi/L	08/15/18 18:26	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

Sample: P-155		Lab ID: 30261472014	Collected: 08/02/18 11:10	Received: 08/07/18 09:45	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Total Radium	Total Radium Calculation	0.227 ± 0.974 (2.08)		pCi/L	08/16/18 14:15	7440-14-4	

Sample: P-01a-1		Lab ID: 30261472015	Collected: 08/02/18 11:50	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.243 ± 0.422 (0.754) C:NA T:79%	pCi/L	08/15/18 21:30	13982-63-3	
Radium-228	EPA 904.0	0.288 ± 0.574 (1.27) C:71% T:73%	pCi/L	08/15/18 18:26	15262-20-1	
Total Radium	Total Radium Calculation	0.531 ± 0.996 (2.02)	pCi/L	08/16/18 14:15	7440-14-4	

Sample: P-156		Lab ID: 30261472016	Collected: 08/02/18 12:40	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	-0.073 ± 0.332 (0.783) C:NA T:90%	pCi/L	08/15/18 21:36	13982-63-3	
Radium-228	EPA 904.0	0.298 ± 0.537 (1.17) C:73% T:75%	pCi/L	08/15/18 18:26	15262-20-1	
Total Radium	Total Radium Calculation	0.298 ± 0.869 (1.95)	pCi/L	08/16/18 14:15	7440-14-4	

Sample: P-162		Lab ID: 30261472017	Collected: 08/02/18 13:40	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.352 ± 0.424 (0.647) C:NA T:73%	pCi/L	08/15/18 21:30	13982-63-3	
Radium-228	EPA 904.0	0.0610 ± 0.421 (0.973) C:74% T:81%	pCi/L	08/15/18 18:26	15262-20-1	
Total Radium	Total Radium Calculation	0.413 ± 0.845 (1.62)	pCi/L	08/16/18 14:15	7440-14-4	

Sample: P-163		Lab ID: 30261472018	Collected: 08/02/18 14:40	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0774 ± 0.402 (0.834) C:NA T:79%	pCi/L	08/15/18 21:47	13982-63-3	
Radium-228	EPA 904.0	-0.0332 ± 0.390 (0.922) C:75% T:88%	pCi/L	08/15/18 18:26	15262-20-1	
Total Radium	Total Radium Calculation	0.0774 ± 0.792 (1.76)	pCi/L	08/16/18 14:15	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

Sample: P-164		Lab ID: 30261472019	Collected: 08/02/18 15:35	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0824 ± 0.428 (0.887) C:NA T:76%	pCi/L	08/15/18 21:43	13982-63-3	
Radium-228	EPA 904.0	0.629 ± 0.467 (0.923) C:75% T:83%	pCi/L	08/15/18 16:40	15262-20-1	
Total Radium	Total Radium Calculation	0.711 ± 0.895 (1.81)	pCi/L	08/16/18 14:15	7440-14-4	

Sample: P-165		Lab ID: 30261472020	Collected: 08/02/18 16:40	Received: 08/07/18 09:45	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 ± 0.341 (0.766) C:NA T:91%	pCi/L	08/15/18 21:43	13982-63-3	
Radium-228	EPA 904.0	0.237 ± 0.364 (0.787) C:77% T:86%	pCi/L	08/15/18 16:40	15262-20-1	
Total Radium	Total Radium Calculation	0.237 ± 0.705 (1.55)	pCi/L	08/16/18 14:15	7440-14-4	

Sample: P-132		Lab ID: 30261472021	Collected: 08/02/18 17:25	Received: 08/07/18 09:45	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 ± 0.331 (0.717) C:NA T:94%	pCi/L	08/16/18 19:41	13982-63-3	
Radium-228	EPA 904.0	0.211 ± 0.368 (0.803) C:80% T:83%	pCi/L	08/15/18 16:40	15262-20-1	
Total Radium	Total Radium Calculation	0.211 ± 0.699 (1.52)	pCi/L	08/20/18 15:27	7440-14-4	

Sample: P-153		Lab ID: 30261472022	Collected: 08/02/18 18:15	Received: 08/07/18 09:45	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.127 ± 0.289 (0.466) C:NA T:92%	pCi/L	08/16/18 19:41	13982-63-3	
Radium-228	EPA 904.0	0.337 ± 0.442 (0.945) C:79% T:78%	pCi/L	08/15/18 16:40	15262-20-1	
Total Radium	Total Radium Calculation	0.464 ± 0.731 (1.41)	pCi/L	08/20/18 15:27	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

QC Batch:	308839	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
Associated Lab Samples:	30261472021, 30261472022		

METHOD BLANK:	1509091	Matrix:	Water
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Associated Lab Samples: 30261472021, 30261472022

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.127 ± 0.290 (0.468) C:NA T:92%	pCi/L	08/16/18 19:41	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

QC Batch:	308837	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
Associated Lab Samples:	30261472001, 30261472002, 30261472003, 30261472004, 30261472005, 30261472006, 30261472007, 30261472008, 30261472009, 30261472010, 30261472011, 30261472012, 30261472013, 30261472014, 30261472015, 30261472016, 30261472017, 30261472018, 30261472019, 30261472020		

METHOD BLANK:	1509088	Matrix:	Water
Associated Lab Samples:	30261472001, 30261472002, 30261472003, 30261472004, 30261472005, 30261472006, 30261472007, 30261472008, 30261472009, 30261472010, 30261472011, 30261472012, 30261472013, 30261472014, 30261472015, 30261472016, 30261472017, 30261472018, 30261472019, 30261472020		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.156 ± 0.374 (0.724) C:NA T:83%	pCi/L	08/15/18 21:00	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

QC Batch:	308838	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	30261472001, 30261472002, 30261472003, 30261472004, 30261472005, 30261472006, 30261472007, 30261472008, 30261472009, 30261472010, 30261472011, 30261472012, 30261472013, 30261472014, 30261472015, 30261472016, 30261472017, 30261472018, 30261472019, 30261472020		

METHOD BLANK:	1509089	Matrix:	Water
Associated Lab Samples:	30261472001, 30261472002, 30261472003, 30261472004, 30261472005, 30261472006, 30261472007, 30261472008, 30261472009, 30261472010, 30261472011, 30261472012, 30261472013, 30261472014, 30261472015, 30261472016, 30261472017, 30261472018, 30261472019, 30261472020		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.126 ± 0.397 (0.896) C:75% T:67%	pCi/L	08/15/18 13:22	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

QC Batch:	308840	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	30261472021, 30261472022		

METHOD BLANK:	1509095	Matrix:	Water
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Associated Lab Samples: 30261472021, 30261472022

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	-0.173 ± 0.301 (0.748) C:76% T:84%	pCi/L	08/15/18 16:41	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 18-00929, Xcel Energy-ShercoBA

Pace Project No.: 30261472

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: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(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

This report shall not be reproduced, except in full,
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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.

Analytical
www.pacelabs.com

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: <u>Xcel Energy</u>	Report To: <u>David Andersen</u>	Attention: <u>Ciara Ruikka</u>	REGULATORY AGENCY		
Address: <u>c/o Pacemaw Field</u>	Copy To:	Company Name: <u>Pacemaw Field Services</u>	NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐		
		Address:	UST ☐ RCRA ☐ OTHER ☐		
Email To:	Purchase Order No.:	Pace Quote Reference:	Site Location		
		Pace Project Manager:	STATE:		
Phone:	Project Name: <u>18-00939, Xcel Energy - Shorto RAP/pond3 CCR</u>	Pace Profile #:			
Requested Due Date/TAT:	Project Number:				

[illegible]

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
							Temp In °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
Client needs to analyze for: Radium 226 + 228 pCi/L Combined.	David Anderson, Pire	8/3/18	1115	Emily Olson	8-7-18	9:45	N/A	N	N	Y
PRINT Name of SAMPLER: David Anderson SIGNATURE of SAMPLER: <i>David Anderson</i> DATE Signed (MM/DD/YY): 8-3-18										

Pittsburgh Lab Sample Condition Upon Receipt

Pace Analytical

Client Name: XCEL

Project # 30261472

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other _____

Tracking #: 4486 7787 0983

Label <u>ET</u>
LIMS Login <u>BZH</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 _____ °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:
Chain of Custody Present:	☒	☐	☐	<u>1053671</u>	<u>ET 8-7-18</u>
Chain of Custody Filled Out:	☒	☐	☐		
Chain of Custody Relinquished:	☒	☐	☐		
Sampler Name & Signature on COC:	☒	☐	☐		
Sample Labels match COC:	☒	☐	☐		
-Includes date/time/ID Matrix: <u>WT</u>					
Samples Arrived within Hold Time:	☒	☐	☐		
Short Hold Time Analysis (<72hr remaining):	☒	☐	☐		
Rush Turn Around Time Requested:	☒	☐	☐		
Sufficient Volume:	☒	☐	☐		
Correct Containers Used:	☒	☐	☐		
-Pace Containers Used:	☒	☐	☐		
Containers Intact:	☒	☐	☐		
Orthophosphate field filtered	☒	☐	☐		
Hex Cr Aqueous Compliance/NPDES sample field filtered	☒	☐	☐		
Organic Samples checked for dechlorination:	☒	☐	☐		
Filtered volume received for Dissolved tests	☒	☐	☐		
All containers have been checked for preservation.	☒	☐	☐		
All containers needing preservation are found to be in compliance with EPA recommendation.	☒	☐	☐	<u>PH12</u>	
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed <u>ET</u>	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):	☒	☐	☐		
Trip Blank Present:	☒	☐	☐		
Trip Blank Custody Seals Present	☒	☐	☐		
Rad Aqueous Samples Screened > 0.5 mrem/hr	☒	☐	☐	Initial when completed: <u>ET</u>	Date: <u>8-7-18</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 C

November 2018 Assessment Monitoring Semiannual Sampling Event
Field Datasheets and Laboratory Reports

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds NPDES + ECR Fall 2018 Project No. 18-01330

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) 77.97 Feet

Static water level measurement at time of sampling (Final Depth) 77.97 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method 6 function rediflo 2 dedicated bladder pump Pump ID SP-1 PC-6

Date Purged 10-31-18 Water Column 3.01 Feet

Time Purged 0720-0732 One Casing Volume 0.5 Gallons

Pump Rate 0.15 (GPM) LPM Volume Purged 1.8 Gallons

Field Sampling Data

Date Sampled 10-31-18

Time Sampled 0800

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.8 (units) D.O. 7.3 (mg/l)

Spec. Cond. 630 (µmhos/cm) Turbidity 3.3 (NTU)

Temp. 9.0 (°C) Eh 257 (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 5-10

Sample Description: clear + odorless

Observations: DJA 10-31-18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
0724	7.9	630	9.0	7.4	NA	256	0.6
0728	7.8	630	9.0	7.3	NA	257	1.2
0732	7.8	630	9.0	7.3	NA	257	1.8
DJA 10/31/18							

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: 10/31/18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds CCR, Fall 2018 Project No. 18-01328

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) 37.93 Feet

Static water level measurement at time of sampling (Final Depth) 37.93 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 10/31/18 Water Column 20.83 Feet

Time Purged 1550-1641 One Casing Volume 3.4 Gallons

Pump Rate 0.2 GPM / LPM Volume Purged 10.2 Gallons

Field Sampling Data

Date Sampled 10/31/18

Time Sampled 1650

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.1 (units) D.O. 6.6 (mg/l)

Spec. Cond. 550 (µmhos/cm) Turbidity 3.5 (NTU)

Temp. 10.0 (°C) Eh 253 (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° + sunny, wind W15

Sample Description: clear + odorless

Observations: DJA 10/31/18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1607	7.2	550	10.0	6.7	NA	265	3.4
1624	7.2	550	10.0	6.6	NA	257	6.8
1641	7.1	550	10.0	6.6	NA	253	10.2
<u>DJA 10/31/18</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: 10/31/18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds NPDES + CCR Fall 2018 Project No. 18-01330

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) 39.97 Feet

Static water level measurement at time of sampling (Final Depth) 39.97 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID SP-1 PC-6

Date Purged 10/30/18 Water Column 17.88 Feet

Time Purged 1440 - 1530 - 1525 One Casing Volume 2.9 Gallons

Pump Rate 0.2 (GPM) LPM Volume Purged 9.0 Gallons

Field Sampling Data

Date Sampled 10/30/18

Time Sampled 1540

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.7 (units) D.O. 6.5 (mg/l)

Spec. Cond. 810 (µmhos/cm) Turbidity 2.0 (NTU)

Temp. 10.5 (°C) Eh 284 (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° + partly cloudy, wind W10

Sample Description: clear + odorless

Observations: DATA 10/30/18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1455	7.8	810	10.5	6.5	NA	284	3.0
1510	7.7	810	10.5	6.5	NA	284	6.0
1525	7.7	810	10.5	6.5	NA	284	9.0

DATA 10/30/18

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: 10/30/18

Well Description and Presampling Information

Client Xcel Energy *Shereco Ponds NPDES + CCR* Project Fall 2018 Project No. 18-01330

Monitoring Point ID P-23 Labeled P-23

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) 42.03 Feet

Static water level measurement at time of sampling (Final Depth) 42.03 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method DTA 10/29/18 6" hoses rediflo 2 dedicated bladder pump Pump ID SP-1

Date Purged 10-29-18 Water Column 25.31 Feet

Time Purged 1700-1803 One Casing Volume 4.1 Gallons

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

Field Sampling Data

Date Sampled 10-29-18

Time Sampled 1820

Sampling Equip. above pump

Meter ID MP5-5

Analyzed by DTA

Field Parameter Measurements of Sample

pH 7.7 (units) D.O. 7.1 (mg/l)

Spec. Cond. 700 (µmhos/cm) Turbidity 3.9 (NTU)

Temp. 11.5 (°C) Eh 283 (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 S S

Sample Description: clear + odorless

Observations: collected Rinse Blank at this well, and collected Duplicate for Shereco Ponds NPDES + CCR.

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1721	7.7	690	11.5	7.0	NA	282	4.2
1742	7.7	700	11.5	7.1	NA	283	8.4
1803	7.7	700	11.5	7.1	NA	283	12.6
DTA 10/29/18							

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: 10/29/18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds CCR, Fall 2018 Project No. 18-01328

Monitoring Point ID P-1524 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) 38.08 Feet

Static water level measurement at time of sampling (Final Depth) 38.08 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 10-31-18 Water Column 4.10 Feet

Time Purged 1505-1520 One Casing Volume 0.7 Gallons

Pump Rate 0.15 GPM / LPM Volume Purged 2.25 Gallons

Field Sampling Data

Date Sampled 10-31-18

Time Sampled 1540

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DTA

Field Parameter Measurements of Sample

pH 7.9 (units) D.O. 8.5 (mg/l)

Spec. Cond. 380 (µmhos/cm) Turbidity 2.2 (NTU)

Temp. 10.5 (°C) Eh 257 (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°+ sunny, wind W15

Sample Description: clear + odorless

Observations: collected Rinse Blank at this well.
collected Duplicate 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)
1510	8.0	380	10.5	8.5	NA	255	0.75
1515	7.9	380	10.5	8.5	NA	257	1.50
1520	7.9	380	10.5	8.5	NA	257	2.25
DTA 10/31/18							

Samples chilled immediately after collection: ☒ Yes ☐ Other

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

Lead Technician Signature: David Anderson Date: 10/31/18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds CCR, Fall 2018 Project No. 18-01328

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) 78.09 Feet

Static water level measurement at time of sampling (Final Depth) 78.09 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 11-1-18 Water Column 7.38 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 11-1-18

Time Sampled 1420

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.7 (units) D.O. 6.7 (mg/l)

Spec. Cond. 780 (µmhos/cm) Turbidity 3.9 (NTU)

Temp. 11.0 (°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: 39° + sunny, wind N10

Sample Description: clear + odorless

Observations: DJA 11-1-18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1348	7.8	780	11.0	6.5	NA	256	1.2
1356	7.7	780	11.0	6.6	NA	253	2.4
1404	7.7	780	11.0	6.7	NA	248	3.6
<u>DJA 11-1-18</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: 11-1-18

Well Sampling Field Data Log Sheet

Client Xcel Energy **Project** Sherco Ponds CCR, Fall 2018 **Project No.** 18-01328

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) 77.18 **Feet**

Static water level measurement at time of sampling (Final Depth) 77.18 **Feet**

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

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

Date Purged 11-1-18 **Water Column** 8.35 **Feet**

Time Purged 1250 - 1311 **One Casing Volume** 1.4 **Gallons**

Pump Rate 0.2 **GPM** **LPM** **Volume Purged** 4.2 **Gallons**

Date Sampled 11-1-18 **Time Sampled** 1325

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

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.8 (units) **D.O** 7.1 (mg/l)

Spec. Cond. 430 (umhos/cm) **Turbidity** 3.0 (NTU)

Temp. 11.0 (°C) **Eh** 250 (mV)

Other NA

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

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

Weather Conditions During Sampling: 38°+ sunny, wind @ 10

Sample Description: clear + odorless

Observations: DJA 11-1-18

Time	pH (units)	Specific Conductance (umhos/cm)	Temp (°C)	D.O (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1257	7.8	440	11.0	6.9	NA	256	1.4
1304	7.8	430	11.0	7.0	NA	252	2.8
1311	7.8	430	11.0	7.1	NA	250	4.2
<u>DJA 11-1-18</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:** 11-1-18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds CCR, Fall 2018 Project No. 18-01328

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) 42.65 Feet

Static water level measurement at time of sampling (Final Depth) 42.65 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 10/31/18 Water Column 6.41 Feet

Time Purged 1745-1800 One Casing Volume 1.0 Gallons

Pump Rate 0.2 GPM LPM Volume Purged 3.0 Gallons

Field Sampling Data

Date Sampled 10/31/18

Time Sampled 1810

Sampling Equip. above pump

Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.2 (units) D.O. 6.3 (mg/l)

Spec. Cond. 640 (µmhos/cm) Turbidity 2.5 (NTU)

Temp. 10.5 (°C) Eh 267 (mV)

Other NA

Field Measurements Temp. Corrected: ☒ Yes ☐ No ☐ NA

Sample for Soluble Metals Filtered in Field: ☐ Yes ☒ No ☐ NA

Weather Conditions During Sampling: 49° + sunny, wind W10

Sample Description: clear + odorless

Observations: DJA 10/31/18

Stabilization Test

Time	pH (units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1750	7.2	650	10.5	6.3	NA	267	1.0
1755	7.2	640	10.5	6.3	NA	267	2.0
1800	7.2	640	10.5	6.3	NA	267	3.0
<u>DJA 10/31/18</u>							

Samples chilled immediately after collection: ☒ Yes ☐ Other

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

Lead Technician Signature: David Anderson Date: 10/31/18

Well Sampling Field Data Log Sheet

Well Description and Presampling Information

Client Xcel Energy Project Sherco Ponds CER, Fall 2018 Project No. 18-01328

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) 40.47 Feet

Static water level measurement at time of sampling (Final Depth) 40.47 Feet

Static Water Level Elevation Before Purging NA Feet

Purge Method dedicated bladder pump Pump ID PC-6

Date Purged 10/31/18 Water Column 8.69 Feet

Time Purged 1700-1721 One Casing Volume 1.4 Gallons

Pump Rate 0.2 GPM LPM Volume Purged 4.2 Gallons

Field Sampling Data

Date Sampled 10/31/18 Time Sampled 1730

Sampling Equip. above pump Meter ID MPS-5

Analyzed by DJA

Field Parameter Measurements of Sample

pH 7.1 (units) D.O. 8.5 (mg/l)

Spec. Cond. 780 (µmhos/cm) Turbidity 3.0 (NTU)

Temp. 10.5 (°C) Eh 266 (mV)

Other NA

Field Measurements Temp. Corrected: ☒ Yes ☐ No ☐ NA

Sample for Soluble Metals Filtered in Field: ☐ Yes ☒ No ☐ NA

Weather Conditions During Sampling: 49° + sunny, wind W 10

Sample Description: clear + odorless

Observations: DJA 10/31/18

Stabilization Test

Time	pH (Units)	Specific Conductance (µmhos/cm)	Temp (°C)	D.O. (mg/l)	Turbidity (NTU)	Eh (mV)	Volume Purged (cumulative gal)
1707	7.2	770	10.5	8.5	NA	267	1.4
1714	7.1	780	10.5	8.5	NA	266	2.8
1721	7.1	780	10.5	8.5	NA	266	4.2
<u>DJA 10/31/18</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: 10/31/18



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

20 November 2018
Charles A Donkers
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 10/31/2018 06:35-11/05/2018 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	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Sample Qualifier	Laboratory ID	Matrix	Sampled	Received
Rinse		MDJ0374-01	Water	10/29/2018 16:50	10/31/2018 6:35
P-23		MDJ0374-09	Water	10/29/2018 18:20	10/31/2018 6:35
Duplicate		MDJ0374-10	Water	10/29/2018 18:20	10/31/2018 6:35
P-22		MDJ0374-22	Water	10/30/2018 15:40	10/31/2018 6:35
P-01A-1		MDK0025-03	Water	10/31/2018 8:00	11/05/2018 5:45
Rinse		MDK0026-04	Water	10/31/2018 15:00	11/05/2018 5:45
P-152A		MDK0026-05	Water	10/31/2018 15:40	11/05/2018 5:45
Duplicate		MDK0026-06	Water	10/31/2018 15:40	11/05/2018 5:45
P-17		MDK0028-01	Water	10/31/2018 16:50	11/05/2018 5:45
P-158		MDK0028-02	Water	10/31/2018 17:30	11/05/2018 5:45
P-157		MDK0028-03	Water	10/31/2018 18:10	11/05/2018 5:45
P-156		MDK0028-04	Water	11/01/2018 13:25	11/05/2018 5:45
P-155		MDK0028-05	Water	11/01/2018 14:20	11/05/2018 5:45

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

Rinse

MDJ0374-01 (Water) - Chain of Custody Number: 1845943/1845965

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	BDK0067	11/5/18 8:50	11/5/18 12:47	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDK0067	11/5/18 8:50	11/5/18 12:47	EPA 300.0	CRL
Sulfate	< 1.00	1.00	mg/L		1	BDK0067	11/5/18 8:50	11/5/18 12:47	EPA 300.0	CRL

Wet Chemistry

pH	6.20		pH Units	M_TTT	1	BDJ0802	10/31/18 11:47	10/31/18 13:05	SM 4500-H+ B	CRL
Total Dissolved Solids	< 20.0	20.0	mg/L		1	BDJ0786	10/31/18 13:00	10/31/18 13:00	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDJ0785	10/31/18 8:58	10/31/18 8:58	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:26	EPA 200.8	CRL
Barium	< 0.500	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:26	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:26	EPA 200.8	CRL
Chromium	< 0.500	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:26	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:26	EPA 200.8	CRL
Selenium	< 0.500	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:26	EPA 200.8	CRL

Total Metals by ICP

Boron	< 0.0500	0.0500	mg/L		1	BDJ0798	10/31/18 10:50	11/6/18 12:19	EPA 200.7	HRD
Calcium	< 1.25	1.25	mg/L		1	BDJ0798	10/31/18 10:50	11/6/18 12:17	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		11/20/2018 08:43
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

P-23

MDJ0374-09 (Water) - Chain of Custody Number: 1845943/1845965

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	BDK0067	11/5/18 8:50	11/5/18 17:12	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDK0067	11/5/18 8:50	11/5/18 17:12	EPA 300.0	CRL
Sulfate	119	1.00	mg/L		1	BDK0067	11/5/18 8:50	11/5/18 17:12	EPA 300.0	CRL

Wet Chemistry

pH	7.75		pH Units	M_TTT	1	BDJ0802	10/31/18 11:47	10/31/18 14:06	SM 4500-H+ B	CRL
Total Dissolved Solids	436	20.0	mg/L		1	BDJ0786	10/31/18 13:00	10/31/18 13:00	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDJ0785	10/31/18 8:58	10/31/18 8:58	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:30	EPA 200.8	CRL
Barium	64.5	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:30	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:30	EPA 200.8	CRL
Chromium	1.03	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:30	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:30	EPA 200.8	CRL
Selenium	1.54	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:30	EPA 200.8	CRL

Total Metals by ICP

Boron	0.236	0.0500	mg/L		1	BDJ0798	10/31/18 10:50	11/6/18 12:24	EPA 200.7	HRD
Calcium	102	1.25	mg/L		1	BDJ0798	10/31/18 10:50	11/6/18 12:22	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

Duplicate

MDJ0374-10 (Water) - Chain of Custody Number: 1845943/1845965

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	BDK0067	11/5/18 8:50	11/5/18 17:33	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDK0067	11/5/18 8:50	11/5/18 17:33	EPA 300.0	CRL
Sulfate	118	1.00	mg/L		1	BDK0067	11/5/18 8:50	11/5/18 17:33	EPA 300.0	CRL

Wet Chemistry

pH	7.79		pH Units	M_TTT	1	BDJ0802	10/31/18 11:47	10/31/18 14:13	SM 4500-H+ B	CRL
Total Dissolved Solids	434	20.0	mg/L		1	BDJ0809	11/1/18 9:08	11/1/18 9:08	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDJ0808	11/1/18 7:03	11/1/18 7:03	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.544	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:34	EPA 200.8	CRL
Barium	65.2	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:34	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:34	EPA 200.8	CRL
Chromium	1.08	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:34	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:34	EPA 200.8	CRL
Selenium	1.53	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:34	EPA 200.8	CRL

Total Metals by ICP

Boron	0.234	0.0500	mg/L		1	BDJ0798	10/31/18 10:50	11/6/18 12:29	EPA 200.7	HRD
Calcium	101	1.25	mg/L		1	BDJ0798	10/31/18 10:50	11/6/18 12:27	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

P-22

MDJ0374-22 (Water) - Chain of Custody Number: 1845943/1845965

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

Chloride	14.7	1.00	mg/L		1	BDK0098	11/6/18 6:10	11/6/18 11:54	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDK0098	11/6/18 6:10	11/6/18 11:54	EPA 300.0	CRL
Sulfate	174	1.00	mg/L		1	BDK0098	11/6/18 6:10	11/6/18 11:54	EPA 300.0	CRL

Wet Chemistry

pH	7.82		pH Units	M_TTT	1	BDJ0802	10/31/18 11:47	10/31/18 15:50	SM 4500-H+ B	CRL
Total Dissolved Solids	536	20.0	mg/L		1	BDK0034	11/2/18 8:46	11/2/18 8:46	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDK0033	11/2/18 6:31	11/2/18 6:31	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:38	EPA 200.8	CRL
Barium	70.3	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:38	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:38	EPA 200.8	CRL
Chromium	0.886	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:38	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:38	EPA 200.8	CRL
Selenium	7.18	0.500	ug/L		1	BDJ0800	10/31/18 10:54	11/1/18 8:38	EPA 200.8	CRL

Total Metals by ICP

Boron	1.52	0.0500	mg/L		1	BDJ0798	10/31/18 10:50	11/6/18 12:34	EPA 200.7	HRD
Calcium	111	1.25	mg/L		1	BDJ0798	10/31/18 10:50	11/6/18 12:32	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		11/20/2018 08:43
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

P-01A-1

MDK0025-03 (Water) - Chain of Custody Number: 1845966

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

Chloride	9.59	1.00	mg/L		1	BDK0098	11/6/18 6:10	11/6/18 15:59	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDK0098	11/6/18 6:10	11/6/18 15:59	EPA 300.0	CRL
Sulfate	81.4	1.00	mg/L		1	BDK0098	11/6/18 6:10	11/6/18 15:59	EPA 300.0	CRL

Wet Chemistry

pH	7.65		pH Units	M_TTT	1	BDK0064	11/5/18 7:58	11/5/18 9:22	SM 4500-H+ B	CRL
Total Dissolved Solids	394	20.0	mg/L		1	BDK0062	11/5/18 9:35	11/5/18 9:35	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDK0061	11/5/18 7:52	11/5/18 7:52	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.510	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 8:47	EPA 200.8	CRL
Barium	35.8	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 8:47	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 8:47	EPA 200.8	CRL
Chromium	1.08	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 8:47	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 8:47	EPA 200.8	CRL
Selenium	4.17	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 8:47	EPA 200.8	CRL

Total Metals by ICP

Boron	0.716	0.0500	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 13:22	EPA 200.7	HRD
Calcium	83.1	1.25	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 13:21	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

Rinse

MDK0026-04 (Water) - Chain of Custody Number: 1845962/1845961

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	BDK0098	11/6/18 6:10	11/6/18 18:22	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDK0098	11/6/18 6:10	11/6/18 18:22	EPA 300.0	CRL
Sulfate	< 1.00	1.00	mg/L		1	BDK0098	11/6/18 6:10	11/6/18 18:22	EPA 300.0	CRL

Wet Chemistry

pH	6.26		pH Units	M_TTT	1	BDK0064	11/5/18 7:58	11/5/18 10:08	SM 4500-H+ B	CRL
Total Dissolved Solids	< 20.0	20.0	mg/L		1	BDK0062	11/5/18 9:35	11/5/18 9:35	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDK0061	11/5/18 7:52	11/5/18 7:52	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:22	EPA 200.8	CRL
Barium	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:22	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:22	EPA 200.8	CRL
Chromium	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:22	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:22	EPA 200.8	CRL
Selenium	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:22	EPA 200.8	CRL

Total Metals by ICP

Boron	< 0.0500	0.0500	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 14:08	EPA 200.7	HRD
Calcium	< 1.25	1.25	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 14:07	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		11/20/2018 08:43
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

P-152A

MDK0026-05 (Water) - Chain of Custody Number: 1845962/1845961

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	BDK0098	11/6/18 6:10	11/6/18 18:42	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDK0098	11/6/18 6:10	11/6/18 18:42	EPA 300.0	CRL
Sulfate	10.5	1.00	mg/L		1	BDK0098	11/6/18 6:10	11/6/18 18:42	EPA 300.0	CRL

Wet Chemistry

pH	7.81		pH Units	M_TTT	1	BDK0064	11/5/18 7:58	11/5/18 10:12	SM 4500-H+ B	CRL
Total Dissolved Solids	218	20.0	mg/L		1	BDK0094	11/6/18 8:56	11/6/18 8:56	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDK0093	11/6/18 6:55	11/6/18 6:55	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:26	EPA 200.8	CRL
Barium	36.8	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:26	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:26	EPA 200.8	CRL
Chromium	0.794	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:26	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:26	EPA 200.8	CRL
Selenium	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:26	EPA 200.8	CRL

Total Metals by ICP

Boron	0.0566	0.0500	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 14:13	EPA 200.7	HRD
Calcium	59.3	1.25	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 14:12	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

Duplicate

MDK0026-06 (Water) - Chain of Custody Number: 1845962/1845961

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	BDK0154	11/7/18 7:29	11/7/18 10:38	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 10:38	EPA 300.0	CRL
Sulfate	10.7	1.00	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 10:38	EPA 300.0	CRL

Wet Chemistry

pH	7.84		pH Units	M_TTT	1	BDK0064	11/5/18 7:58	11/5/18 10:15	SM 4500-H+ B	CRL
Total Dissolved Solids	204	20.0	mg/L		1	BDK0094	11/6/18 8:56	11/6/18 8:56	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDK0093	11/6/18 6:55	11/6/18 6:55	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.512	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:30	EPA 200.8	CRL
Barium	37.7	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:30	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:30	EPA 200.8	CRL
Chromium	0.777	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:30	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:30	EPA 200.8	CRL
Selenium	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:30	EPA 200.8	CRL

Total Metals by ICP

Boron	0.0570	0.0500	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 14:18	EPA 200.7	HRD
Calcium	60.4	1.25	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 14:17	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

P-17

MDK0028-01 (Water) - Chain of Custody Number: 1845962/1845961

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

Chloride	19.7	1.00	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 12:41	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 12:41	EPA 300.0	CRL
Sulfate	27.1	1.00	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 12:41	EPA 300.0	CRL

Wet Chemistry

pH	7.87		pH Units	M_TTT	1	BDK0064	11/5/18 7:58	11/5/18 10:46	SM 4500-H+ B	CRL
Total Dissolved Solids	306	20.0	mg/L		1	BDK0094	11/6/18 8:56	11/6/18 8:56	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDK0093	11/6/18 6:55	11/6/18 6:55	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.509	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:53	EPA 200.8	CRL
Barium	40.0	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:53	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:53	EPA 200.8	CRL
Chromium	0.800	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:53	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:53	EPA 200.8	CRL
Selenium	0.534	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:53	EPA 200.8	CRL

Total Metals by ICP

Boron	< 0.0500	0.0500	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 14:48	EPA 200.7	HRD
Calcium	77.5	1.25	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 14:46	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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MDK0028-02 (Water) - Chain of Custody Number: 1845962/1845961

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

Chloride	4.67	1.00	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 13:01	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 13:01	EPA 300.0	CRL
Sulfate	174	1.00	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 13:01	EPA 300.0	CRL

Wet Chemistry

pH	7.71		pH Units	M_TTT	1	BDK0064	11/5/18 7:58	11/5/18 10:50	SM 4500-H+ B	CRL
Total Dissolved Solids	514	20.0	mg/L		1	BDK0094	11/6/18 8:56	11/6/18 8:56	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDK0093	11/6/18 6:55	11/6/18 6:55	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.557	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:57	EPA 200.8	CRL
Barium	79.8	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:57	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:57	EPA 200.8	CRL
Chromium	0.797	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:57	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:57	EPA 200.8	CRL
Selenium	1.97	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 9:57	EPA 200.8	CRL

Total Metals by ICP

Boron	0.802	0.0500	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 14:53	EPA 200.7	HRD
Calcium	114	1.25	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 14:52	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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MDK0028-03 (Water) - Chain of Custody Number: 1845962/1845961

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	BDK0154	11/7/18 7:29	11/7/18 13:22	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 13:22	EPA 300.0	CRL
Sulfate	66.1	1.00	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 13:22	EPA 300.0	CRL

Wet Chemistry

pH	7.68		pH Units	M_TTT	1	BDK0064	11/5/18 7:58	11/5/18 10:53	SM 4500-H+ B	CRL
Total Dissolved Solids	370	20.0	mg/L		1	BDK0094	11/6/18 8:56	11/6/18 8:56	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDK0093	11/6/18 6:55	11/6/18 6:55	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:09	EPA 200.8	CRL
Barium	45.5	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:09	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:09	EPA 200.8	CRL
Chromium	1.63	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:09	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:09	EPA 200.8	CRL
Selenium	2.24	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:09	EPA 200.8	CRL

Total Metals by ICP

Boron	0.244	0.0500	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 15:08	EPA 200.7	HRD
Calcium	86.7	1.25	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 15:07	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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MDK0028-04 (Water) - Chain of Custody Number: 1845962/1845961

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

Chloride	2.05	1.00	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 13:42	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 13:42	EPA 300.0	CRL
Sulfate	19.4	1.00	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 13:42	EPA 300.0	CRL

Wet Chemistry

pH	7.85		pH Units	M_TTT	1	BDK0064	11/5/18 7:58	11/5/18 10:57	SM 4500-H+ B	CRL
Total Dissolved Solids	254	20.0	mg/L		1	BDK0120	11/7/18 9:08	11/7/18 9:08	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDK0119	11/7/18 7:04	11/7/18 7:04	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	0.565	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:13	EPA 200.8	CRL
Barium	49.9	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:13	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:13	EPA 200.8	CRL
Chromium	0.754	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:13	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:13	EPA 200.8	CRL
Selenium	2.03	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:13	EPA 200.8	CRL

Total Metals by ICP

Boron	0.165	0.0500	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 15:13	EPA 200.7	HRD
Calcium	66.0	1.25	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 15:12	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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MDK0028-05 (Water) - Chain of Custody Number: 1845962/1845961

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

Chloride	19.5	1.00	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 15:45	EPA 300.0	CRL
Fluoride	< 0.750	0.750	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 15:45	EPA 300.0	CRL
Sulfate	167	1.00	mg/L		1	BDK0154	11/7/18 7:29	11/7/18 15:45	EPA 300.0	CRL

Wet Chemistry

pH	7.72		pH Units	M_TTT	1	BDK0064	11/5/18 7:58	11/5/18 11:00	SM 4500-H+ B	CRL
Total Dissolved Solids	504	20.0	mg/L		1	BDK0120	11/7/18 9:08	11/7/18 9:08	SM 2540C	HSD
Total Suspended Solids	< 4.00	4.00	mg/L		1	BDK0119	11/7/18 7:04	11/7/18 7:04	SM 2540D	HSD

Total Metals by ICPMS

Arsenic	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:17	EPA 200.8	CRL
Barium	64.3	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:17	EPA 200.8	CRL
Cobalt	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:17	EPA 200.8	CRL
Chromium	0.997	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:17	EPA 200.8	CRL
Molybdenum	< 0.500	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:17	EPA 200.8	CRL
Selenium	4.96	0.500	ug/L		1	BDK0069	11/5/18 9:17	11/8/18 10:17	EPA 200.8	CRL

Total Metals by ICP

Boron	1.51	0.0500	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 15:18	EPA 200.7	HRD
Calcium	93.7	1.25	mg/L		1	BDK0068	11/5/18 9:11	11/7/18 15:17	EPA 200.7	HRD

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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 BDK0067 - Wet Prep

Blank (BDK0067-BLK1)				Prepared & Analyzed: 11/05/2018						
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

Blank (BDK0067-BLK2)				Prepared & Analyzed: 11/05/2018						
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

LCS (BDK0067-BS1)				Prepared & Analyzed: 11/05/2018						
Chloride	23.6	1.00	mg/L	25.000		94.6	90-110			
Fluoride	2.63	0.750	mg/L	2.5000		105	90-110			
Sulfate	45.8	1.00	mg/L	48.000		95.4	90-110			

LCS (BDK0067-BS2)				Prepared & Analyzed: 11/05/2018						
Chloride	23.7	1.00	mg/L	25.000		95.0	90-110			
Fluoride	2.61	0.750	mg/L	2.5000		104	90-110			
Sulfate	45.7	1.00	mg/L	48.000		95.2	90-110			

LCS (BDK0067-BS3)				Prepared & Analyzed: 11/05/2018						
Chloride	23.7	1.00	mg/L	25.000		94.9	90-110			
Fluoride	2.60	0.750	mg/L	2.5000		104	90-110			
Sulfate	45.7	1.00	mg/L	48.000		95.1	90-110			

Duplicate (BDK0067-DUP1)				Source: MDJ0374-11		Prepared & Analyzed: 11/05/2018				
Chloride	12.1	1.00	mg/L		12.3			1.54	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	45.1	1.00	mg/L		45.5			0.847	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		11/20/2018 08:43
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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 BDK0067 - Wet Prep

Duplicate (BDK0067-DUP2)		Source: MDJ0374-12		Prepared & Analyzed: 11/05/2018						
Chloride	9.77	1.00	mg/L		9.88			1.07	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	55.5	1.00	mg/L		56.2			1.21	20	

Matrix Spike (BDK0067-MS1)		Source: MDJ0374-11		Prepared & Analyzed: 11/05/2018						
Chloride	41.7	1.25	mg/L	31.250	12.3	94.0	80-120			
Fluoride	3.01	0.938	mg/L	3.1250	<0.938	96.4	80-120			
Sulfate	102	1.25	mg/L	60.000	45.5	93.6	80-120			

Matrix Spike (BDK0067-MS2)		Source: MDJ0374-12		Prepared & Analyzed: 11/05/2018						
Chloride	40.7	1.25	mg/L	31.250	9.88	98.7	80-120			
Fluoride	3.35	0.938	mg/L	3.1250	<0.938	107	80-120			
Sulfate	115	1.25	mg/L	60.000	56.2	97.8	80-120			

Matrix Spike Dup (BDK0067-MSD1)		Source: MDJ0374-11		Prepared & Analyzed: 11/05/2018						
Chloride	42.8	1.25	mg/L	31.250	12.3	97.6	80-120	2.64	20	
Fluoride	3.40	0.938	mg/L	3.1250	<0.938	109	80-120	12.0	20	
Sulfate	104	1.25	mg/L	60.000	45.5	97.3	80-120	2.17	20	

Matrix Spike Dup (BDK0067-MSD2)		Source: MDJ0374-12		Prepared & Analyzed: 11/05/2018						
Chloride	40.8	1.25	mg/L	31.250	9.88	99.0	80-120	0.230	20	
Fluoride	3.45	0.938	mg/L	3.1250	<0.938	110	80-120	2.98	20	
Sulfate	115	1.25	mg/L	60.000	56.2	97.9	80-120	0.0696	20	

Batch BDK0098 - Wet Prep

Blank (BDK0098-BLK1)		Prepared & Analyzed: 11/06/2018								
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	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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 BDK0098 - Wet Prep

Blank (BDK0098-BLK2)				Prepared & Analyzed: 11/06/2018						
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

LCS (BDK0098-BS1)				Prepared & Analyzed: 11/06/2018						
Chloride	24.9	1.00	mg/L	25.000		99.4	90-110			
Fluoride	2.65	0.750	mg/L	2.5000		106	90-110			
Sulfate	47.9	1.00	mg/L	48.000		99.7	90-110			

LCS (BDK0098-BS2)				Prepared & Analyzed: 11/06/2018						
Chloride	23.9	1.00	mg/L	25.000		95.5	90-110			
Fluoride	2.51	0.750	mg/L	2.5000		101	90-110			
Sulfate	45.8	1.00	mg/L	48.000		95.4	90-110			

LCS (BDK0098-BS3)				Prepared & Analyzed: 11/06/2018						
Chloride	23.9	1.00	mg/L	25.000		95.7	90-110			
Fluoride	2.51	0.750	mg/L	2.5000		100	90-110			
Sulfate	45.9	1.00	mg/L	48.000		95.6	90-110			

Duplicate (BDK0098-DUP1)				Source: MDJ0374-19		Prepared & Analyzed: 11/06/2018				
Chloride	0.759	1.00	mg/L		0.762			0.394	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	3.88	1.00	mg/L		3.85			0.906	20	

Duplicate (BDK0098-DUP2)				Source: MDJ0374-21		Prepared & Analyzed: 11/06/2018				
Chloride	0.974	1.00	mg/L		0.961			1.34	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	12.9	1.00	mg/L		12.6			2.82	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		11/20/2018 08:43
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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 BDK0098 - Wet Prep

Matrix Spike (BDK0098-MS1)	Source: MDJ0374-19			Prepared & Analyzed: 11/06/2018						
Chloride	30.5	1.25	mg/L	31.250	0.762	95.1	80-120			
Fluoride	3.25	0.938	mg/L	3.1250	<0.938	104	80-120			
Sulfate	61.4	1.25	mg/L	60.000	3.85	95.9	80-120			

Matrix Spike (BDK0098-MS2)	Source: MDJ0374-21			Prepared & Analyzed: 11/06/2018						
Chloride	31.5	1.25	mg/L	31.250	0.961	97.9	80-120			
Fluoride	3.41	0.938	mg/L	3.1250	<0.938	109	80-120			
Sulfate	72.1	1.25	mg/L	60.000	12.6	99.3	80-120			

Matrix Spike Dup (BDK0098-MSD1)	Source: MDJ0374-19			Prepared & Analyzed: 11/06/2018						
Chloride	31.7	1.25	mg/L	31.250	0.762	99.1	80-120	4.03	20	
Fluoride	3.34	0.938	mg/L	3.1250	<0.938	107	80-120	2.69	20	
Sulfate	63.7	1.25	mg/L	60.000	3.85	99.8	80-120	3.67	20	

Matrix Spike Dup (BDK0098-MSD2)	Source: MDJ0374-21			Prepared & Analyzed: 11/06/2018						
Chloride	31.8	1.25	mg/L	31.250	0.961	98.6	80-120	0.711	20	
Fluoride	3.34	0.938	mg/L	3.1250	<0.938	107	80-120	2.00	20	
Sulfate	72.5	1.25	mg/L	60.000	12.6	99.8	80-120	0.448	20	

Batch BDK0154 - Wet Prep

Blank (BDK0154-BLK1)	Prepared & Analyzed: 11/07/2018									
Chloride	<1.00	1.00	mg/L							
Fluoride	<0.750	0.750	mg/L							
Sulfate	<1.00	1.00	mg/L							

Blank (BDK0154-BLK2)	Prepared & Analyzed: 11/07/2018									
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	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		11/20/2018 08:43
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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 BDK0154 - Wet Prep

LCS (BDK0154-BS1)			Prepared & Analyzed: 11/07/2018							
Chloride	24.4	1.00	mg/L	25.000		97.4	90-110			
Fluoride	2.50	0.750	mg/L	2.5000		100	90-110			
Sulfate	47.0	1.00	mg/L	48.000		97.9	90-110			

LCS (BDK0154-BS2)			Prepared & Analyzed: 11/07/2018							
Chloride	23.7	1.00	mg/L	25.000		94.8	90-110			
Fluoride	2.50	0.750	mg/L	2.5000		100	90-110			
Sulfate	45.6	1.00	mg/L	48.000		94.9	90-110			

LCS (BDK0154-BS3)			Prepared & Analyzed: 11/07/2018							
Chloride	23.6	1.00	mg/L	25.000		94.5	90-110			
Fluoride	2.48	0.750	mg/L	2.5000		99.2	90-110			
Sulfate	45.4	1.00	mg/L	48.000		94.6	90-110			

Duplicate (BDK0154-DUP1)			Source: MDK0026-08		Prepared & Analyzed: 11/07/2018					
Chloride	18.1	1.00	mg/L		18.1			0.0938	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	18.2	1.00	mg/L		18.0			0.900	20	

Duplicate (BDK0154-DUP2)			Source: MDK0026-09		Prepared & Analyzed: 11/07/2018					
Chloride	0.405	1.00	mg/L		0.404			0.247	20	
Fluoride	<0.750	0.750	mg/L		<0.750				20	
Sulfate	3.17	1.00	mg/L		3.14			0.887	20	

Matrix Spike (BDK0154-MS1)			Source: MDK0026-08		Prepared & Analyzed: 11/07/2018					
Chloride	47.4	1.25	mg/L	31.250	18.1	93.6	80-120			
Fluoride	2.98	0.938	mg/L	3.1250	<0.938	95.5	80-120			
Sulfate	74.4	1.25	mg/L	60.000	18.0	93.9	80-120			

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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 BDK0154 - Wet Prep

Matrix Spike (BDK0154-MS2)	Source: MDK0026-09			Prepared & Analyzed: 11/07/2018						
Chloride	30.8	1.25	mg/L	31.250	0.404	97.4	80-120			
Fluoride	3.28	0.938	mg/L	3.1250	<0.938	105	80-120			
Sulfate	62.0	1.25	mg/L	60.000	3.14	98.0	80-120			

Matrix Spike Dup (BDK0154-MSD1)	Source: MDK0026-08			Prepared & Analyzed: 11/07/2018						
Chloride	48.8	1.25	mg/L	31.250	18.1	98.3	80-120	3.06	20	
Fluoride	3.28	0.938	mg/L	3.1250	<0.938	105	80-120	9.35	20	
Sulfate	76.9	1.25	mg/L	60.000	18.0	98.2	80-120	3.40	20	

Matrix Spike Dup (BDK0154-MSD2)	Source: MDK0026-09			Prepared & Analyzed: 11/07/2018						
Chloride	30.9	1.25	mg/L	31.250	0.404	97.5	80-120	0.0770	20	
Fluoride	3.40	0.938	mg/L	3.1250	<0.938	109	80-120	3.52	20	
Sulfate	62.1	1.25	mg/L	60.000	3.14	98.3	80-120	0.244	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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 BDJ0785 - Wet Prep

Blank (BDJ0785-BLK1)				Prepared & Analyzed: 10/31/2018						
Total Suspended Solids	<4.00	4.00	mg/L							
Duplicate (BDJ0785-DUP1)				Source: MDJ0364-01		Prepared & Analyzed: 10/31/2018				
Total Suspended Solids	7.20	4.00	mg/L		6.00			18.2	20	

Batch BDJ0786 - Wet Prep

Blank (BDJ0786-BLK1)				Prepared & Analyzed: 10/31/2018						
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BDJ0786-DUP1)				Source: MDJ0364-01		Prepared & Analyzed: 10/31/2018				
Total Dissolved Solids	548	20.0	mg/L		554			1.09	20	

Batch BDJ0802 - Wet Prep

LCS (BDJ0802-BS1)				Prepared & Analyzed: 10/31/2018						
pH	7.08		pH Units	7.0000		101	90-110			
LCS (BDJ0802-BS2)				Prepared & Analyzed: 10/31/2018						
pH	7.09		pH Units	7.0000		101	90-110			
Duplicate (BDJ0802-DUP1)				Source: MDJ0374-02		Prepared & Analyzed: 10/31/2018				
pH	7.64		pH Units	7.66				0.261	20	
Duplicate (BDJ0802-DUP2)				Source: MDJ0374-11		Prepared & Analyzed: 10/31/2018				
pH	7.78		pH Units	7.77				0.129	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
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Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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 BDJ0802 - Wet Prep

Duplicate (BDJ0802-DUP3)	Source: MDJ0374-21		Prepared & Analyzed: 10/31/2018							
pH	7.79		pH Units		7.78			0.128	20	

Batch BDJ0808 - Wet Prep

Blank (BDJ0808-BLK1)	Prepared & Analyzed: 11/01/2018									
Total Suspended Solids	<4.00	4.00	mg/L							
Duplicate (BDJ0808-DUP1)	Source: MDJ0374-10		Prepared & Analyzed: 11/01/2018							
Total Suspended Solids	<4.00	4.00	mg/L		<4.00				20	

Batch BDJ0809 - Wet Prep

Blank (BDJ0809-BLK1)	Prepared & Analyzed: 11/01/2018									
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BDJ0809-DUP1)	Source: MDJ0374-10		Prepared & Analyzed: 11/01/2018							
Total Dissolved Solids	426	20.0	mg/L		434			1.86	20	

Batch BDK0033 - Wet Prep

Blank (BDK0033-BLK1)	Prepared & Analyzed: 11/02/2018									
Total Suspended Solids	<4.00	4.00	mg/L							
Duplicate (BDK0033-DUP1)	Source: MDJ0374-20		Prepared & Analyzed: 11/02/2018							
Total Suspended Solids	0.400	4.00	mg/L		0.400			0.00	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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 BDK0034 - Wet Prep

Blank (BDK0034-BLK1)				Prepared & Analyzed: 11/02/2018						
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BDK0034-DUP1)				Source: MDJ0374-20		Prepared & Analyzed: 11/02/2018				
Total Dissolved Solids	1390	20.0	mg/L		1400			0.715	20	

Batch BDK0061 - Wet Prep

Blank (BDK0061-BLK1)				Prepared & Analyzed: 11/05/2018						
Total Suspended Solids	<4.00	4.00	mg/L							
Duplicate (BDK0061-DUP1)				Source: MDK0025-01		Prepared & Analyzed: 11/05/2018				
Total Suspended Solids	75.6	4.00	mg/L		65.2			14.8	20	

Batch BDK0062 - Wet Prep

Blank (BDK0062-BLK1)				Prepared & Analyzed: 11/05/2018						
Total Dissolved Solids	<20.0	20.0	mg/L							
Duplicate (BDK0062-DUP1)				Source: MDK0025-01		Prepared & Analyzed: 11/05/2018				
Total Dissolved Solids	352	20.0	mg/L		358			1.69	20	

Batch BDK0064 - Wet Prep

LCS (BDK0064-BS1)				Prepared & Analyzed: 11/05/2018						
pH	7.06		pH Units	7.0000		101	90-110			

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
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Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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 BDK0064 - Wet Prep

LCS (BDK0064-BS2)				Prepared & Analyzed: 11/05/2018						
pH	7.06		pH Units	7.0000		101	90-110			
Duplicate (BDK0064-DUP1)				Source: MDK0025-01 Prepared & Analyzed: 11/05/2018						
pH	7.70		pH Units	7.76		0.776	20			
Duplicate (BDK0064-DUP2)				Source: MDK0026-01 Prepared & Analyzed: 11/05/2018						
pH	8.01		pH Units	8.02		0.125	20			
Duplicate (BDK0064-DUP3)				Source: MDK0026-11 Prepared & Analyzed: 11/05/2018						
pH	7.84		pH Units	7.84		0.00	20			
Duplicate (BDK0064-DUP4)				Source: MDK0029-02 Prepared & Analyzed: 11/05/2018						
pH	7.62		pH Units	7.66		0.524	20			

Batch BDK0093 - Wet Prep

Blank (BDK0093-BLK1)				Prepared & Analyzed: 11/06/2018						
Total Suspended Solids	<4.00	4.00	mg/L							
Duplicate (BDK0093-DUP1)				Source: MDK0026-05 Prepared & Analyzed: 11/06/2018						
Total Suspended Solids	<4.00	4.00	mg/L	<4.00			20			

Batch BDK0094 - Wet Prep

Blank (BDK0094-BLK1)				Prepared & Analyzed: 11/06/2018						
Total Dissolved Solids	<20.0	20.0	mg/L							

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Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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 BDK0094 - Wet Prep

Duplicate (BDK0094-DUP1)		Source: MDK0026-05		Prepared & Analyzed: 11/06/2018			
Total Dissolved Solids	206	20.0	mg/L	218	5.66	20	

Batch BDK0119 - Wet Prep

Blank (BDK0119-BLK1)				Prepared & Analyzed: 11/07/2018			
Total Suspended Solids	<4.00	4.00	mg/L				
Duplicate (BDK0119-DUP1)				Prepared & Analyzed: 11/07/2018			
Total Suspended Solids	<4.00	4.00	mg/L	<4.00	20		

Batch BDK0120 - Wet Prep

Blank (BDK0120-BLK1)				Prepared & Analyzed: 11/07/2018			
Total Dissolved Solids	<20.0	20.0	mg/L				
Duplicate (BDK0120-DUP1)				Prepared & Analyzed: 11/07/2018			
Total Dissolved Solids	242	20.0	mg/L	254	4.84	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
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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 BDJ0800 - EPA 200.2, EPA 3005

Blank (BDJ0800-BLK1)

Prepared: 10/31/2018 Analyzed: 11/01/2018

Arsenic	<0.500	0.500	ug/L							
Molybdenum	<0.500	0.500	ug/L							
Selenium	<0.500	0.500	ug/L							
Chromium	<0.500	0.500	ug/L							
Barium	<0.500	0.500	ug/L							
Cobalt	<0.500	0.500	ug/L							

LCS (BDJ0800-BS1)

Prepared: 10/31/2018 Analyzed: 11/01/2018

Chromium	103	0.500	ug/L	100.00		103	85-115			
Cobalt	103	0.500	ug/L	100.00		103	85-115			
Molybdenum	99.1	0.500	ug/L	100.00		99.1	85-115			
Selenium	98.9	0.500	ug/L	100.00		98.9	85-115			
Arsenic	96.8	0.500	ug/L	100.00		96.8	85-115			
Barium	98.2	0.500	ug/L	100.00		98.2	85-115			

Duplicate (BDJ0800-DUP1)

Source: MDJ0364-01

Prepared: 10/31/2018 Analyzed: 11/01/2018

Chromium	1.31	0.500	ug/L		1.36			3.75	20	
Barium	64.6	0.500	ug/L		63.2			2.09	20	
Molybdenum	3.21	0.500	ug/L		3.28			2.11	20	
Selenium	0.766	0.500	ug/L		0.806			5.11	20	
Cobalt	8.13	0.500	ug/L		8.11			0.318	20	
Arsenic	1.08	0.500	ug/L		1.04			4.13	20	

Matrix Spike (BDJ0800-MS1)

Source: MDJ0364-01

Prepared: 10/31/2018 Analyzed: 11/01/2018

Barium	168	0.500	ug/L	100.00	63.2	105	70-130			
Arsenic	106	0.500	ug/L	100.00	1.04	105	70-130			
Molybdenum	104	0.500	ug/L	100.00	3.28	101	70-130			
Chromium	106	0.500	ug/L	100.00	1.36	104	70-130			
Cobalt	112	0.500	ug/L	100.00	8.11	104	70-130			
Selenium	98.3	0.500	ug/L	100.00	0.806	97.5	70-130			

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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 BDJ0800 - EPA 200.2, EPA 3005

Matrix Spike Dup (BDJ0800-MSD1)	Source: MDJ0364-01			Prepared: 10/31/2018 Analyzed: 11/01/2018						
Molybdenum	107	0.500	ug/L	100.00	3.28	103	70-130	2.47	20	
Selenium	103	0.500	ug/L	100.00	0.806	102	70-130	4.68	20	
Cobalt	112	0.500	ug/L	100.00	8.11	104	70-130	0.195	20	
Barium	168	0.500	ug/L	100.00	63.2	105	70-130	0.282	20	
Chromium	109	0.500	ug/L	100.00	1.36	107	70-130	2.89	20	
Arsenic	106	0.500	ug/L	100.00	1.04	105	70-130	0.210	20	

Batch BDK0069 - EPA 200.2, EPA 3005

Blank (BDK0069-BLK1)	Prepared: 11/05/2018 Analyzed: 11/08/2018									
Cobalt	<0.500	0.500	ug/L							
Selenium	<0.500	0.500	ug/L							
Chromium	<0.500	0.500	ug/L							
Molybdenum	<0.500	0.500	ug/L							
Arsenic	<0.500	0.500	ug/L							
Barium	<0.500	0.500	ug/L							

Blank (BDK0069-BLK2)	Prepared: 11/05/2018 Analyzed: 11/08/2018									
Chromium	<0.500	0.500	ug/L							
Cobalt	<0.500	0.500	ug/L							
Barium	<0.500	0.500	ug/L							
Arsenic	<0.500	0.500	ug/L							
Molybdenum	<0.500	0.500	ug/L							
Selenium	<0.500	0.500	ug/L							

LCS (BDK0069-BS1)	Prepared: 11/05/2018 Analyzed: 11/08/2018									
Molybdenum	99.5	0.500	ug/L	100.00		99.5	85-115			
Barium	93.8	0.500	ug/L	100.00		93.8	85-115			
Chromium	99.4	0.500	ug/L	100.00		99.4	85-115			
Cobalt	100	0.500	ug/L	100.00		100	85-115			
Selenium	95.2	0.500	ug/L	100.00		95.2	85-115			
Arsenic	96.2	0.500	ug/L	100.00		96.2	85-115			

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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 BDK0069 - EPA 200.2, EPA 3005

LCS (BDK0069-BS2)

Prepared: 11/05/2018 Analyzed: 11/08/2018

Cobalt	100	0.500	ug/L	100.00		100	85-115			
Arsenic	98.6	0.500	ug/L	100.00		98.6	85-115			
Chromium	101	0.500	ug/L	100.00		101	85-115			
Selenium	99.2	0.500	ug/L	100.00		99.2	85-115			
Molybdenum	101	0.500	ug/L	100.00		101	85-115			
Barium	98.7	0.500	ug/L	100.00		98.7	85-115			

Duplicate (BDK0069-DUP1)

Source: MDK0026-07

Prepared: 11/05/2018 Analyzed: 11/08/2018

Cobalt	0.0325	0.500	ug/L		<0.500			20		
Arsenic	0.568	0.500	ug/L		0.628			10.2	20	
Selenium	0.295	0.500	ug/L		0.381			25.5	20	M_D-RL
Molybdenum	0.234	0.500	ug/L		0.146			46.4	20	M_D-RL
Barium	51.6	0.500	ug/L		50.8			1.56	20	
Chromium	0.735	0.500	ug/L		0.732			0.375	20	

Duplicate (BDK0069-DUP2)

Source: MDK0026-08

Prepared: 11/05/2018 Analyzed: 11/08/2018

Cobalt	0.193	0.500	ug/L		0.183			4.95	20	
Selenium	0.371	0.500	ug/L		0.468			23.1	20	M_D-RL
Molybdenum	0.306	0.500	ug/L		0.314			2.50	20	
Barium	46.8	0.500	ug/L		47.2			0.862	20	
Chromium	0.841	0.500	ug/L		0.851			1.22	20	
Arsenic	0.250	0.500	ug/L		0.315			22.8	20	M_D-RL

Duplicate (BDK0069-DUP3)

Source: MDK0026-09

Prepared: 11/05/2018 Analyzed: 11/08/2018

Selenium	0.340	0.500	ug/L		0.387			13.0	20	
Cobalt	0.0251	0.500	ug/L		<0.500				20	
Chromium	0.817	0.500	ug/L		0.798			2.28	20	
Barium	16.5	0.500	ug/L		16.7			1.17	20	
Arsenic	1.07	0.500	ug/L		1.14			6.67	20	
Molybdenum	0.692	0.500	ug/L		0.697			0.654	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
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Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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 BDK0069 - EPA 200.2, EPA 3005

Matrix Spike (BDK0069-MS1)		Source: MDK0026-07		Prepared: 11/05/2018 Analyzed: 11/08/2018						
Chromium	103	0.500	ug/L	100.00	0.732	102	70-130			
Molybdenum	103	0.500	ug/L	100.00	0.146	103	70-130			
Arsenic	102	0.500	ug/L	100.00	0.628	102	70-130			
Barium	144	0.500	ug/L	100.00	50.8	92.9	70-130			
Selenium	103	0.500	ug/L	100.00	0.381	103	70-130			
Cobalt	106	0.500	ug/L	100.00	<0.500	106	70-130			
Matrix Spike (BDK0069-MS2)		Source: MDK0026-08		Prepared: 11/05/2018 Analyzed: 11/08/2018						
Chromium	103	0.500	ug/L	100.00	0.851	102	70-130			
Cobalt	102	0.500	ug/L	100.00	0.183	102	70-130			
Barium	145	0.500	ug/L	100.00	47.2	98.2	70-130			
Arsenic	98.2	0.500	ug/L	100.00	0.315	97.8	70-130			
Selenium	98.3	0.500	ug/L	100.00	0.468	97.9	70-130			
Molybdenum	103	0.500	ug/L	100.00	0.314	103	70-130			
Matrix Spike (BDK0069-MS3)		Source: MDK0026-09		Prepared: 11/05/2018 Analyzed: 11/08/2018						
Cobalt	102	0.500	ug/L	100.00	<0.500	102	70-130			
Arsenic	102	0.500	ug/L	100.00	1.14	101	70-130			
Chromium	102	0.500	ug/L	100.00	0.798	101	70-130			
Selenium	102	0.500	ug/L	100.00	0.387	102	70-130			
Molybdenum	104	0.500	ug/L	100.00	0.697	104	70-130			
Barium	116	0.500	ug/L	100.00	16.7	98.9	70-130			
Matrix Spike Dup (BDK0069-MSD1)		Source: MDK0026-07		Prepared: 11/05/2018 Analyzed: 11/08/2018						
Cobalt	103	0.500	ug/L	100.00	<0.500	103	70-130	3.24	20	
Selenium	98.7	0.500	ug/L	100.00	0.381	98.3	70-130	4.29	20	
Molybdenum	98.2	0.500	ug/L	100.00	0.146	98.1	70-130	4.94	20	
Barium	143	0.500	ug/L	100.00	50.8	92.2	70-130	0.424	20	
Chromium	102	0.500	ug/L	100.00	0.732	101	70-130	0.941	20	
Arsenic	97.2	0.500	ug/L	100.00	0.628	96.5	70-130	5.03	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 BDK0069 - EPA 200.2, EPA 3005

Matrix Spike Dup (BDK0069-MSD2)		Source: MDK0026-08		Prepared: 11/05/2018 Analyzed: 11/08/2018						
Arsenic	101	0.500	ug/L	100.00	0.315	101	70-130	2.77	20	
Molybdenum	106	0.500	ug/L	100.00	0.314	106	70-130	3.03	20	
Barium	144	0.500	ug/L	100.00	47.2	97.1	70-130	0.729	20	
Cobalt	101	0.500	ug/L	100.00	0.183	100	70-130	1.76	20	
Chromium	103	0.500	ug/L	100.00	0.851	102	70-130	0.0966	20	
Selenium	102	0.500	ug/L	100.00	0.468	101	70-130	3.46	20	
Matrix Spike Dup (BDK0069-MSD3)		Source: MDK0026-09		Prepared: 11/05/2018 Analyzed: 11/08/2018						
Arsenic	102	0.500	ug/L	100.00	1.14	101	70-130	0.555	20	
Cobalt	98.4	0.500	ug/L	100.00	<0.500	98.4	70-130	3.32	20	
Selenium	101	0.500	ug/L	100.00	0.387	101	70-130	0.613	20	
Chromium	100	0.500	ug/L	100.00	0.798	99.5	70-130	1.97	20	
Molybdenum	104	0.500	ug/L	100.00	0.697	104	70-130	0.144	20	
Barium	114	0.500	ug/L	100.00	16.7	96.8	70-130	1.78	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

Total Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch BDJ0798 - EPA 200.2, EPA 3005

Blank (BDJ0798-BLK1)				Prepared: 10/31/2018 Analyzed: 11/06/2018						
Calcium	<1.25	1.25	mg/L							
Boron	<0.0500	0.0500	mg/L							
LCS (BDJ0798-BS1)				Prepared: 10/31/2018 Analyzed: 11/06/2018						
Calcium	109	1.25	mg/L	100.00		109	85-115			
Boron	1.04	0.0500	mg/L	1.0000		104	85-115			
Duplicate (BDJ0798-DUP1)				Source: MDJ0369-01		Prepared: 10/31/2018 Analyzed: 11/06/2018				
Calcium	137	1.25	mg/L		134			2.55	20	
Boron	0.0879	0.0500	mg/L		0.0876			0.335	20	
Matrix Spike (BDJ0798-MS1)				Source: MDJ0369-01		Prepared: 10/31/2018 Analyzed: 11/06/2018				
Calcium	247	1.25	mg/L	100.00	134	113	70-130			
Boron	1.15	0.0500	mg/L	1.0000	0.0876	107	70-130			
Matrix Spike Dup (BDJ0798-MSD1)				Source: MDJ0369-01		Prepared: 10/31/2018 Analyzed: 11/06/2018				
Boron	1.15	0.0500	mg/L	1.0000	0.0876	106	70-130	0.353	20	
Calcium	251	1.25	mg/L	100.00	134	117	70-130	1.73	20	

Batch BDK0068 - EPA 200.2, EPA 3005

Blank (BDK0068-BLK1)				Prepared: 11/05/2018 Analyzed: 11/07/2018						
Boron	<0.0500	0.0500	mg/L							
Calcium	<1.25	1.25	mg/L							
Blank (BDK0068-BLK2)				Prepared: 11/05/2018 Analyzed: 11/07/2018						
Boron	<0.0500	0.0500	mg/L							
Calcium	<1.25	1.25	mg/L							

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	Reported:
250 Marquette Plaza		11/20/2018 08:43
Minneapolis MN, 55401	Project Manager: Charles A Donkers	

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 BDK0068 - EPA 200.2, EPA 3005

LCS (BDK0068-BS1)				Prepared: 11/05/2018 Analyzed: 11/07/2018						
Calcium	103	1.25	mg/L	100.00		103	85-115			
Boron	0.983	0.0500	mg/L	1.0000		98.3	85-115			
LCS (BDK0068-BS2)				Prepared: 11/05/2018 Analyzed: 11/07/2018						
Calcium	106	1.25	mg/L	100.00		106	85-115			
Boron	1.01	0.0500	mg/L	1.0000		101	85-115			
Duplicate (BDK0068-DUP1)				Source: MDK0026-01		Prepared: 11/05/2018 Analyzed: 11/07/2018				
Calcium	95.4	1.25	mg/L		96.9			1.61	20	
Boron	0.205	0.0500	mg/L		0.212			3.59	20	
Duplicate (BDK0068-DUP2)				Source: MDK0026-02		Prepared: 11/05/2018 Analyzed: 11/07/2018				
Calcium	142	1.25	mg/L		142			0.284	20	
Boron	0.500	0.0500	mg/L		0.506			1.15	20	
Duplicate (BDK0068-DUP3)				Source: MDK0026-03		Prepared: 11/05/2018 Analyzed: 11/07/2018				
Calcium	76.1	1.25	mg/L		80.2			5.32	20	
Boron	0.0533	0.0500	mg/L		0.0532			0.0853	20	
Matrix Spike (BDK0068-MS1)				Source: MDK0026-01		Prepared: 11/05/2018 Analyzed: 11/07/2018				
Calcium	207	1.25	mg/L	100.00	96.9	111	70-130			
Boron	1.24	0.0500	mg/L	1.0000	0.212	103	70-130			
Matrix Spike (BDK0068-MS2)				Source: MDK0026-02		Prepared: 11/05/2018 Analyzed: 11/07/2018				
Calcium	253	1.25	mg/L	100.00	142	111	70-130			
Boron	1.53	0.0500	mg/L	1.0000	0.506	103	70-130			
Matrix Spike (BDK0068-MS3)				Source: MDK0026-03		Prepared: 11/05/2018 Analyzed: 11/07/2018				
Boron	1.09	0.0500	mg/L	1.0000	0.0532	103	70-130			
Calcium	188	1.25	mg/L	100.00	80.2	108	70-130			

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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 BDK0068 - EPA 200.2, EPA 3005

Matrix Spike Dup (BDK0068-MSD1)		Source: MDK0026-01		Prepared: 11/05/2018 Analyzed: 11/07/2018						
Calcium	204	1.25	mg/L	100.00	96.9	107	70-130	1.90	20	
Boron	1.25	0.0500	mg/L	1.0000	0.212	104	70-130	0.415	20	
Matrix Spike Dup (BDK0068-MSD2)		Source: MDK0026-02		Prepared: 11/05/2018 Analyzed: 11/07/2018						
Boron	1.53	0.0500	mg/L	1.0000	0.506	102	70-130	0.0701	20	
Calcium	254	1.25	mg/L	100.00	142	112	70-130	0.227	20	
Matrix Spike Dup (BDK0068-MSD3)		Source: MDK0026-03		Prepared: 11/05/2018 Analyzed: 11/07/2018						
Calcium	188	1.25	mg/L	100.00	80.2	108	70-130	0.159	20	
Boron	1.09	0.0500	mg/L	1.0000	0.0532	104	70-130	0.474	20	

Environmental Services-Water Minneapolis	Project Name/Location: Sherco BAP CCR	
250 Marquette Plaza		Reported:
Minneapolis MN, 55401	Project Manager: Charles A Donkers	11/20/2018 08:43

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.
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 Required Project Information:		Section C Invoice Information:	
Company:	Xcel Energy	Report To:	Chuck Donkers	Attention:	Steve Davis
Address:	Environmental Services	Copy To:		Company Name:	
Email To:	mp-7	Purchase Order No.:		Address:	
Phone:		Project Name:	Shelco Ponds NPDES + CCR	Pace Quote Reference:	
Fax:		Project Number:	Wells, Fall 2018	Pace Project Manager:	
Requested Due Date/TAT:		Pace Profile #:			
		Pace Profile #:			

Page: 1 of 3

1845943

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

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives							Requested Analysis Filtered (Y/N)	Pace Project No. / Lab I.D.
				COMPOSITE START	COMPOSITE END/GRAB			Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol		
1	Rinse	DW	WT	DATE	TIME	DATE	TIME									
2	P-129	WW	WT			10/29/18	1650	4	112							
3	P-128	P	WT				1135	3	111							
4	P-127	SL	WT				1240	3	111							
5	P-126	OL	WT				1305	3	111							
6	P-90A	WP	WT				1400	3	111							
7	P-92A	AR	WT				1455	3	111							
8	P-93A	TS	WT				1545	3	111							
9	P-23	OT	WT				1635	3	111							
10	duplicate		WT				1820	4	112							
11	P-43		WT				1820	4	112							
12	P-66		WT				0830	3	111							
			WT				0920	3	111							

ADDITIONAL COMMENTS		RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS	
David Ambrose / Pace		David Ambrose / Pace	10/30/18	1620	David Ambrose / Pace	10/30/18	1620	Received on	Temp in °C
Janel Preface		Janel Preface	10/30/18	0635	Janel Preface	10/30/18	0635	Sealed Cooler	
PH Step 5: mD00402								Custody	
								Samples Intact	

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: David Ambrose
SIGNATURE of SAMPLER: David Ambrose
DATE Signed (MM/DD/YY): 10/30/18



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 Environmental Services	Report To: Chuck Dankers	Attention: Steve Davis	Company Name:	REGULATORY AGENCY	
Address: MP-7	Copy To:		Address:	☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER	
Email To:	Purchase Order No.:		Pace Quote Reference:	☐ UST ☐ RCRA	OTHER _____
Phone:	Project Name: SAPECO Ponds NPDES + CCR		Pace Project Manager:	Site Location	
Requested Due Date/TAT:	Project Number: Wells Fall 2018			STATE:	

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F-ALL-Q-020rev.07, 15-May-2007

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

Section A Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Report To:	Attention:	Company Name:	Address:	Address:
Xcel Energy	Chuck Danters	Steve Davis			
Address:	Copy To:			Pace Quote Reference:	Pace Project Manager:
Environmental Services					
mp-7	Purchase Order No.:				
Email To:	Project Name:				
	Shetco Ponds ccr only wells				
Phone:	Project Number:				
Requested Due Date/TAT:					

[illegible][illegible]

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-Q-020rev.07, 15-May-2007

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</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>Chuck Dauters</u> Copy To: _____ Purchase Order No.: _____ Project Name: <u>Sherco Ponds ccr only wells</u> Project Number: _____		Section C Invoice Information: Attention: <u>Steve Davis</u> Company Name: _____ Address: _____ Pace Quote Reference: _____ Pace Project Manager: _____ Pace Profile #: _____	
Regulatory Agency: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER _____		Site Location: STATE: _____		Page: <u>1</u> of <u>2</u> 1845962	

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		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Y/N	Analysis Test	Y/N	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS	Pace Project No./ Lab I.D.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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1	P-162		WT			DATE	TIME	10/31/18	1230	2	1	Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

ADDITIONAL COMMENTS In cooler #45tripinm00402		RELINQUISHED BY / AFFILIATION David Andersen Pace	DATE 11-2-18	TIME 1345	ACCEPTED BY / AFFILIATION D/Xcel	DATE 11/5/18	TIME 1500	SAMPLE CONDITIONS Received on Ice (Y/N) ☒ Custody Sealed Cooler (Y/N) ☒ Samples Intact (Y/N) ☒
Temp in °C 18.2								

ORIGINAL

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: David Andersen
 SIGNATURE of SAMPLER: David Andersen
 DATE Signed (MM/DD/YY): 11-1-18

CHAIN-OF-CUSTODY / Analytical Request Document

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



www.pacelabs.com

Section A Required Client Information: Company: <u>Xcel 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>Chuck Donkers</u> Copy To: _____ Purchase Order No.: _____ Project Name: <u>Shelco Ponds NPDES + CCR</u> Project Number: <u>Wells, Fall 2018</u>		Section C Invoice Information: Attention: <u>Steve Davis</u> Company Name: _____ Address: _____ Pace Quote Reference: _____ Pace Project Manager: _____ Pace Profile #: _____	
Regulatory Agency: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER _____		Site Location: STATE: _____		Page: <u>2</u> of <u>3</u> <u>1845965</u>	

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE Drinking Water DW Water WT Waste Water WW Product P Soil/Solid SL Oil OL Wipe WP Air AR Tissue TS Other OT	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives								Analysis Test ↑ 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 S ₂ O ₃				Methanol	Other																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
David Anderson Pace Quality Assurance	David Anderson Pace Quality Assurance	10/30/18	1620	David Anderson Pace	10/30/18	1620	Received on _____ Custody (Y/N) _____ Sealed Cooler (Y/N) _____ Samples Intact (Y/N) _____
		10/30/18	0635	David Anderson Pace	10/30/18	0635	
Temp in °C: <u>M4084/12.3°C</u>							

ORIGINAL

D4 steps: MDO0402

SAMPALER NAME AND SIGNATURE PRINT Name of SAMPALER: <u>David Anderson</u> SIGNATURE of SAMPALER: <u>David Anderson</u>		DATE Signed (MM/DD/YY): <u>10/30/18</u>
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*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 Requested Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company: <u>Xcel Energy</u>	Report To: <u>Chuck Dankers</u>	Attention: <u>Steve Davis</u>	Company Name: _____	REGULATORY AGENCY	Page: <u>2</u> of <u>2</u> <u>1845961</u>
Address: <u>Environmental Services</u>	Copy To: _____	Address: _____	Address: _____	☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER _____	
Email To: <u>mp-7</u>	Purchase Order No.: _____	Pace Quote Reference: _____	Pace Project Manager: _____	Site Location	STATE: _____
Phone: _____	Project Name: <u>Shelco Ponds CCR only wells</u>	Project Number: _____	Pace Profile #: _____		
Requested Due Date/TAT: _____					

[illegible][illegible]

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>Xcel Energy</u> Address: <u>Environmental Services</u> Email To: <u>MP-7</u> Phone: <u></u> Fax: <u></u> Requested Due Date/TAT: <u></u>		Section B Required Project Information: Report To: <u>Chuck Dankers</u> Copy To: <u></u> Purchase Order No.: <u></u> Project Name: <u>Shetco Ponds CCR only wells</u> Project Number: <u></u>		Section C Invoice Information: Attention: <u>Steve Davis</u> Company Name: <u></u> Address: <u></u> Pace Quote Reference: <u></u> Pace Project Manager: <u></u> Pace Profile #: <u></u>	
Regulatory Agency: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER <u></u>		Site Location: STATE: <u></u>		Page: <u>2</u> of <u>2</u> <u>1845961</u>	

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	SAMPLE TYPE (G=GRAB C=COMP) (see valid codes to left)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Analysis Test ↑ Y/N	Requested Analysis Filtered (Y/N)												Pace Project No. / Lab I.D.
				COMPOSITE START	COMPOSITE END/GRAB			Unpreserved														
1	P-154-d	DW	WT	11-18 1135		11-18 1135	2															
2	P-165	Water	WT	1230		1230	2															
3	P-156	Waste Water	WT	1325		1325	2															
4	P-155	Product	WT	1430		1430	2															
5		Oil	WT																			
6		Wipe	WT																			
7		Air	WT																			
8		Tissue	WT																			
9		Other	WT																			
10																						
11																						
12																						

ADDITIONAL COMMENTS <u>In Cooler</u> <u>pH Strip: 7.0-7.2</u>		RELINQUISHED BY / AFFILIATION <u>David Anderson</u>	DATE <u>11-2-18</u>	TIME <u>1345</u>	ACCEPTED BY / AFFILIATION <u>W / Xcel</u>	DATE <u>11/5/18</u>	TIME <u>0545</u>	SAMPLE CONDITIONS Received on <u>11/5/18</u> Ice (Y/N) <u>X</u> Custody (Y/N) <u>X</u> Sealed Cooler (Y/N) <u>X</u> Samples Intact (Y/N) <u>X</u>
---	--	--	------------------------	---------------------	--	------------------------	---------------------	--

ORIGINAL

SAMPLER NAME AND SIGNATURE
 PRINT Name of SAMPLER: David Anderson
 SIGNATURE of SAMPLER: David Anderson
 DATE Signed (MM/DD/YY): 11-1-18

*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-Q-020rev 07, 15-May-2007

November 29, 2018

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

RE: Project: 18-01330, Xcel Energy
Pace Project No.: 30270907

Dear Dave Anderson:

Enclosed are the analytical results for sample(s) received by the laboratory on November 08, 2018. 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: Harry S. Davis III, Xcel Energy
Charles A. Donkers, 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: 18-01330, Xcel Energy

Pace Project No.: 30270907

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

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: 18-01330, Xcel Energy

Pace Project No.: 30270907

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30270907001	Rinse	Water	10/29/18 16:50	11/08/18 10:15
30270907002	P-23	Water	10/29/18 18:20	11/08/18 10:15
30270907003	Duplicate	Water	10/29/18 18:20	11/08/18 10:15
30270907004	P-22	Water	10/30/18 15:40	11/08/18 10:15
30270907005	P-01A-1	Water	10/31/18 08:00	11/08/18 10:15
30270907006	P-130	Water	10/31/18 09:00	11/08/18 10:15
30270907007	P-131	Water	10/31/18 10:05	11/08/18 10:15
30270907008	P-132	Water	10/31/18 10:50	11/08/18 10:15

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 18-01330, Xcel Energy

Pace Project No.: 30270907

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30270907001	Rinse	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270907002	P-23	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270907003	Duplicate	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270907004	P-22	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270907005	P-01A-1	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270907006	P-130	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270907007	P-131	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270907008	P-132	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: 18-01330, Xcel Energy

Pace Project No.: 30270907

Method: EPA 903.1

Description: 903.1 Radium 226

Client: Pace-MN Field Services Division

Date: November 29, 2018

General Information:

8 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: 18-01330, Xcel Energy

Pace Project No.: 30270907

Method: EPA 904.0

Description: 904.0 Radium 228

Client: Pace-MN Field Services Division

Date: November 29, 2018

General Information:

8 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: 18-01330, Xcel Energy

Pace Project No.: 30270907

Method: Total Radium Calculation

Description: Total Radium 228+226

Client: Pace-MN Field Services Division

Date: November 29, 2018

General Information:

8 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: 18-01330, Xcel Energy
Pace Project No.: 30270907

Sample: Rinse		Lab ID: 30270907001	Collected: 10/29/18 16:50	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.396 ± 0.366 (0.533) C:NA T:90%	pCi/L	11/27/18 21:16	13982-63-3	
Radium-228	EPA 904.0	0.761 ± 0.639 (1.29) C:70% T:83%	pCi/L	11/26/18 16:54	15262-20-1	
Total Radium	Total Radium Calculation	1.16 ± 1.01 (1.82)	pCi/L	11/28/18 13:42	7440-14-4	

Sample: P-23		Lab ID: 30270907002	Collected: 10/29/18 18:20	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.160 ± 0.278 (0.496) C:NA T:83%	pCi/L	11/27/18 21:16	13982-63-3	
Radium-228	EPA 904.0	1.10 ± 0.511 (0.884) C:71% T:86%	pCi/L	11/26/18 13:31	15262-20-1	
Total Radium	Total Radium Calculation	1.26 ± 0.789 (1.38)	pCi/L	11/28/18 13:42	7440-14-4	

Sample: Duplicate		Lab ID: 30270907003	Collected: 10/29/18 18:20	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.251 ± 0.328 (0.541) C:NA T:92%	pCi/L	11/27/18 21:16	13982-63-3	
Radium-228	EPA 904.0	0.668 ± 0.517 (1.05) C:70% T:91%	pCi/L	11/26/18 13:26	15262-20-1	
Total Radium	Total Radium Calculation	0.919 ± 0.845 (1.59)	pCi/L	11/28/18 13:42	7440-14-4	

Sample: P-22		Lab ID: 30270907004	Collected: 10/30/18 15:40	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.490 ± 0.417 (0.586)	pCi/L	11/27/18 21:16	13982-63-3	
		C:NA T:81%				
Radium-228	EPA 904.0	1.04 ± 0.504 (0.894)	pCi/L	11/26/18 13:26	15262-20-1	
		C:66% T:95%				
Total Radium	Total Radium Calculation	1.53 ± 0.921 (1.48)	pCi/L	11/28/18 13:42	7440-14-4	

Sample: P-01A-1		Lab ID: 30270907005	Collected: 10/31/18 08:00	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.628 ± 0.410 (0.420) C:NA T:80%	pCi/L	11/27/18 21:30	13982-63-3	
Radium-228	EPA 904.0	0.652 ± 0.481 (0.952) C:69% T:82%	pCi/L	11/26/18 13:26	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-01330, Xcel Energy

Pace Project No.: 30270907

Sample: P-01A-1		Lab ID: 30270907005	Collected: 10/31/18 08:00	Received: 11/08/18 10:15	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Total Radium	Total Radium Calculation	1.28 ± 0.891 (1.37)		pCi/L	11/28/18 13:42	7440-14-4	

Sample: P-130		Lab ID: 30270907006	Collected: 10/31/18 09:00	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.650 ± 0.481 (0.651) C:NA T:88%	pCi/L	11/27/18 21:30	13982-63-3	
Radium-228	EPA 904.0	0.230 ± 0.468 (1.03) C:69% T:86%	pCi/L	11/26/18 13:26	15262-20-1	
Total Radium	Total Radium Calculation	0.880 ± 0.949 (1.68)	pCi/L	11/28/18 13:42	7440-14-4	

Sample: P-131		Lab ID: 30270907007	Collected: 10/31/18 10:05	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.302 ± 0.283 (0.401) C:NA T:97%	pCi/L	11/27/18 21:30	13982-63-3	
Radium-228	EPA 904.0	-0.00344 ± 0.491 (1.12) C:69% T:85%	pCi/L	11/26/18 13:26	15262-20-1	
Total Radium	Total Radium Calculation	0.302 ± 0.774 (1.52)	pCi/L	11/28/18 13:42	7440-14-4	

Sample: P-132		Lab ID: 30270907008	Collected: 10/31/18 10:50	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.745 ± 0.433 (0.461) C:NA T:87%	pCi/L	11/27/18 21:30	13982-63-3	
Radium-228	EPA 904.0	0.314 ± 0.521 (1.13) C:70% T:86%	pCi/L	11/26/18 16:53	15262-20-1	
Total Radium	Total Radium Calculation	1.06 ± 0.954 (1.59)	pCi/L	11/28/18 13:42	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 18-01330, Xcel Energy

Pace Project No.: 30270907

QC Batch:	320182	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
Associated Lab Samples:	30270907001, 30270907002, 30270907003, 30270907004, 30270907005, 30270907006, 30270907007, 30270907008		

METHOD BLANK:	1562010	Matrix:	Water
Associated Lab Samples:	30270907001, 30270907002, 30270907003, 30270907004, 30270907005, 30270907006, 30270907007, 30270907008		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0918 ± 0.221 (0.426) C:NA T:96%	pCi/L	11/27/18 20:47	

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: 18-01330, Xcel Energy

Pace Project No.: 30270907

QC Batch:	320188	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	30270907001, 30270907002, 30270907003, 30270907004, 30270907005, 30270907006, 30270907007, 30270907008		

METHOD BLANK:	1562041	Matrix:	Water
Associated Lab Samples:	30270907001, 30270907002, 30270907003, 30270907004, 30270907005, 30270907006, 30270907007, 30270907008		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.561 ± 0.388 (0.731) C:70% T:74%	pCi/L	11/26/18 13:30	

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: 18-01330, Xcel Energy

Pace Project No.: 30270907

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 Ruikie
Address:	210 Pace Mill Field	Copy To:		Company Name:	Pace Mill Field Services
Email To:		Purchase Order No.:		Address:	
Phone:		Project Name:	18-01330; Xcel Energy -	Pace Quote Reference:	Tom Halverson
Requested Due Date/TAT:		Project Number:	Shelco Ponds NPDES + CCR	Pace Project Manager:	Carin Ferris

Section D Required Client Information		Section E Requested Analysis Filtered (Y/N)	
SAMPLE ID (A-Z, 0-9 / -) Sample IDs MUST BE UNIQUE		WO# : 30270907 30270907	
Matrix Codes MATRIX / CODE Drinking Water DW Waste Water WW Product P Soil/Solid SL Oil OL Wipe WP Air AR Tissue TS Other OT		Preservatives Unpreserved H₂SO₄ HNO₃ HCl NaOH Na₂O₃ Methanol Other	
COLLECTED COMPOSITE START COMPOSITE END/GRAB		# OF CONTAINERS	
MATRIX CODE (see valid codes to left) SAMPLE TYPE (G=GRAB C=COMP)		Analysis Test RA-226 EPA 903.1 RA-228 EPA 904.0	
DATE TIME		DATE TIME	
RELINQUISHED BY / AFFILIATION		ACCEPTED BY / AFFILIATION	
DATE TIME		DATE TIME	

Section F Additional Comments		Section G Sample Conditions	
① client needs to analyze for: Radium 226 + 228 pCi/L combined. ② RA-226 EPA 903.1 ORIGINAL RA-228 EPA 904.0		Temp in °C Received on Custody (Y/N) Sealed Cooler (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/YYYY): 10/31/18		SAMPLE CONDITIONS DATE TIME 11/8/18 10:05 N N Y	

*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

Face Analytical

Client Name: Xcel energy

Project # 30270907

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other

Tracking #: 4486 7790 0718

Label	<u>BTH</u>
LIMS Login	<u>BTH</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 °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:
Chain of Custody Present:	☒	☐	☐	<u>10D41071</u>	<u>BTH 11/8/18</u>
Chain of Custody Filled Out:	☒	☐	☐		
Chain of Custody Relinquished:	☒	☐	☐		
Sampler Name & Signature on COC:	☒	☐	☐		
Sample Labels match COC:	☒	☐	☐		
-Includes date/time/ID	☒	☐	☐		
Matrix: <u>WT</u>					
Samples Arrived within Hold Time:	☒	☐	☐		
Short Hold Time Analysis (<72hr remaining):	☒	☐	☐		
Rush Turn Around Time Requested:	☒	☐	☐		
Sufficient Volume:	☒	☐	☐		
Correct Containers Used:	☒	☐	☐		
-Pace Containers Used:	☒	☐	☐		
Containers Intact:	☒	☐	☐		
Orthophosphate field filtered	☒	☐	☐		
Hex Cr Aqueous Compliance/NPDES sample field filtered	☒	☐	☐		
Organic Samples checked for dechlorination:	☒	☐	☐		
Filtered volume received for Dissolved tests	☒	☐	☐		
All containers have been checked for preservation.	☒	☐	☐		
All containers needing preservation are found to be in compliance with EPA recommendation.	☒	☐	☐	<u>pH 12</u>	
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed <u>BTH</u>	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):	☒	☐	☐		
Trip Blank Present:	☒	☐	☐		
Trip Blank Custody Seals Present	☒	☐	☐		
Rad Aqueous Samples Screened > 0.5 mrem/hr	☒	☐	☐	Initial when completed <u>BTH</u>	Date: <u>11/8/18</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.

December 03, 2018

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

RE: Project: 18-01328, Xcel Energy
Pace Project No.: 30270899

Dear Dave Anderson:

Enclosed are the analytical results for sample(s) received by the laboratory on November 08, 2018. 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: Harry S. Davis III, Xcel Energy
Charles A. Donkers, 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: 18-01328, Xcel Energy

Pace Project No.: 30270899

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

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: 18-01328, Xcel Energy

Pace Project No.: 30270899

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30270899001	P-162	Water	10/31/18 12:30	11/08/18 10:15
30270899002	P-163	Water	10/31/18 13:30	11/08/18 10:15
30270899003	P-164	Water	10/31/18 14:25	11/08/18 10:15
30270899004	Rinse	Water	10/31/18 15:00	11/08/18 10:15
30270899005	P-152a	Water	10/31/18 15:40	11/08/18 10:15
30270899006	Duplicate	Water	10/31/18 15:40	11/08/18 10:15
30270899007	P-17	Water	10/31/18 16:50	11/08/18 10:15
30270899008	P-158	Water	10/31/18 17:30	11/08/18 10:15
30270899009	P-157	Water	10/31/18 18:10	11/08/18 10:15
30270899010	P-150	Water	11/01/18 08:30	11/08/18 10:15
30270899011	P-151	Water	11/01/18 09:30	11/08/18 10:15
30270899012	P-153	Water	11/01/18 10:30	11/08/18 10:15
30270899013	P-154a	Water	11/01/18 11:35	11/08/18 10:15
30270899014	P-165	Water	11/01/18 12:30	11/08/18 10:15
30270899015	P-156	Water	11/01/18 13:25	11/08/18 10:15
30270899016	P-155	Water	11/01/18 14:20	11/08/18 10:15

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 18-01328, Xcel Energy

Pace Project No.: 30270899

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30270899001	P-162	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270899002	P-163	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270899003	P-164	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270899004	Rinse	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270899005	P-152a	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270899006	Duplicate	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270899007	P-17	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270899008	P-158	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270899009	P-157	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270899010	P-150	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270899011	P-151	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270899012	P-153	EPA 903.1	MK1	1	PASI-PA
		EPA 904.0	JLW	1	PASI-PA
		Total Radium Calculation	CMC	1	PASI-PA
30270899013	P-154a	EPA 903.1	MK1	1	PASI-PA

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 18-01328, Xcel Energy

Pace Project No.: 30270899

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
30270899014	P-165	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
30270899015	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
30270899016	P-155	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: 18-01328, Xcel Energy

Pace Project No.: 30270899

Method: EPA 903.1

Description: 903.1 Radium 226

Client: Pace-MN Field Services Division

Date: December 03, 2018

General Information:

16 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: 18-01328, Xcel Energy

Pace Project No.: 30270899

Method: EPA 904.0

Description: 904.0 Radium 228

Client: Pace-MN Field Services Division

Date: December 03, 2018

General Information:

16 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: 18-01328, Xcel Energy

Pace Project No.: 30270899

Method: Total Radium Calculation

Description: Total Radium 228+226

Client: Pace-MN Field Services Division

Date: December 03, 2018

General Information:

16 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: 18-01328, Xcel Energy

Pace Project No.: 30270899

Sample: P-162		Lab ID: 30270899001	Collected: 10/31/18 12:30	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.202 ± 0.343 (0.606) C:NA T:89%	pCi/L	11/27/18 20:34	13982-63-3	
Radium-228	EPA 904.0	-0.0473 ± 0.508 (1.21) C:60% T:83%	pCi/L	11/26/18 19:14	15262-20-1	
Total Radium	Total Radium Calculation	0.202 ± 0.851 (1.82)	pCi/L	11/28/18 13:36	7440-14-4	

Sample: P-163		Lab ID: 30270899002	Collected: 10/31/18 13:30	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.439 ± 0.462 (0.733) C:NA T:89%	pCi/L	11/27/18 20:34	13982-63-3	
Radium-228	EPA 904.0	0.766 ± 0.712 (1.46) C:66% T:80%	pCi/L	11/26/18 19:14	15262-20-1	
Total Radium	Total Radium Calculation	1.21 ± 1.17 (2.19)	pCi/L	11/28/18 13:36	7440-14-4	

Sample: P-164		Lab ID: 30270899003	Collected: 10/31/18 14:25	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.349 ± 0.380 (0.598) C:NA T:84%	pCi/L	11/27/18 20:34	13982-63-3	
Radium-228	EPA 904.0	-0.0102 ± 0.603 (1.41) C:63% T:74%	pCi/L	11/26/18 19:14	15262-20-1	
Total Radium	Total Radium Calculation	0.349 ± 0.983 (2.01)	pCi/L	11/28/18 13:36	7440-14-4	

Sample: Rinse		Lab ID: 30270899004	Collected: 10/31/18 15:00	Received: 11/08/18 10:15	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.235 ± 0.216 (0.127) C:NA T:96%		pCi/L	11/27/18 20:34	13982-63-3	
Radium-228	EPA 904.0	0.661 ± 0.638 (1.31) C:63% T:81%		pCi/L	11/26/18 19:14	15262-20-1	
Total Radium	Total Radium Calculation	0.896 ± 0.854 (1.44)		pCi/L	11/28/18 13:36	7440-14-4	

Sample: P-152a		Lab ID: 30270899005	Collected: 10/31/18 15:40	Received: 11/08/18 10:15	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.302 ± 0.227 (0.117) C:NA T:98%		pCi/L	11/27/18 20:34	13982-63-3	
Radium-228	EPA 904.0	0.488 ± 0.371 (0.719) C:73% T:75%		pCi/L	11/29/18 15:14	15262-20-1	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-01328, Xcel Energy

Pace Project No.: 30270899

Sample: P-152a		Lab ID: 30270899005	Collected: 10/31/18 15:40	Received: 11/08/18 10:15	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Total Radium	Total Radium Calculation	0.790 ± 0.598 (0.836)		pCi/L	11/30/18 13:15	7440-14-4	

Sample: Duplicate		Lab ID: 30270899006	Collected: 10/31/18 15:40	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.622 ± 0.334 (0.120) C:NA T:95%	pCi/L	11/27/18 20:47	13982-63-3	
Radium-228	EPA 904.0	0.211 ± 0.531 (1.19) C:65% T:89%	pCi/L	11/26/18 19:27	15262-20-1	
Total Radium	Total Radium Calculation	0.833 ± 0.865 (1.31)	pCi/L	11/28/18 13:36	7440-14-4	

Sample: P-17		Lab ID: 30270899007	Collected: 10/31/18 16:50	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.218 ± 0.428 (0.769) C:NA T:79%	pCi/L	11/27/18 20:47	13982-63-3	
Radium-228	EPA 904.0	0.986 ± 0.650 (1.22) C:62% T:80%	pCi/L	11/26/18 19:27	15262-20-1	
Total Radium	Total Radium Calculation	1.20 ± 1.08 (1.99)	pCi/L	11/28/18 13:36	7440-14-4	

Sample: P-158		Lab ID: 30270899008	Collected: 10/31/18 17:30	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.142 ± 0.307 (0.567) C:NA T:89%	pCi/L	11/27/18 20:47	13982-63-3	
Radium-228	EPA 904.0	0.971 ± 0.610 (1.13) C:67% T:83%	pCi/L	11/26/18 19:27	15262-20-1	
Total Radium	Total Radium Calculation	1.11 ± 0.917 (1.70)	pCi/L	11/28/18 13:36	7440-14-4	

Sample: P-157		Lab ID: 30270899009	Collected: 10/31/18 18:10	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.639 ± 0.398 (0.392) C:NA T:86%	pCi/L	11/27/18 21:02	13982-63-3	
Radium-228	EPA 904.0	0.251 ± 0.397 (0.860) C:76% T:83%	pCi/L	11/26/18 13:57	15262-20-1	
Total Radium	Total Radium Calculation	0.890 ± 0.795 (1.25)	pCi/L	11/28/18 13:42	7440-14-4	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-01328, Xcel Energy
Pace Project No.: 30270899

Sample: P-150		Lab ID: 30270899010	Collected: 11/01/18 08:30	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.281 ± 0.319 (0.504) C:NA T:91%	pCi/L	11/27/18 21:02	13982-63-3	
Radium-228	EPA 904.0	0.893 ± 0.474 (0.848) C:78% T:80%	pCi/L	11/26/18 14:36	15262-20-1	
Total Radium	Total Radium Calculation	1.17 ± 0.793 (1.35)	pCi/L	11/28/18 13:42	7440-14-4	

Sample: P-151		Lab ID: 30270899011	Collected: 11/01/18 09:30	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.564 ± 0.419 (0.552) C:NA T:86%	pCi/L	11/27/18 21:02	13982-63-3	
Radium-228	EPA 904.0	0.459 ± 0.327 (0.636) C:83% T:88%	pCi/L	11/26/18 13:31	15262-20-1	
Total Radium	Total Radium Calculation	1.02 ± 0.746 (1.19)	pCi/L	11/28/18 13:42	7440-14-4	

Sample: P-153		Lab ID: 30270899012	Collected: 11/01/18 10:30	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.293 ± 0.298 (0.451) C:NA T:99%	pCi/L	11/27/18 21:02	13982-63-3	
Radium-228	EPA 904.0	0.990 ± 0.486 (0.859) C:77% T:79%	pCi/L	11/26/18 13:31	15262-20-1	
Total Radium	Total Radium Calculation	1.28 ± 0.784 (1.31)	pCi/L	11/28/18 13:42	7440-14-4	

Sample: P-154a		Lab ID: 30270899013	Collected: 11/01/18 11:35	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0501 ± 0.229 (0.466) C:NA T:90%	pCi/L	11/27/18 21:02	13982-63-3	
Radium-228	EPA 904.0	0.779 ± 0.405 (0.720) C:74% T:89%	pCi/L	11/26/18 13:31	15262-20-1	
Total Radium	Total Radium Calculation	0.829 ± 0.634 (1.19)	pCi/L	11/28/18 13:42	7440-14-4	

Sample: P-165		Lab ID: 30270899014	Collected: 11/01/18 12:30	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.0477 ± 0.337 (0.673) C:NA T:90%	pCi/L	11/27/18 21:02	13982-63-3	
Radium-228	EPA 904.0	0.215 ± 0.400 (0.877) C:74% T:79%	pCi/L	11/26/18 13:31	15262-20-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 18-01328, Xcel Energy

Pace Project No.: 30270899

Sample: P-165		Lab ID: 30270899014	Collected: 11/01/18 12:30	Received: 11/08/18 10:15	Matrix: Water		
PWS:		Site ID:	Sample Type:				
Parameters	Method	Act ± Unc (MDC) Carr Trac		Units	Analyzed	CAS No.	Qual
Total Radium	Total Radium Calculation	0.263 ± 0.737 (1.55)		pCi/L	11/28/18 13:42	7440-14-4	

Sample: P-156		Lab ID: 30270899015	Collected: 11/01/18 13:25	Received: 11/08/18 10:15	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 ± 0.385 (0.833) C:NA T:90%		pCi/L	12/03/18 09:53	13982-63-3	
Radium-228	EPA 904.0	0.786 ± 0.410 (0.732) C:75% T:88%		pCi/L	11/26/18 13:31	15262-20-1	
Total Radium	Total Radium Calculation	0.786 ± 0.795 (1.57)		pCi/L	12/03/18 14:53	7440-14-4	

Sample: P-155		Lab ID: 30270899016	Collected: 11/01/18 14:20	Received: 11/08/18 10:15	Matrix: Water	
PWS:		Site ID:	Sample Type:			
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 903.1	0.291 ± 0.357 (0.583) C:NA T:87%	pCi/L	11/27/18 21:16	13982-63-3	
Radium-228	EPA 904.0	0.512 ± 0.391 (0.766) C:70% T:83%	pCi/L	11/26/18 13:31	15262-20-1	
Total Radium	Total Radium Calculation	0.803 ± 0.748 (1.35)	pCi/L	11/28/18 13:42	7440-14-4	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 18-01328, Xcel Energy

Pace Project No.: 30270899

QC Batch:	320186	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	30270899001, 30270899002, 30270899003, 30270899004, 30270899005, 30270899006, 30270899007, 30270899008		

METHOD BLANK:	1562014	Matrix:	Water
Associated Lab Samples:	30270899001, 30270899002, 30270899003, 30270899004, 30270899005, 30270899006, 30270899007, 30270899008		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.405 ± 0.316 (0.616) C:80% T:79%	pCi/L	11/26/18 13:41	

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: 18-01328, Xcel Energy

Pace Project No.: 30270899

QC Batch:	320182	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
Associated Lab Samples:	30270899009, 30270899010, 30270899011, 30270899012, 30270899013, 30270899014, 30270899015, 30270899016		

METHOD BLANK:	1562010	Matrix:	Water
Associated Lab Samples:	30270899009, 30270899010, 30270899011, 30270899012, 30270899013, 30270899014, 30270899015, 30270899016		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0918 ± 0.221 (0.426) C:NA T:96%	pCi/L	11/27/18 20:47	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 18-01328, Xcel Energy

Pace Project No.: 30270899

QC Batch:	320188	Analysis Method:	EPA 904.0
QC Batch Method:	EPA 904.0	Analysis Description:	904.0 Radium 228
Associated Lab Samples:	30270899009, 30270899010, 30270899011, 30270899012, 30270899013, 30270899014, 30270899015, 30270899016		

METHOD BLANK:	1562041	Matrix:	Water
Associated Lab Samples:	30270899009, 30270899010, 30270899011, 30270899012, 30270899013, 30270899014, 30270899015, 30270899016		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-228	0.561 ± 0.388 (0.731) C:70% T:74%	pCi/L	11/26/18 13:30	

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: 18-01328, Xcel Energy

Pace Project No.: 30270899

QC Batch:	320181	Analysis Method:	EPA 903.1
QC Batch Method:	EPA 903.1	Analysis Description:	903.1 Radium-226
Associated Lab Samples:	30270899001, 30270899002, 30270899003, 30270899004, 30270899005, 30270899006, 30270899007, 30270899008		

METHOD BLANK:	1562009	Matrix:	Water
Associated Lab Samples:	30270899001, 30270899002, 30270899003, 30270899004, 30270899005, 30270899006, 30270899007, 30270899008		

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Radium-226	0.0996 ± 0.227 (0.366) C:NA T:88%	pCi/L	11/27/18 20:07	

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.

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: 18-01328, Xcel Energy
Pace Project No.: 30270899

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: Company: <u>Xcel Energy</u> Address: <u>510 Pace MN Field</u> Email To: _____ Phone: _____ Fax: _____ Requested Due Date/TAT: _____		Section B Required Project Information: Report To: <u>David Anderson</u> Copy To: _____ Purchase Order No.: _____ Project Name: <u>18-01328, Xcel Energy -</u> Project Number: <u>Shoreo Ponds CCR only wells</u>		Section C Invoice Information: Attention: <u>Clara Ruitk</u> Company Name: <u>Pace MN Field Services</u> Address: _____ Pace Quote Reference: <u>Tom Halverson</u> Pace Project Manager: <u>Carin Feltis</u> Pace Profile #: _____	
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 DW Waste Water WW Product P Soil/Solid SL Oil OL Wipe Wipe Air AR Tissue TS Other OT	SAMPLE TYPE (G=GRAB C=COMP) (see valid codes to left)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives Unpreserved H ₂ SO ₄ HNO ₃ HCl NaOH Na ₂ S ₂ O ₃ Methanol Other	Analysis Test ↑ RA-226EPA903.1 RA-228EPA904.0	Requested Analysis Filtered (Y/N)	Pace Project No./ Lab I.D.
				COMPOSITE START	COMPOSITE END/SEAS						
1	P-162		WT	DATE	TIME	DATE	TIME				
2	P-163			10/31/18	1230						
3	P-164				1330						
4	Rinse				1425						
5	P-152a				1500						
6	Duplicate				1540						
7	P-17				1540						
8	P-158				1650						
9	P-157				1730						
10	P-150				1810						
11	P-151				11-1-18 0830						
12	P-153				0930						
					1030						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
① client needs to analyze for: Radium 226 & 228 pCi/L Combined, RA-226 EPA 903.1 RA-228 EPA 904.0	David Anderson	11-6-18	1250	Philip	11/8/18	1015	N N N Y
SAMPLER NAME AND SIGNATURE PRINT Name of SAMPLER: <u>David Anderson</u> DATE Signed (MM/DD/YYYY): <u>11-1-18</u> SIGNATURE of SAMPLER: <u>David Anderson</u>							
Temp in °C _____ Received on _____ Sealed Cooler (Y/N) _____ Custody (Y/N) _____ Samples Intact (Y/N) _____							

CHAIN-OF-CUSTODY / Analytical Request Document

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



www.pacelabs.com

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Xcel Energy	Report To:	David Anderson	Attention:	Ciara Ruikkie
Address:	56 Pace MN Field	Copy To:		Company Name:	Pace MN Field Services
Email To:		Purchase Order No.:		Address:	
Phone:		Project Name:	18-01328, Xcel Energy -	Pace Quote Reference:	Tom Halverson
Requested Due Date/TAT:		Project Number:	Shorelands CCR only wells	Pace Project Manager:	Carin Fertis

ITEM #	Section D Required Client Information	Matrix Codes MATRIX L CODE	SAMPLE ID (A-Z, 0-9 / -)	Matrix Codes MATRIX L CODE	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED		SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives	Analysis Test	Requested Analysis Filtered (Y/N)
						COMPOSITE START	COMPOSITE END/GRAB					
1		Drinking Water	P-1544	DW	WT	DATE	TIME	DATE	TIME			
2		Waste Water	P-1654	WW		11-1-18	1135		2			
3		Product	P-156	P			1230		2			
4		Soil/Solid	P-155	SL			1325		2			
5		Oil		OL			1420		2			
6		Wipe		WP								
7		Air		AR								
8		Tissue		TS								
9		Other		OT								
10												
11												
12												

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
							Received on	Sealed Cooler	Custody	Samples Intact
① Client needs to analyze for:	David Anderson	11/18/18	1050	David Anderson	11/18/18	1050				
Radium 226+228 pCi/L										
combined.										
RA-226 EPA 903.1 ORIGINAL										
RA-228 EPA 904.0										

Pittsburgh Lab Sample Condition Upon Receipt

Face Analytical

Client Name: Xcel energy

Project # 30270899

Courier: ☒ Fed Ex ☐ UPS ☐ USPS ☐ Client ☐ Commercial ☐ Pace Other

Tracking #: 4486 7790 0713

Label	<u>BTH</u>
LIMS Login	<u>BTH</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 — °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:
Chain of Custody Present:	☒	☐	☐	<u>10D4671</u>	<u>BTH 11/8/18</u>
Chain of Custody Filled Out:	☒	☐	☐		
Chain of Custody Relinquished:	☒	☐	☐		
Sampler Name & Signature on COC:	☒	☐	☐		
Sample Labels match COC:	☒	☐	☐		
-Includes date/time/ID Matrix: <u>WT</u>					
Samples Arrived within Hold Time:	☒	☐	☐		
Short Hold Time Analysis (<72hr remaining):	☒	☐	☐		
Rush Turn Around Time Requested:	☒	☐	☐		
Sufficient Volume:	☒	☐	☐		
Correct Containers Used:	☒	☐	☐		
-Pace Containers Used:	☒	☐	☐		
Containers Intact:	☒	☐	☐		
Orthophosphate field filtered	☒	☐	☐		
Hex Cr Aqueous Compliance/NPDES sample field filtered	☒	☐	☐		
Organic Samples checked for dechlorination:	☒	☐	☐		
Filtered volume received for Dissolved tests	☒	☐	☐		
All containers have been checked for preservation.	☒	☐	☐		
All containers needing preservation are found to be in compliance with EPA recommendation.	☒	☐	☐	<u>PH12</u>	
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed <u>BTH</u>	Date/time of preservation
				Lot # of added preservative	
Headspace in VOA Vials (>6mm):	☒	☐	☐		
Trip Blank Present:	☒	☐	☐		
Trip Blank Custody Seals Present	☒	☐	☐		
Rad Aqueous Samples Screened > 0.5 mrem/hr	☒	☐	☐	Initial when completed <u>BTH</u>	Date:

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.