2023 Annual Groundwater Monitoring and Corrective Action Report

Ash Disposal Area

Big Stone Plant
Big Stone City, South Dakota

Prepared for
Otter Tail Power Company

January 2024; Updated April 2024

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Acronyms

Acronym	Description
ADA	Ash Disposal Area
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
EPA	Environmental Protection Agency
OTP	Otter Tail Power Company
SSI	Statistically Significant Increase

Executive Summary

This summary provides an overview of the Groundwater Monitoring & Corrective Action Program status as required by §257.90(e)(6). The CCR unit operated under the detection monitoring program described in §257.94 at the start and at the end of the 2023 annual reporting period. The current status of the facility is detection monitoring.

The monitoring program did not identify any statistically significant increases (SSIs) over background for any of the constituents listed in Appendix III to the CCR Rule; therefore, assessment monitoring of the constituents listed in Appendix IV to the CCR Rule were not monitored. Corrective action provisions of the CCR Rule were not required.

The monitoring network continues to be refined and augmented to adjust to data collected. Recent changes to the monitoring network include the installation and baseline monitoring of new upgradient and downgradient wells to adjust to changes in the interpretation groundwater flow direction.

1.0 Introduction

Otter Tail Power Company (OTP) operates the Big Stone Plant (Big Stone), located near Big Stone City, South Dakota. Big Stone is a coal-fired electrical generating plant, the operation of which results in coal combustion residuals (CCR) as a by-product. Management of CCR from plant operations includes placing CCR in an on-site landfill, referred to as the Ash Disposal Area (ADA). The ADA is required to comply with the provisions of the US Environmental Protection Agency (EPA) CCR Rule (40 CFR Parts 257 and 261, Disposal of Coal Combustion Residuals from Electric Utilities) for existing CCR landfills. The location of the ADA is shown on Figure 1.

This 2023 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) describes the monitoring program and results for the ADA at Big Stone. The ADA is currently in detection monitoring, as described by §257.94 of the CCR Rule.

1.1 Purpose

As stated in Section §257.90(e), the purpose of the Annual Report is to:

- Document the status of monitoring and corrective action program for the CCR unit
- Summarize key actions completed
- Describe any problems encountered
- Discuss actions to resolve the problems
- Highlight key activities for the upcoming year

1.2 Status of the Groundwater Monitoring and Corrective Action Program

Except for recently installed wells H10, H11, and H12, baseline monitoring for the network was completed in 2017, as documented in the 2017 Annual Groundwater Monitoring and Corrective Action Report, Ash Disposal Area (Barr, 2018). Wells H10, H11, and H12 data collection efforts are subsequently described in Section 2.1.2.

Statistical evaluation of detection monitoring results began on October 17, 2017, and continued through 2023. In 2023, the monitoring program did not identify any statistically significant increases (SSIs) over background for any of the constituents listed in Appendix III to the CCR Rule; therefore, constituents listed in Appendix IV to the CCR Rule were not monitored. Corrective action provisions of the CCR Rule were not required.

1.3 CCR Rule Requirements

This Annual Report has been prepared in accordance with the requirements of §257.90(e) of the CCR Rule, as outlined in the following Table 1.

Table 1 CCR Rule Requirements

CCR Rule Reference	Content Required in Report	Location
§257.90(e)(1)	Map showing the CCR unit and all monitoring wells that are part of the groundwater monitoring system	Section 2.1.1 Documentation; see Figure 1
§257.90(e)(2)	Discuss any new or decommissioned monitoring wells	Section 2.1.2 Changes to Monitoring System; Appendix A
§257.90(e)(3)	All monitoring data obtained under §257.90 through §257.98; provide the number and date groundwater samples were collected, and the monitoring (i.e., detection or assessment)	Section 2.2 Monitoring and Analytical Results; Table 2, Figure 2, Figure 4, Appendix B, Appendix C
§257.90(e)(4)	Discuss any transition between monitoring programs	Not applicable – no transition between monitoring programs was necessary
§257.90(e)(5)	Other information specified in §257.90 through §257.98	Throughout report
§257.90(e)(6)	Overview at beginning of annual report	Executive Summary

2.0 Groundwater Monitoring and Corrective Action Program

This section documents the status of the groundwater monitoring and corrective action program for the ADA for 2023. The groundwater monitoring system is described in Section 2.1, the monitoring and analytical results are described in Section 2.2, key actions completed and problems encountered are described in Section 2.3, and key activities planned for 2024 are described in Section 2.4.

2.1 Groundwater Monitoring System

2.1.1 Documentation

Figure 1 shows an aerial image of the ADA and all upgradient (background) and downgradient monitoring wells, including the well identification numbers, that are part of the groundwater monitoring system, as required by §257.90(e)(1). Further details on the monitoring system and the ADA monitoring wells can be found in the Groundwater Monitoring System Report, Big Stone Plant Ash Disposal Area (Barr, 2016).

2.1.2 Changes to Monitoring System

One upgradient monitoring well H12 was installed east of the cooling pond on September 14, 2023 to provide a representative upgradient well for the area upgradient of H6 and H8 based on recent groundwater flow interpretations (Figure 1; Appendix A). Baseline sample collection began on October 17, 2023 and will continue in spring 2024.

In 2022, two downgradient monitoring wells were installed (H10 and H11). Baseline sample collection for these wells began on May 15, 2023. Additional baseline samples were collected on June 12, August 21, and October 17, 2023. Baseline samples were also collected on December 11, 2023; however, the lab results from that event are not available at this time. Baseline sample collection will continue in spring 2024.

2.2 Monitoring and Analytical Results

Groundwater samples were collected from monitoring wells H2OX, H3OX, H4OX, H6, H8, and H9 during two semiannual sampling events and from H8 for one verification resampling event. A total of 12 groundwater samples (six monitoring wells and two sampling events) were collected and analyzed for the constituents listed in Appendix III (Part 257) in 2023 under the detection monitoring program, consistent with the requirements of §257.94(c). An elevated total dissolved solids (TDS) concentration was observed in the sample collected from monitoring well H8 during the spring 2023 detection monitoring event. Monitoring well H8 was subsequently resampled for TDS on July 21, 2023. The resampled results indicated that TDS concentrations were not statistically significantly higher than background. Dates of sampling are reported on the field data sheets, and analytical laboratory reports are presented in Appendix B. Results are summarized in Table 2 from samples collected at monitoring wells previously included in the detection monitoring program. Results from samples collected at newly-installed monitoring wells are

summarized in Table 3. Groundwater flow data, as required by §257.93(c), are presented in Figure 2, Figure 4, and Appendix C.

2.3 Key Actions Completed/Problems Encountered

The following key actions were completed for the groundwater monitoring program during 2023:

- Completed semiannual groundwater sampling under the detection monitoring program.
- Statistical analysis was conducted according to the Statistical Analysis Plan, Appendix B of the CCR Groundwater Sampling and Analysis Plan (Carlson McCain, 2017).
- Determined, pursuant to §257.93(h), that a statistically significant increase (SSI) over background levels occurred for Calcium at downgradient monitoring well H6 during the fall 2022 detection monitoring sampling event. A successful Alternative Source Demonstration (ASD) was completed for this SSI in April of 2023 finding the SSI was attributed to an error in sampling. The written ASD is provided in Appendix E.
- Determined, pursuant to §257.93(h), that no statistically significant increase over background levels occurred for any of the constituents listed in Appendix III at any downgradient monitoring well during the 2023 detection monitoring sampling events.
- A partial closure of approximately 7.7 acres of the landfill was completed in 2023.

2.4 Key Activities for Upcoming Year

The following key groundwater monitoring program activities are planned for 2024:

- Continue the detection monitoring program in accordance with the CCR Rule.
- Evaluate analytical results from the 2024 semiannual detection monitoring events for SSIs according to the Statistical Analysis Plan (Carlson McCain, 2017).
- Continue collection of background water samples from monitoring wells H10, H11, and H12. Appendix III and Appendix IV parameters will be analyzed.
- Update the Groundwater Monitoring Network to include monitoring wells H10, H11, and H12.

3.0 References

Barr, 2018. 2017 Annual Groundwater Monitoring and Corrective Action Report, Big Stone Plant Ash Disposal Area. Prepared for Otter Tail Power Company. January 2018.

Barr, 2016. Groundwater Monitoring System Report, Big Stone Plant Ash Disposal Area. Prepared for Otter Tail Power Company. December 2016.

Carlson McCain, 2017. CCR Groundwater Sampling and Analysis Plan (Including Statistical Method Selection and Certification), Big Stone Plant Ash Disposal Area. Prepared for Otter Tail Power Company. October 2017.

Tables

Table 2
Detection Monitoring Well Groundwater Analytical Data Summary
Big Stone Plant
Otter Tail Power Company

		Location	H2OX	H2OX	H3OX	H3OX	H4OX	H4OX	H6	H6	H8	H8	H8	H9	H9
		Date	5/15/2023	10/17/2023	5/15/2023	10/17/2023	5/15/2023	10/17/2023	5/15/2023	10/17/2023	5/15/2023	7/21/2023	10/17/2023	5/15/2023	10/17/2023
		Sample Type	N	N	N	N	N	N	N	N	N	Resample	N	N	N
Parameter	Analysis Location	Units													
Appendix III Parameters															
Boron, total	Lab	mg/l	**0.251**	**0.258**	**6.540**	**7.310**	**0.518**	**0.564**	**3.260**	**2.350**	**3.020**	--	**3.360**	**1.100**	**1.230**
Calcium, total	Lab	mg/l	**229.0**	**521.0**	**364.0**	**405.0**	**330.0**	**321.0**	**36.60**	**64.70**	**125.0**	--	**128.0**	**488.0**	**640.0**
Chloride	Lab	mg/l	**4.1**	**3.5**	**66.0**	**65.3**	**42.8**	**41.7**	**3.2**	< 3 U	**4.3**	--	**3.4**	**40.9**	**81.6**
Fluoride	Lab	mg/l	**0.350**	**0.320**	**0.430**	**0.370**	**0.530**	**0.480**	**0.500**	**0.430**	**0.550**	--	**0.510**	**0.360**	**0.310**
pH	Lab	pH units	**7.3**	**7.2**	**7.2**	**7.2**	**7.1**	**7.2**	**7.7**	**7.6**	**7.4**	--	**7.5**	**6.9**	**7.0**
pH	Field	pH units	**6.74**	**6.52**	**6.62**	**6.43**	**6.61**	**6.52**	**7.54**	**7.56**	**7.24**	--	**7.22**	**6.71**	**6.62**
Solids, total dissolved	Lab	mg/l	**3850**	**3610**	**3160**	**2880**	**2140**	**2160**	**536**	**558**	**5270 R 951 H 964 H**	**1050**	**973**	**2580**	**2900**
Sulfate, as SO4	Lab	mg/l	**1950**	**1720**	**1490**	**1340**	**1050**	**987**	**93.0**	**80.6**	**359**	--	**321**	**1510**	**1620**
Groundwater elevation	Field	ft amsl	**1097.68**	**1096.64**	**1088.36**	**1087.26**	**1091.98**	**1091.17**	**1089.94**	**1082**	**1077.03**	**1071.48**	**1074.63**	**1079.46**	**1074.64**

-- Not analyzed/Not available.
N Sample Type: Normal Detection Monitoring
H Recommended sample preservation, extraction or analysis holding time was exceeded.
R The data are unusable. The samples results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
U The analyte was analyzed for, but was not detected.

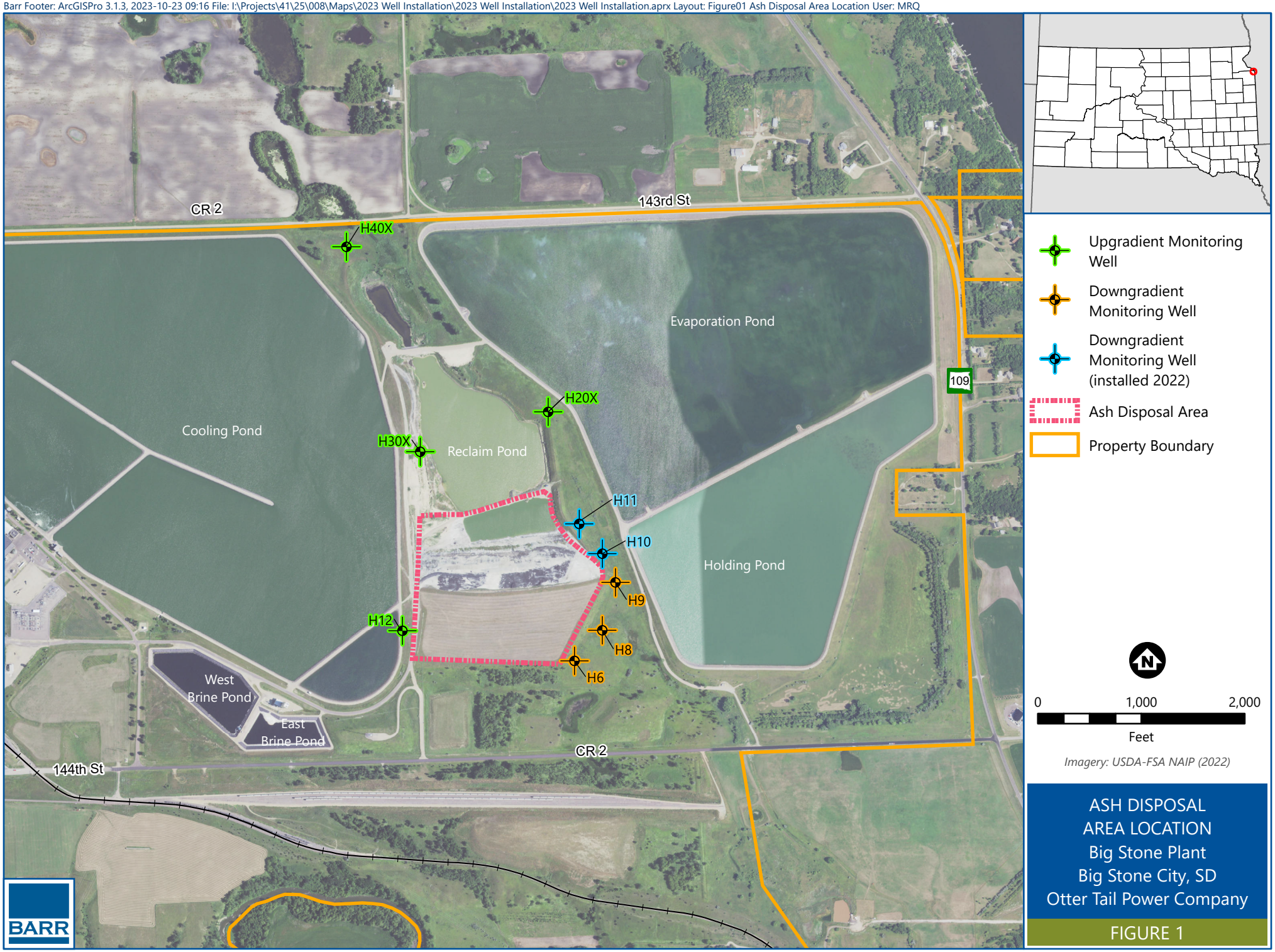
Table 3
New Well Groundwater Analytical Data Summary
Big Stone Plant
Otter Tail Power Company

Location		H10	H10	H10	H10	H11	H11	H11	H11	H12
Date		5/15/2023	6/12/2023	8/21/2023	10/17/2023	5/15/2023	6/12/2023	8/21/2023	10/17/2023	10/17/2023
Sample Type		N	N	N	N	N	N	N	N	N
Parameter	Units									
Appendix III										
Boron, Total	mg/l	**0.292**	**0.284**	**0.298**	**0.358**	**0.232**	**0.247**	**0.245**	**0.271**	**0.402**
Calcium, Total	mg/l	**284.0**	**489.0**	**492.0**	**509.0**	**217.0**	**547.0**	**543.0**	**573.0**	**25.60**
Chloride	mg/l	**7.1**	**6.6**	**6.3**	**6.3**	**4.7**	**3.9**	**3.5**	**3.6**	< 3 U
Fluoride	mg/l	**0.200**	**0.180**	**0.180**	**0.190**	**0.140**	**0.130**	**0.140**	**0.140**	**0.290**
pH	pH units	**7.0**	**7.1**	**7.0**	**7.2**	**7.0**	**7.0**	**6.9**	**6.9**	**8.2**
pH, Field	pH units	**6.34**	**7.00**	**6.88**	**6.51**	**6.37**	**6.80**	**6.70**	**6.59**	**7.99**
Solids, total dissolved	mg/l	**4810**	**4820**	**4840**	**4840**	**4270**	**4230**	**4220**	**4220**	**197**
Sulfate, as SO4	mg/l	**2590**	**2650**	**2270**	**2590**	**2640**	**2170**	**2440**	**2580**	**20.8**
Appendix IV										
Antimony, Total	mg/l	< 0.0025 U	< 0.001 U	< 0.001 U	< 0.0025 U	< 0.0005 U	< 0.0005 U	< 0.001 U	< 0.0025 U	< 0.0005 U
Arsenic, Total	mg/l	< 0.0025 U	< 0.001 U	< 0.001 U	< 0.0025 U	< 0.0025 U	< 0.001 U	< 0.001 U	< 0.0025 U	**0.00274**
Barium, Total	mg/l	**0.026**	**0.026**	**0.023**	**0.027**	**0.036**	**0.035**	**0.034**	**0.030**	**0.058**
Beryllium, Total	mg/l	< 0.005 U	< 0.005 U	< 0.00005 U	< 0.005 U	< 0.005 U	< 0.005 U	< 0.0001 U	< 0.005 U	< 0.005 U
Cadmium, Total	mg/l	< 0.0005 U	**0.00025**	< 0.0002 U	< 0.0005 U	**0.00038**	**0.00035**	**0.00027**	< 0.0005 U	< 0.0001 U
Chromium, Total	mg/l	< 0.01 U	< 0.01 U	< 0.0005 U	< 0.0025 U	< 0.01 U	< 0.01 U	< 0.001 U	< 0.0025 U	**0.00371**
Cobalt, Total	mg/l	< 0.005 U	< 0.005 U	< 0.005 U	< 0.005 U	**0.008**	**0.009**	**0.008**	< 0.005 U	< 0.005 U
Lead, Total	mg/l	< 0.0025 U	< 0.001 U	< 0.0025 U	< 0.0025 U	< 0.0025 U	< 0.001 U	< 0.001 U	< 0.0025 U	**0.00153**
Lithium, Total	mg/l	**0.226**	**0.235**	**0.271**	**0.298**	**0.223**	**0.251**	**0.303**	**0.332**	< 0.02 U
Mercury, Total	mg/l	< 0.000005 U	< 0.000005 U	< 0.000005 U	< 0.000005 U	< 0.000005 U	< 0.000005 U	< 0.000005 U	< 0.000005 U	**0.000012**
Molybdenum, Total	mg/l	**0.017**	< 0.015 U	**0.00865**	**0.0123**	< 0.015 U	< 0.015 U	**0.00490**	**0.00303**	**0.0342**
Selenium, Total	mg/l	**0.00495**	**0.00474**	**0.00454**	**0.00379 J+**	< 0.0025 U	**0.00172 J+**	< 0.002 U	< 0.0025 U	< 0.0005 U
Thallium, Total	mg/l	< 0.0005 U	< 0.0002 U	< 0.0005 U	< 0.0005 U	< 0.0005 U	< 0.0002 U	< 0.0002 U	< 0.0005 U	< 0.0001 U
Radium 226	pCi/l	**4.42 +/- 0.989**	**0.390 +/- 0.250**	**0.290 +/- 0.217**	0.0723 +/- 0.186 ND	**1.27 +/- 0.422**	0.171 +/- 0.205 ND	**1.83 +/- 0.496**	0.0392 +/- 0.107 ND	0.182 +/- 0.170 ND
Radium 228	pCi/l	**0.726 +/- 0.251**	0.402 +/- 0.331 ND	0.465 +/- 0.265 ND	0.238 +/- 0.287 ND	**0.875 +/- 0.201**	**0.772 +/- 0.328**	0.798 +/- 0.293 UB	**0.538 +/- 0.242**	**0.465 +/- 0.228**
Radium, combined (226+228) [Barr Calculation]	pCi/l	**5.15 +/- 1.02**	**0.792 +/- 0.415 q**	**0.755 +/- 0.340 q**	0.310 +/- 0.342 ND	**2.15 +/- 0.467**	**0.943 +/- 0.387 q**	**1.83 +/- 0.496**	**0.577 +/- 0.265 q**	**0.647 +/- 0.284 q**
Other										
Groundwater elevation, Field	ft amsl	**1079.81**	**1078.28**	**1075.36**	**1073.73**	**1082.58**	**1082.19**	**1079.29**	**1078.43**	**1109.26**

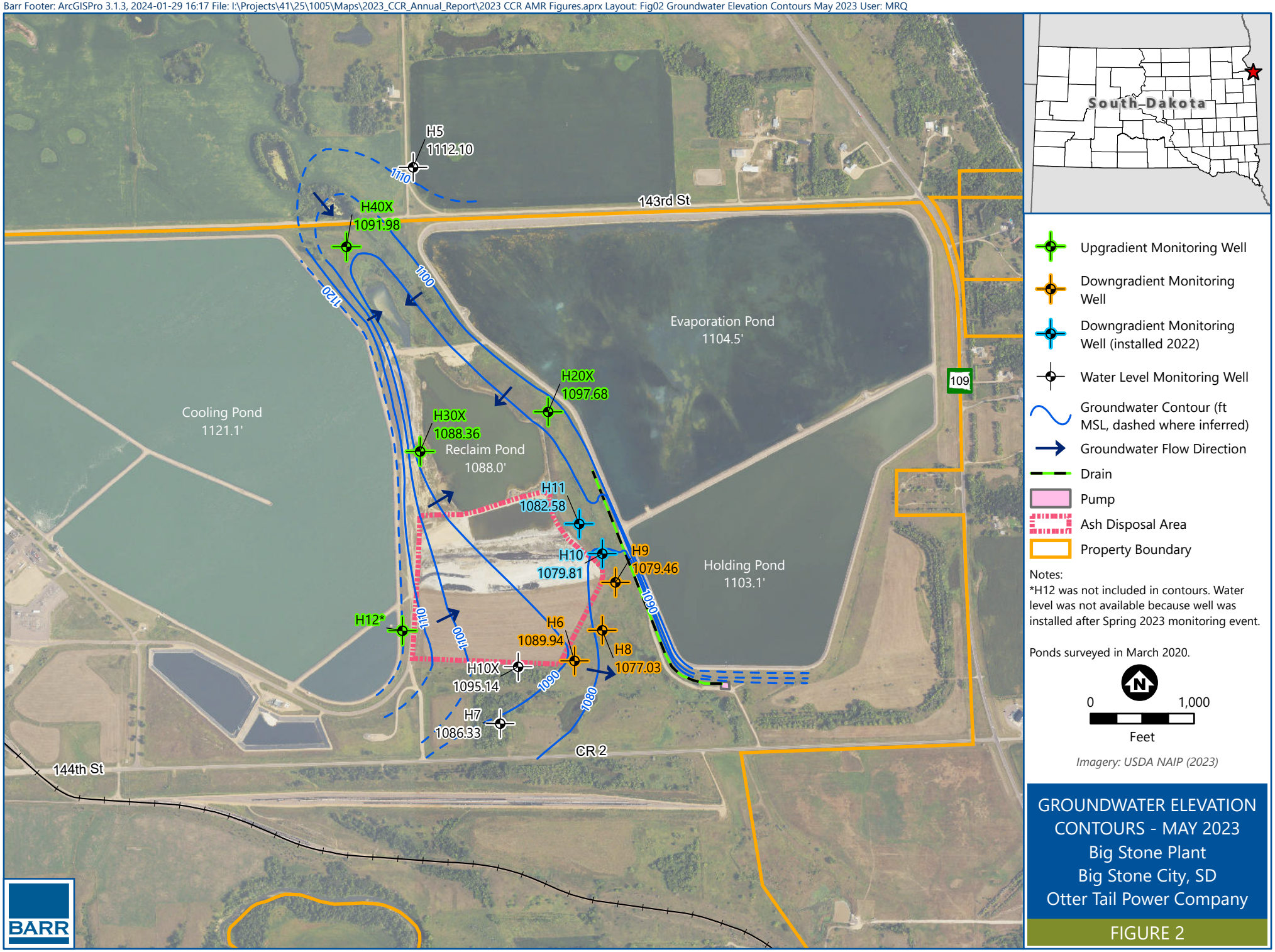
N Sample Type: Normal Detection Monitoring
J+ The result is an estimated quantity and may be biased high.
ND the analyte was analyzed for, but was not detected.
q The combined radium result includes both detected and not detected values.
U The analyte was analyzed for, but was not detected.
UB The analyte was detected in one of the associated laboratory, equipment, field or trip blank samples and is considered non-detect at the concentration reported by the laboratory.

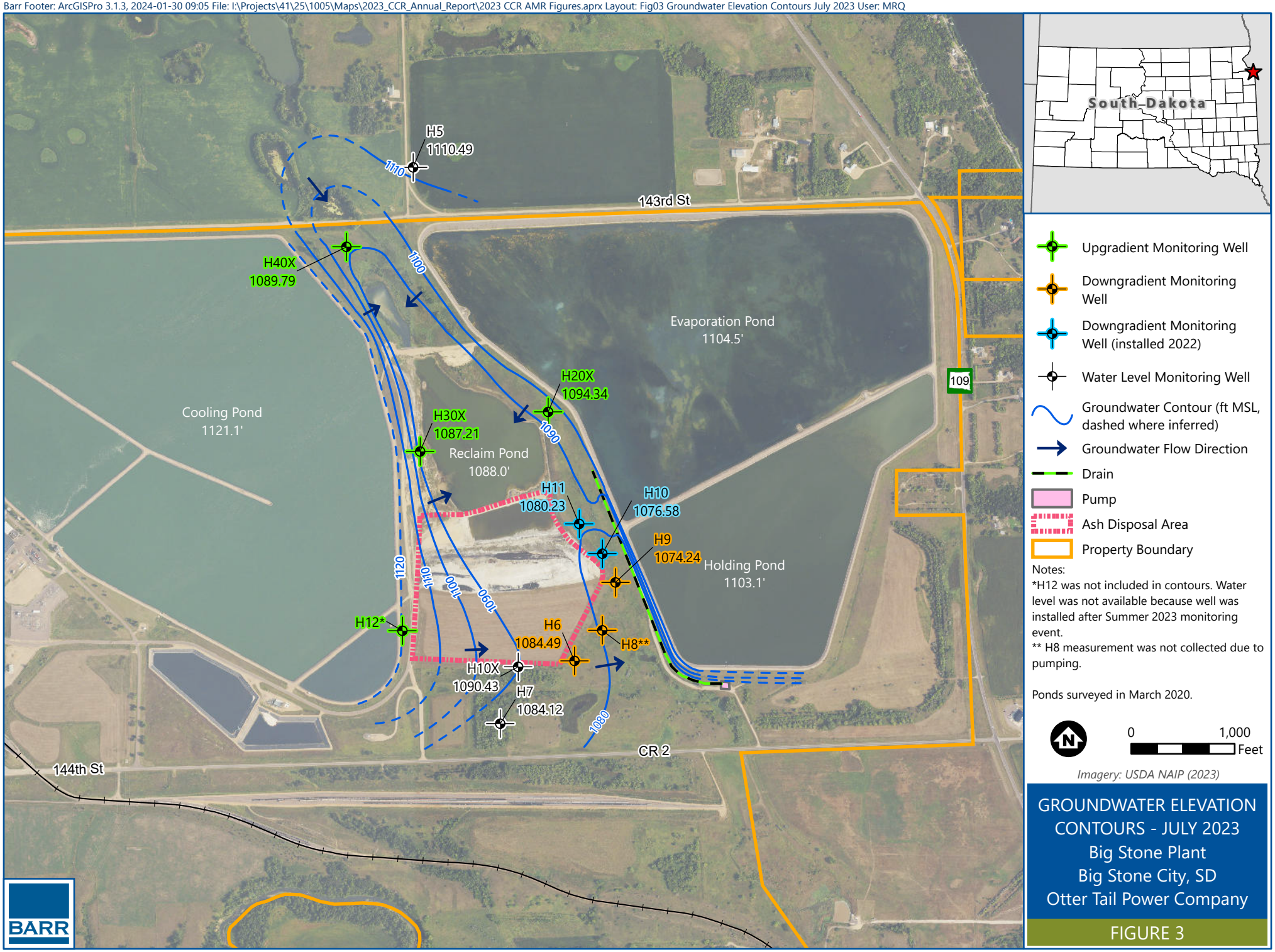
Figures

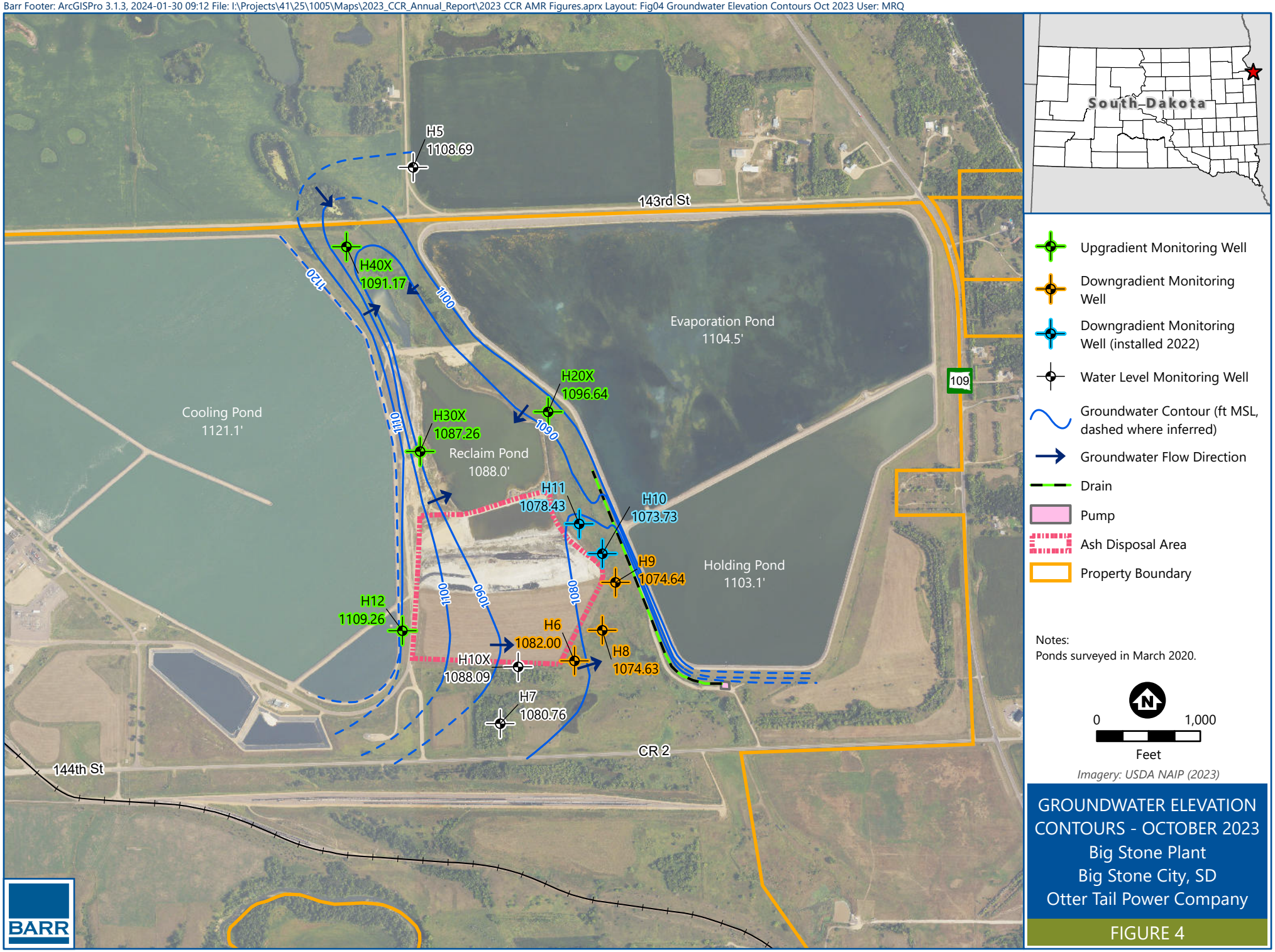
Barr Footer: ArcGISPro 3.1.3, 2023-10-23 09:16 File: I:\Projects\41\25\008\Maps\2023 Well Installation\2023 Well Installation\2023 Well Installation.aprx Layout: Figure01 Ash Disposal Area Location User: MRQ



Barr Footer: ArcGISPro 3.1.3, 2024-01-29 16:17 File: I:\Projects\41\25\1005\Maps\2023_CCR_Annual_Report\2023 CCR AMR Figures.aprx Layout: Fig02 Groundwater Elevation Contours May 2023 User: MRQ




H5
1110.49
1110
143rd St
H40X
1089.79
1100
Evaporation Pond
1104.5'
H20X
1094.34
109
Cooling Pond
1121.1'
H30X
1087.21
1090
Reclaim Pond
1088.0'
H11
1080.23
H10
1076.58
H9
1074.24
Holding Pond
1103.1'
1120
1110
1100
1090
H12*
H6
1084.49
H8**
H10X
1090.43
H7
1084.12
1080
CR 2
144th St
South Dakota
Upgradient Monitoring Well
Downgradient Monitoring Well
Downgradient Monitoring Well (installed 2022)
Water Level Monitoring Well
Groundwater Contour (ft MSL, dashed where inferred)
Groundwater Flow Direction
Drain
Pump
Ash Disposal Area
Property Boundary
Notes:
*H12 was not included in contours. Water level was not available because well was installed after Summer 2023 monitoring event.
** H8 measurement was not collected due to pumping.
Ponds surveyed in March 2020.
0
1,000
Feet
Imagery: USDA NAIP (2023)
GROUNDWATER ELEVATION CONTOURS - JULY 2023
Big Stone Plant
Big Stone City, SD
Otter Tail Power Company
FIGURE 3
BARR


H5
1108.69
143rd St
H40X
1091.17
1120
1100
Evaporation Pond
1104.5'
H20X
1096.64
109
Cooling Pond
1121.1'
H30X
1087.26
1110
1090
Reclaim Pond
1088.0'
H11
1078.43
H10
1073.73
H9
1074.64
Holding Pond
1103.1'
H12
1109.26
1100
1090
1080
H6
1082.00
H8
1074.63
H10X
1088.09
H7
1080.76
CR 2
144th St
South Dakota
Upgradient Monitoring Well
Downgradient Monitoring Well
Downgradient Monitoring Well (installed 2022)
Water Level Monitoring Well
Groundwater Contour (ft MSL, dashed where inferred)
Groundwater Flow Direction
Drain
Pump
Ash Disposal Area
Property Boundary
Notes:
Ponds surveyed in March 2020.
0
1,000
Feet
Imagery: USDA NAIP (2023)
GROUNDWATER ELEVATION CONTOURS - OCTOBER 2023
Big Stone Plant
Big Stone City, SD
Otter Tail Power Company
FIGURE 4
BARR

Appendices

Appendix A

2023 Well Boring Logs

Barr Engineering Co.
4300 MarketPointe Drive Suite 200
Minneapolis, MN 55435
Telephone: 952-832-2600

LOG OF WELL H12

Project:	CCR Monitoring Well Network	Surface Elevation:	1124.6 ft	Top of Casing Elev.: 1127.4 ft
Project No.:	41251005	Drilling Method:	Hollow Stem Auger	
Location:	Big Stone Plant	Sampling Method:	Dual tube	
Coordinates:		Completion Depth:	30.0 ft	
Datum:	NAD83			

Depth, feet	Sample Type & Recovery	Sample No.	USCS	Graphic Log	LITHOLOGIC DESCRIPTION	Elevation, feet
0			ML		SILT WITH SAND (ML): fine to medium sand; trace coarse sand; abundant roots; Very dark grayish brown (10YR 3/2); moist; non-plastic plasticity; 0% gravel, 25% sand, 75% fines, [top soil].	
		1	CL		SANDY LEAN CLAY (CL): fine to medium sand; trace coarse sand; trace coarse gravel; gray and orange mottling; increasing silt with depth; Light olive brown (2.5Y 5/3); moist; stiff; low plasticity; 0% gravel, 30% sand, 70% fines. 1.5-1.6: Strong brown oxidation; sand increased to 40%.	
5		2				1120
10		3	SP-SM		POORLY GRADED SAND WITH SILT (SP-SM): fine to medium sand; 10% of sand fraction coarse); trace fine gravel; grain size coarsens downward; trace strong brown oxidation; Yellowish brown (10YR 5/6); moist; non-plastic plasticity; 90% sand, 10% fines.	1115
15					15: Wet.	1110
		4	CL		SANDY LEAN CLAY (CL): fine to medium sand; trace fine to coarse gravel; orange mottling; Yellowish brown (10YR 5/4); moist; stiff; low plasticity; 0% gravel, 35% sand, 65% fines.	
20					19: 1 mm organic lamination. 20-23.5: soft; gray and orange mottling; sand decreased to 20%; siltier fines.	1105
		5			23: 1 " granitic gravel. 23.3-23.5: clayey sand (SC) lens; 60% coarse sand; 5-10% fine to medium sand; 35% clayey fines; red oxidation. 23.5: 0.1' poorly graded sand (SP) lens; very fine sand; trace fines.	
25						1100
		6	SP		POORLY GRADED SAND (SP): medium to coarse sand; fine to coarse gravel; Yellowish brown (10YR 5/6); wet; angular to subangular; 5% gravel, 90% sand, 5% fines.	
			CL		LEAN CLAY WITH SAND (CL): fine to coarse sand; fine gravel; strong brown mottling; black organics; Yellowish brown (10YR 5/4); moist; stiff; low plasticity; 5% gravel, 20% sand, 75% fines.	
30					End of well 30.0 feet	1095

WELL OR PIEZOMETER CONSTRUCTION DETAIL

PRO. CASING
- Diameter: **6"**
- Type: **Steel**
- Interval: **2.75' ags-4.25' bgs**

RISER CASING
- Diameter: **2"**
- Type: **PVC SCH 40**
- Interval: **2.5' ags-12' bgs**

GROUT
- Type: **Bentonite**
- Interval: **2-10' bgs**

SEAL
- Type: **Bentonite chips**
- Interval: **2-20' bgs**

SANDPACK
- Type: **Red Flint Sand**
- Interval: **#40**
- **10-22' bgs**

SCREEN
- Diameter: **2"**
- Type: **PVC SCH 40**
- Interval: **12-22' bgs**

Date Boring Started:	9/14/23 10:00 am
Date Boring Completed:	9/14/23 12:00 pm
Logged By:	KJN3
Drilling Contractor:	Dakota Technologies
Drill Rig:	7720DT

Remarks: Survey data provided by Otter Tail Power on October 18, 2023.

Additional data may have been collected in the field which is not included on this log.

Appendix B

Laboratory Reports and Field Sheets

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

MEMBER ACIL

FINAL REPORT COMPLETION DATE: 8 Aug 23 AS

Date Reported: 4 Aug 2023

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Work Order #: 31-0147
Account #: 006106
PO #: 59601

Project Name: BIG STONE PLANT-CCR

Field Service Manager/Date Reviewed

Chemistry Lab Manager/Date Reviewed

Quality Assurance Director/Date Reviewed

RL = Reporting Limits
NQ = Not Present, Qualitative Only
PQ = Present, Qualitative Only
ND = Not Determined

All data for this report has been approved by MVTL Laboratory Management.

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MEMBER ACIL

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 4 Aug 2023
Lab Number: 23-A7487
Work Order #: 31-0147
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 15 May 2023 12:04
Sampled By: MVTL FIELD PERSONNEL
Date Received: 15 May 2023 16:29
PO #: 59601

Project Name: BIG STONE PLANT-CCR

Sample Description: H20X

Temp at Receipt: 3.9C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions					16 May 23	KH
pH, Field	6.74	units	1.00	SM4500-H+-2011	15 May 23 12:04	BMW
pH	* 7.3	units	1.0	SM 4500 H+ B-2000	16 May 23 12:27	KFL
Sulfate	1950 ~	mg/L	5.0	ASTM D516-11	18 May 23 11:15	SS
Chloride	4.1	mg/L	3.0	SM 4500 Cl E	18 May 23 11:17	LS
Solids, Total Dissolved	3850	mg/L	10	SM 2540 C-97	17 May 23 9:45	CC
Calcium	229.0 #	mg/L	0.500	SW6010D	25 May 23 12:52	RMV
Boron	0.251	mg/L	0.100	SW6010D	23 May 23 11:06	RMV
Fluoride	0.350 @	mg/L	0.020	EPA 300.0	25 May 23 6:18	MDH

* Holding Time Exceeded

~ Sample diluted due to result above calibration of linear range.

RL = Reporting Limit
Analyses performed under our Minnesota Department of Health Accreditation conform to the current TNI standards.
The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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PO BOX 496
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Report Date: 4 Aug 2023
Lab Number: 23-A7488
Work Order #: 31-0147
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 15 May 2023 10:49
Sampled By: MVTL FIELD PERSONNEL
Date Received: 15 May 2023 16:29
PO #: 59601

Project Name: BIG STONE PLANT-CCR

Sample Description: H30X

Temp at Receipt: 3.9C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions					16 May 23	KH
pH, Field	6.62	units	1.00	SM4500-H+-2011	15 May 23 10:49	BMW
pH	* 7.2	units	1.0	SM 4500 H+ B-2000	16 May 23 12:27	KFL
Sulfate	1490 ~	mg/L	5.0	ASTM D516-11	18 May 23 11:15	SS
Chloride	66.0	mg/L	3.0	SM 4500 Cl E	18 May 23 11:17	LS
Solids, Total Dissolved	3160	mg/L	10	SM 2540 C-97	17 May 23 9:45	CC
Calcium	364.0 ~	mg/L	0.500	SW6010D	25 May 23 12:52	RMV
Boron	6.540 ~	mg/L	0.100	SW6010D	23 May 23 11:06	RMV
Fluoride	0.430	mg/L	0.020	EPA 300.0	25 May 23 6:18	MDH

* Holding Time Exceeded

~ Sample diluted due to result above calibration of linear range.

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FERGUS FALLS MN 56538-0496

Report Date: 4 Aug 2023
Lab Number: 23-A7489
Work Order #: 31-0147
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 15 May 2023 11:15
Sampled By: MVTL FIELD PERSONNEL
Date Received: 15 May 2023 16:29
PO #: 59601

Project Name: BIG STONE PLANT-CCR

Sample Description: H40X

Temp at Receipt: 3.9C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions					16 May 23	KH
pH, Field	6.61	units	1.00	SM4500-H+-2011	15 May 23 11:15	BMW
pH	* 7.1	units	1.0	SM 4500 H+ B-2000	16 May 23 12:27	KFL
Sulfate	1050 ~	mg/L	5.0	ASTM D516-11	18 May 23 11:15	SS
Chloride	42.8	mg/L	3.0	SM 4500 Cl E	18 May 23 11:17	LS
Solids, Total Dissolved	2140	mg/L	10	SM 2540 C-97	17 May 23 9:45	CC
Calcium	330.0	mg/L	0.500	SW6010D	25 May 23 13:24	RMV
Boron	0.518	mg/L	0.100	SW6010D	23 May 23 11:06	RMV
Fluoride	0.530	mg/L	0.020	EPA 300.0	25 May 23 11:33	MDH

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! = Due to sample quantity
= Due to concentration of other analytes
+ = Due to internal standard response
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FERGUS FALLS MN 56538-0496

Report Date: 4 Aug 2023
Lab Number: 23-A7490
Work Order #: 31-0147
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 15 May 2023 12:53
Sampled By: MVTL FIELD PERSONNEL
Date Received: 15 May 2023 16:29
PO #: 59601

Project Name: BIG STONE PLANT-CCR

Sample Description: H-6

Temp at Receipt: 3.9C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions					16 May 23	KH
pH, Field	7.54	units	1.00	SM4500-H+-2011	15 May 23 12:53	DGF
pH	* 7.7	units	1.0	SM 4500 H+ B-2000	16 May 23 12:27	KFL
Sulfate	93.0 @	mg/L	5.0	ASTM D516-11	18 May 23 11:33	SS
Chloride	3.2	mg/L	3.0	SM 4500 Cl E	18 May 23 11:34	LS
Solids, Total Dissolved	536	mg/L	10	SM 2540 C-97	17 May 23 9:45	CC
Calcium	36.60	mg/L	0.500	SW6010D	23 May 23 11:41	RMV
Boron	3.260	mg/L	0.100	SW6010D	23 May 23 11:41	RMV
Fluoride	0.500	mg/L	0.020	EPA 300.0	25 May 23 11:33	MDH

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Report Date: 4 Aug 2023
Lab Number: 23-A7491
Work Order #: 31-0147
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 15 May 2023 13:34
Sampled By: MVTL FIELD PERSONNEL
Date Received: 15 May 2023 16:29
PO #: 59601

Project Name: BIG STONE PLANT-CCR

Sample Description: H-8

Temp at Receipt: 3.9C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions					16 May 23	KH
pH, Field	7.24	units	1.00	SM4500-H+-2011	15 May 23 13:34	DGF
pH	* 7.4	units	1.0	SM 4500 H+ B-2000	16 May 23 12:27	KFL
Sulfate	359 ~	mg/L	5.0	ASTM D516-11	18 May 23 11:33	SS
Chloride	4.3	mg/L	3.0	SM 4500 Cl E	18 May 23 11:34	LS
Solids, Total Dissolved	5270	mg/L	10	SM 2540 C-97	17 May 23 9:45	CC
Calcium	125.0	mg/L	0.500	SW6010D	23 May 23 11:41	RMV
Boron	3.020	mg/L	0.100	SW6010D	23 May 23 11:41	RMV
Fluoride	0.550	mg/L	0.020	EPA 300.0	25 May 23 11:33	MDH

* Holding Time Exceeded

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! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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Report Date: 4 Aug 2023
Lab Number: 23-A7492
Work Order #: 31-0147
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 15 May 2023 14:27
Sampled By: MVTL FIELD PERSONNEL
Date Received: 15 May 2023 16:29
PO #: 59601

Project Name: BIG STONE PLANT-CCR

Sample Description: H-9

Temp at Receipt: 3.9C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions					16 May 23	KH
pH, Field	6.71	units	1.00	SM4500-H+-2011	15 May 23 14:27	DGF
pH	* 6.9	units	1.0	SM 4500 H+ B-2000	16 May 23 12:27	KFL
Sulfate	1510 ~	mg/L	5.0	ASTM D516-11	18 May 23 11:33	SS
Chloride	40.9	mg/L	3.0	SM 4500 Cl E	18 May 23 11:34	LS
Solids, Total Dissolved	2580	mg/L	10	SM 2540 C-97	17 May 23 9:45	CC
Calcium	488.0 ~	mg/L	0.500	SW6010D	23 May 23 11:41	RMV
Boron	1.100	mg/L	0.100	SW6010D	23 May 23 11:41	RMV
Fluoride	0.360 @	mg/L	0.020	EPA 300.0	25 May 23 11:33	MDH

* Holding Time Exceeded

~ Sample diluted due to result above calibration of linear range.

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CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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Report Date: 4 Aug 2023
Lab Number: 23-A7493
Work Order #: 31-0147
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 15 May 2023 13:02
Sampled By: MVTL FIELD PERSONNEL
Date Received: 15 May 2023 16:29
PO #: 59601

Project Name: BIG STONE PLANT-CCR

Sample Description: H-10

Temp at Receipt: 3.9C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
MS Water Digestions					16 May 23	KH
Water Digestions					16 May 23	KH
pH, Field	6.34	units	1.00	SM4500-H+-2011	15 May 23 13:02	BMW
pH	* 7.0	units	1.0	SM 4500 H+ B-2000	16 May 23 12:27	KFL
Radium 226	4.42	pCi/L	0.60		23 Jun 23 17:46	OL
Radium 228	0.73	pCi/L	3.00	EPA M9320	21 Jun 23 21:31	OL
Sulfate	2590 ~	mg/L	5.0	ASTM D516-11	18 May 23 11:33	SS
Chloride	7.1	mg/L	3.0	SM 4500 Cl E	18 May 23 11:34	LS
Mercury	< 0.005	ug/L	0.005	EPA 245.7	23 May 23 13:53	RMB
Solids, Total Dissolved	4810	mg/L	10	SM 2540 C-97	17 May 23 9:45	CC
Calcium	284.0	mg/L	0.500	SW6010D	23 May 23 11:41	RMV
Lithium	0.226	mg/L	0.020	SW6010D	23 May 23 11:41	RMV
Barium	0.026	mg/L	0.005	SW6010D	23 May 23 11:41	RMV
Beryllium	< 0.005	mg/L	0.005	SW6010D	23 May 23 11:41	RMV
Chromium	< 0.01	mg/L	0.01	SW6010D	23 May 23 11:41	RMV
Cobalt	< 0.005	mg/L	0.005	SW6010D	23 May 23 11:41	RMV
Molybdenum	0.017	mg/L	0.015	SW6010D	23 May 23 11:41	RMV
Boron	0.292	mg/L	0.100	SW6010D	23 May 23 11:41	RMV
Antimony	< 2.5 @	ug/L	0.5	SW6020B	18 May 23 23:03	KAM
Arsenic	< 2.5 @	ug/L	0.5	SW6020B	18 May 23 23:03	KAM
Cadmium	< 0.5 @	ug/L	0.1	SW6020B	18 May 23 23:03	KAM
Lead	< 2.5 @	ug/L	0.5	SW6020B	22 May 23 11:43	KAM
Selenium	4.95 @	ug/L	0.50	SW6020B	22 May 23 11:43	KAM
Thallium	< 0.5 @	ug/L	0.1	SW6020B	22 May 23 11:43	KAM
Fluoride	0.200 @	mg/L	0.020	EPA 300.0	25 May 23 11:33	MDH

* Holding Time Exceeded

Radium 226 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

Radium 228 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

~ Sample diluted due to result above calibration of linear range.

OL = Analysis performed by an Outside Laboratory.

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JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Project Name: BIG STONE PLANT-CCR

Sample Description: H-11

Report Date: 4 Aug 2023
Lab Number: 23-A7494
Work Order #: 31-0147
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 15 May 2023 12:35
Sampled By: MVTL FIELD PERSONNEL
Date Received: 15 May 2023 16:29
PO #: 59601

Temp at Receipt: 3.9C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
MS Water Digestions					16 May 23	KH
Water Digestions					16 May 23	KH
pH, Field	6.37	units	1.00	SM4500-H+-2011	15 May 23 12:35	BMW
pH	* 7.0	units	1.0	SM 4500 H+ B-2000	16 May 23 12:27	KFL
Radium 226	1.27	pCi/L	0.60		23 Jun 23 17:46	OL
Radium 228	0.88	pCi/L	3.00	EPA M9320	28 Jun 23 17:46	OL
Sulfate	2640 ~	mg/L	5.0	ASTM D516-11	18 May 23 11:33	SS
Chloride	4.7	mg/L	3.0	SM 4500 Cl E	18 May 23 11:34	LS
Mercury	< 0.005	ug/L	0.005	EPA 245.7	23 May 23 13:53	RMB
Solids, Total Dissolved	4270	mg/L	10	SM 2540 C-97	17 May 23 9:45	CC
Calcium	217.0	mg/L	0.500	SW6010D	23 May 23 11:41	RMV
Lithium	0.223	mg/L	0.020	SW6010D	23 May 23 11:41	RMV
Barium	0.036	mg/L	0.005	SW6010D	23 May 23 11:41	RMV
Beryllium	< 0.005	mg/L	0.005	SW6010D	23 May 23 11:41	RMV
Chromium	< 0.01	mg/L	0.01	SW6010D	23 May 23 11:41	RMV
Cobalt	0.008	mg/L	0.005	SW6010D	23 May 23 11:41	RMV
Molybdenum	< 0.015	mg/L	0.015	SW6010D	23 May 23 11:41	RMV
Boron	0.232	mg/L	0.100	SW6010D	23 May 23 11:41	RMV
Antimony	< 0.5	ug/L	0.5	SW6020B	18 May 23 23:03	KAM
Arsenic	< 2.5 @	ug/L	0.5	SW6020B	18 May 23 23:03	KAM
Cadmium	0.38	ug/L	0.10	SW6020B	18 May 23 23:03	KAM
Lead	< 2.5 @	ug/L	0.5	SW6020B	22 May 23 11:43	KAM
Selenium	< 2.5 @	ug/L	0.5	SW6020B	22 May 23 11:43	KAM
Thallium	< 0.5 @	ug/L	0.1	SW6020B	22 May 23 11:43	KAM
Fluoride	0.140	mg/L	0.020	EPA 300.0	25 May 23 11:33	MDH

* Holding Time Exceeded

Radium 226 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

Radium 228 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

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Date Reported: 4 Aug 2023

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FERGUS FALLS MN 56538-0496

Work Order #: 202331-0147
Account Number: 006106
PO #: 59601

Project Name: BIG STONE PLANT-CCR

LABORATORY NARRATIVE

INORGANIC & METALS ANALYSES:
No problems were encountered.

AMENDED REPORT 03 AUGUST 2023:
The report was amended to include the following details of re-analysis:

Sample 23-A7491 was re-analyzed in duplicate for total dissolved solids on 14 July 2023 when it was noticed that the result did not align with historical data. The re-analysis results were 951 mg/L and 964 mg/L. It is unknown why the originally reported results were biased.

MINNESOTA VALLEY TESTING LABORATORIES, INC.

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Quality Control Report

Lab IDs: 23-A7487 to 23-A7494 **Project:** BIG STONE PLANT-CCR **Work Order:** 202331-0147

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Antimony ug/L	25.0	102	85-115	25.0	23A7465q	< 2.5	26.6	106	75-125	26.6	26.9	108	1.1	10	100	90-110	< 0.5
Arsenic ug/L	25.0	98	85-115	25.0	23A7465q	21.5	49.3	111	75-125	49.3	49.0	110	0.6	10	98	90-110	< 0.5
Barium mg/L	1.000	103	85-115	1.00	23A7491q	0.033	1.050	102	75-125	1.050	1.050	102	0.0	10	100	90-110	< 0.005
Beryllium mg/L	1.000	101	85-115	1.00	23A7491q	< 0.005	1.010	101	75-125	1.010	1.010	101	0.0	10	101	90-110	< 0.005
Boron mg/L	1.000	102	85-115	1.00	23A7491q	3.020	4.130	111	75-125	4.130	4.120	110	0.2	10	98	90-110	< 0.1
Cadmium ug/L	5.00	103	85-115	5.00	23A7465q	< 0.5	5.06	101	75-125	5.06	5.43	109	7.1	10	102	90-110	< 0.1
Calcium mg/L	50.00	103	85-115	50.0	23A7491q	125.0	174.0	98	75-125	174.0	174.0	98	0.0	10	100	90-110	< 0.5
Chloride mg/L	- -	- -	- -	60.0 600	23-A7489 23-A7516	42.8 305	103 906	100 100	80-120 80-120	103 906	103 907	100 100	0.0 0.1	10 10	93 93	90-110 90-110	< 3 < 3
Chromium mg/L	1.000	96	85-115	1.00	23A7491q	< 0.01	0.944	94	75-125	0.944	0.948	95	0.4	10	96	90-110	< 0.01
Cobalt mg/L	1.000	102	85-115	1.00	23A7491q	< 0.005	0.948	95	75-125	0.948	0.950	95	0.2	10	101	90-110	< 0.005
Fluoride mg/L	- -	- -	- -	1.00 1.00	23-A7487 23-A77492qc	0.350 0.360	1.49 1.42	114 106	75-125 75-125	1.49 1.42	1.48 1.47	113 111	0.7 3.5	10 10	102 103	90-110 90-110	< 0.02
Lead ug/L	25.0	95	85-115	25.0	23A7465q	< 5	26.5	106	75-125	26.5	26.6	106	0.4	10	99	90-110	< 0.5
Lithium mg/L	1.000	104	85-115	1.00	23-A7491	0.044	1.080	104	75-125	1.080	1.080	104	0.0	10	103	90-110	< 0.02
Mercury ug/L	-	-	-	0.10	23-A7434	< 0.005	0.069	69	63-111	0.069	0.069	69	0.0	18	94	76-113	< 0.005
Molybdenum mg/L	1.000	100	85-115	1.00	23A7491q	< 0.015	1.020	102	75-125	1.020	1.020	102	0.0	10	102	90-110	< 0.015
pH units	-	-	-	-	-	-	-	-	-	7.0	7.0	-	0.0	2.5	101	90-110	-
Selenium ug/L	25.0	103	85-115	25.0	23A7465q	8.70	36.1	110	75-125	36.1	39.1	122	8.0	10	102	90-110	< 0.5
Solids, Total Dissolved mg/L	- -	- -	- -	- -	- -	- -	- -	- -	- -	4270 951	4400 964	- -	3.0 1.4	7 7	99 100	85-115 85-115	< 10 < 10
Sulfate mg/L	- -	- -	- -	500 50.0	23-A7486 23-A7516	509 6.2	996 59.0	97 106	80-120 80-120	996 59.0	985 59.6	95 107	1.1 1.0	10 10	99 99	80-120 80-120	< 5 < 5
Thallium ug/L	5.00	96	85-115	5.00	23A7465q	< 1	5.36	107	75-125	5.36	5.29	106	1.3	10	99	90-110	< 0.1

Approved by: _____

ANALYTICAL REPORT

June 28, 2023

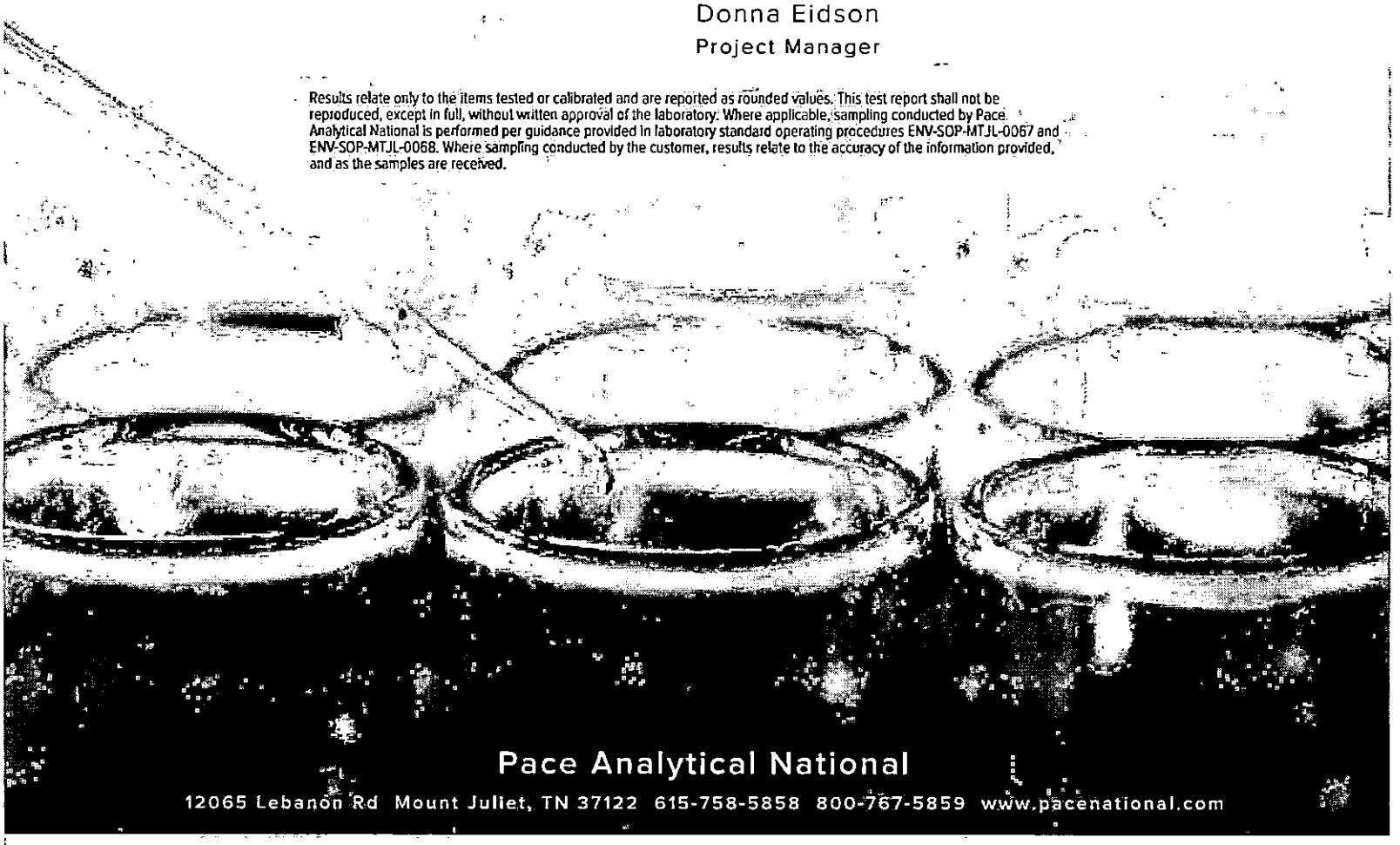
Pace Analytical - Minnesota

Sample Delivery Group:	L1618172
Samples Received:	05/19/2023
Project Number:	10653516
Description:	31-0147 Ottertail
Site:	001
Report To:	Piper Gibbs 1700 Elm Street Suite 200 Minneapolis, MN 55414

Entire Report Reviewed By:

Donna Eidson
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



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SAMPLE SUMMARY

23A7493-H-10 L1618172-01 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				05/15/23 13:02	05/19/23 09:05	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2077154	1	06/14/23 18:57	06/21/23 21:31	SNR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2078608	1	06/22/23 12:18	06/23/23 17:46	RGT	Mt. Juliet, TN

23A7494-H-11 L1618172-02 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				05/15/23 12:35	05/19/23 09:05	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2077154	1	06/14/23 18:57	06/21/23 21:31	SNR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2078608	1	06/22/23 12:18	06/23/23 17:46	RGT	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Donna Eidson
Project Manager

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.726		0.251	0.442	06/21/2023 21:31	WG2077154
(T) Barium	*85.5*			*30.0-143*	*06/21/2023 21:31*	WG2077154
(T) Yttrium	*100*			*30.0-136*	*06/21/2023 21:31*	WG2077154

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	4.42		0.989	0.432	06/23/2023 17:46	WG2078608
(T) Barium-133	*63.4*			*30.0-143*	*06/23/2023 17:46*	WG2078608

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.875		0.201	0.342	06/21/2023 21:31	WG2077154
(T) Barium	*111*			*30.0-143*	*06/21/2023 21:31*	WG2077154
(T) Yttrium	*106*			*30.0-136*	*06/21/2023 21:31*	WG2077154

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	1.27		0.422	0.188	06/23/2023 17:46	WG2078608
(T) Barium-133	*87.1*			*30.0-143*	*06/23/2023 17:46*	WG2078608

Method Blank (MB)

(MB) R3940781-1 06/21/23 21:31

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty +/- pCi/l	MB MDA pCi/l
Radium-228	0.163	J	0.134	0.245
(T) Barium	*111*		*111*	
(T) Yttrium	*109*		*109*	

L1620768-42 Original Sample (OS) • Duplicate (DUP)

(OS) L1620768-42 06/21/23 21:31 • (DUP) R3940781-5 06/21/23 21:31

Analyte	Original Result pCi/l	Original Uncertainty +/- pCi/l	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty +/- pCi/l	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	0.258	0.326	0.602	1.02	0.329	0.602	1	119	1.64		20	3
(T) Barium	*122*			*108*	*108*							
(T) Yttrium	*114*			*109*	*109*							

Laboratory Control Sample (LCS)

(LCS) R3940781-2 06/21/23 21:31

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	4.98	99.7	80.0-120	
(T) Barium			*112*		
(T) Yttrium			*110*		

L1618373-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1618373-01 06/21/23 21:31 • (MS) R3940781-3 06/21/23 21:31 • (MSD) R3940781-4 06/21/23 21:31

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	10.0	-0.124	9.11	9.19	91.1	91.9	1	70.0-130			0.874		20
(T) Barium		*107*			*115*	*124*							
(T) Yttrium		*108*			*105*	*106*							

Method Blank (MB)

(MB) R3941782-1 06/23/23 17:46

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty +/- pCi/l	MB MDA pCi/l
Radium-226	0.0104	U	0.0583	0.109
(T) Barium-133	*64.8*		*64.8*	

L1620768-20 Original Sample (OS) • Duplicate (DUP)

(OS) L1620768-20 06/23/23 17:46 • (DUP) R3941782-5 06/23/23 17:46

Analyte	Original Result pCi/l	Original Uncertainty +/- pCi/l	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty +/- pCi/l	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.0818	0.160	0.270	0.0852	0.183	0.270	1	4.12	0.0142	U	20	3
(T) Barium-133	*92.4*			*81.8*	*81.8*							

Laboratory Control Sample (LCS)

(LCS) R3941782-2 06/23/23 17:46

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.01	5.72	114	80.0-120	
(T) Barium-133			*69.2*		

L1620768-27 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1620768-27 06/23/23 17:46 • (MS) R3941782-3 06/23/23 17:46 • (MSD) R3941782-4 06/23/23 17:46

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.0	0.133	21.8	19.9	108	98.6	1	75.0-125			9.31		20
(T) Barium-133		*99.2*			*80.1*	*90.4*							

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDA	Minimum Detectable Activity.
Rec.	Recovery.
RER	Replicate Error Ratio.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
U	Below Detectable Limits: Indicates that the analyte was not detected.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [16]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [14]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Orinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

F059

Internal Transfer Chain of Custody

Pace Analytical®
www.pacelabs.com

☐ Samples Pre-Logged into eCOC.

State Of Origin: MN
Cert. Needed: ☑ Yes ☐ No

Workorder: 10653516 **Workorder Name:** Work Order: 31-0147 Ottertail

Owner Received Date: 5/17/2023 **Results Requested By:** 6/16/2023

Report To	Subcontract To
Piper Gibbs Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700	Pace National 12065 Lebanon Rd Mt. Juliet, TN 37122 Phone (615) 758-5858

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Unpreserved	Requested Analysis: Radium 226/228	LAB USE ONLY: 468972
1	23A7493-H-10	PS	5/15/2023 13:02	10653516001	Water	1	X	-01
2	23A7494-H-11	PS	5/15/2023 12:35	10653516002	Water	1	X	-02
3								
4								
5								

Transfers	Released By	Date/Time	Received By	Date/Time
1	[illegible]	5-18-23 1730	[illegible]	5-19-23 0905
2				
3				

Comments: OK

Cooler Temperature on Receipt 0.9 °C | Custody Seal (Y) or N | Received on Ice (Y) or N | Samples Intact (Y) or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.
This chain of custody is considered complete as is since this information is available in the owner laboratory.

0.9°C-0.9°C

Count= 28

Sample Receipt Checklist

		If Applicable	
COC Seal Present/Intact:	Y N	VOA Zero Headspace:	Y N
COC Signed/Accurate:	Y N	Pres.Correct/Check:	Y N
Bottles arrive intact:	Y N		
Correct bottles used:	Y N		
Sufficient volume sent:	Y N		
RAD Screen <0.5 mR/hr:	Y N		

pH/ADS SIA 1542

This is an exact copy of the original document
By AR Date 15 May 23
pages 1-12

Minnesota Valley Testing Laboratories

1126 North Front Street New Ulm, MN 56003
Phone: 800 782 3557 Fax: 507 359 2890

Field Service Chain of Custody Record

Project	Otter Tail Power Company	**Project Type:**	Big Stone Plant CCR	**Name of Samplers:**	MS, DF, DS, BW
Report	Otter Tail Power Company	**Carbon Copy:**	Barr Engineering		
Attn:	Paul Vukonich	Attn:		Quote Number:	
Address	P.O. Box 496	Address:		Work Order Number:	31-0147
	Fergus Falls, MN 56538-0496			Lab Numbers:	
Phone:	218-739-8349				

Sample Information | **Bottle Type** | **Analysis**

Lab Number	Sample ID	Unique Station ID	Date	Time	Sample Type	Sample Location	1000 HNO3 Inner Mountain	500 None	1000 none	500 HNO3	Filter? Y or N	500 H2SO4	Filter? Y or N	1000 Amber none Pace	1000 Amber H2SO4	500 NaOH	Other: 150 H2SO4	Other 150 None	Analysis Required
A7487	H2OX		15 May 23	1204	GW				1	1	N								CCR 3
88	H3OX			1049	GW				1	1	N								CCR 3
89	H4OX			1115	GW				1	1	N								CCR 3
90	H-6			1253	GW				1	1	N								CCR 3
91	H-8			1334	GW				1	1	N								CCR 3
92	H-9			1427	GW				1	1	N								CCR 3
93	H10			1302	GW				1	1	N			1					CCR 3&4
94	H11			1035	GW				1	1	N			1					CCR 3&4

Comments:

Samples Relinquished By:				Samples Received By:	A. Kueder
Date: 15 May 23	Time: 1629	Temp: 3.9 Tm 3.7		Date: 15 May 23	Time: 1629	Temp: 3.9C
Samples Relinquished into:	Fridge	Log in Cart	Other:			
Samples Relinquished By:				Samples Received By:		
Date:	Time:	Temp:		Date:	Time:	Temp:
Delivery:	Samplers	Other:		Seal Number(s) - If Used		
Transport:	Ambient	Ice	Other:	Seals Intact?	Yes	No

~~April~~ 2023
MAY

2023 Big Stone Sampling - CCR

Landfill or ADA wells

Site	Parameter List	Well Depth (constructed)	Diameter (Inches)	Well Elevation (TOC)	Sample Equipment	Dedicated?	Pump Rate (ml/minute)	Goes Dry?	Sampling Seasons**
H2OX	CCR 3	32.20	2	1103.86	Bladder	Yes	100	Yes	April & Oct
H3OX	CCR 3	22.55	2	1095.26	Bladder	Yes	100	Yes	April & Oct
H4OX	CCR 3	27.20	2	1108.25	Bladder	Yes	100	No	April & Oct
H6	CCR 3	15.00	2	1097.76	Bladder	Yes	100	Yes	April & Oct
H8	CCR 3	22.05	2	1081.23	Bladder	Yes	100	No	April & Oct
H9	CCR 3	30.20	2	1086.21	Bladder	Yes	100	No	April & Oct
H10	CCR 3 and 4	35.49	2	1090.83	Bladder	Yes	100		See highlighted note below
H11	CCR 3 and 4	42.15	2	1093.24	Bladder	Yes	100		See highlighted note below

Note: Wells H10 and H11 need to be sampled 8 times for CCR this year. Background sampling like 5 years ago. We want to sample in April - November. Each event has to be about 30 days apart. Also, durning every sampling event for the CCR, we will need water levels on the CCR wells not sampled.

Note: CCR sampling is for total recoverable metals. They are not filtered in the field.

CCR 3 & 4 parameters see the first two tabs labeled CCR 3 and CCR 4

CCR - Appendix III Detection Monitoring

Field Parameters

pH*

* Field and Laboratory Measurements

Total Concentration Parameters	**Method**
Boron	6010
Calcium	6010
Chloride	SM4500 CL E
Fluoride	EPA 300
pH	SM 4500 H+B-96
Sulfate	ASTM D516
Dissolved Solids, Total	SM 2540 C-97

Note: These are non-filtered samples.

CCR - Appendix IV - Assessment Monitoring

Total Concentration Parameters	**Method**
Antimony	SW6020A
Arsenic	SW602A
Barium	SW6010C
Beryllium	SW6020A
Cadmium	SW6020A
Chromium, Total	SW6020A
Cobalt	SW6010C
Fluoride	EPA 300
Lead	SW6020A
Lithium	SW6010C
Mercury	EPA 245.7
Molybdenum	SW6020A
Selenium	SW6020A
Thallium	SW6020A
Radium 226 + 228	

Note: These are non-filtered samples.

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Site: Otter Tail Power Co./ Big Stone

Sampling Personnel: Bir

Facility ID:

Date: 15 May 23

Unique Station ID:

Sample ID: Well H2OX

Well Condition

Well Locked?	(Yes)	No	Protective Posts?	Yes	(No)
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	(Yes)	No

Repairs Necessary:

Well Information

Well Depth:	32.83	Well Casing Elevation:	1103.91
Constructed Depth:	32.20	Static Water Elevation:	1097.73
Casing Diameter:	2"	Previous Static:	1097.82
Water Level Before Purge:	6.18	Water Level After Sample:	Below Pump
Well Volume:	4.35 Gallons	Measurement Method:	(Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 74 Wind: Lir Sky: Fair

Sampling Method: Grundfos (Bladder SS/T) Disp. Bailer Whale Grab Other:

Dedicated Equipment:	(Yes) No	Pumping Rate:	.25 gpm
Well Purged Dry?	(Yes) No	Time Pump Began:	1141 (am) / pm
Time Purged Dry?	1154	Time of Sampling:	1204 am / (pm)
Duplicate Sample?	Yes (No) ID: —	Sample EH:	446

Sample Appearance: General: Clear Color: None Phase: None Odor: None

Time 15	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1159	6.65	3990	8.79	NA	NA	4.5	1	
							2	
1204	6.74	3976	8.32	"	"	—	3	Recharge
							4	
							5	

Stabilized? Yes (No) Amount Water Removed: 4.6 Gallons

Comments:

TCR

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Site: Otter Tail Power Co./ Big Stone

Sampling Personnel: BSW

Facility ID:

Date: 15 May 23

Unique Station ID:

Sample ID: Well H3OX

Well Condition

Well Locked?	(Yes)	No	Protective Posts?	Yes	(No)
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	Yes	(No)

Repairs Necessary:

Well Information

Well Depth:	22.68	Well Casing Elevation:	1095.19
Constructed Depth:	22.55	Static Water Elevation:	1088.29
Casing Diameter:	2"	Previous Static:	1088.56
Water Level Before Purge:	6.90	Water Level After Sample:	Below pump
Well Volume:	2.57 Gallons	Measurement Method:	(Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 69 Wind: Lt V Sky: Fair

Sampling Method: Grundfos (Bladder SS/T 15 May 23) Disp. Bailer Whale Grab Other:

Dedicated Equipment: (Yes) No

Well Purged Dry? (Yes) No

Time Purged Dry? 1044

Duplicate Sample? Yes (No) ID: —

Pumping Rate: .25 gpm

Time Pump Began: 1033 (am) / pm

Time of Sampling: 1049 (am) / pm

Sample EH: 206.8

Sample Appearance: General: Clear Color: None Phase: None Odor: None

Time 11	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1044	6.57	3813	10.80	NA	NA	2.75	1	
				↓	↓		2	
1049	6.62	3761	10.38	↓	↓	—	3	Recharge
							4	
							5	

Stabilized? Yes (No)

Amount Water Removed: 2.75 Gallons

Comments:

YECR

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Site: Otter Tail Power Co./ Big Stone

Sampling Personnel: BW

Facility ID:

Date: 15May23

Unique Station ID:

Sample ID: Well H4OX

Well Condition

Well Locked?	~~Yes~~	No	Protective Posts?	Yes	~~No~~
Well Labeled?	~~Yes~~	No	State ID Tag?	Yes	~~No~~
Casing Straight?	~~Yes~~	No	Grout Seal Intact?	~~Yes~~	No

Repairs Necessary:

Well Information

Well Depth:	27.48	Well Casing Elevation:	1108.22
Constructed Depth:	27.20	Static Water Elevation:	1091.35
Casing Diameter:	2"	Previous Static:	1092.16
Water Level Before Purge:	16.27	Water Level After Sample:	Below Pump
Well Volume:	1.83 Gallons	Measurement Method:	(Elec. WLI) Steel Tape

Sampling Information

Weather Conditions: Temp: 72 Wind: Lt V Sky: Fair

Sampling Method: Grundfos (Bladder SS/T) Disp. Bailer Whale Grab Other:

Dedicated Equipment:	~~Yes~~ No	Pumping Rate:	.25 gpm
Well Purged Dry?	~~Yes~~ No	Time Pump Began:	1102 ~~am~~/ pm
Time Purged Dry?	1110	Time of Sampling:	1115 ~~am~~/ pm
Duplicate Sample?	Yes (No) ID: —	Sample EH:	200.9

Sample Appearance: General: Clear Color: None Phase: None Odor: None

Time 8	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1110	6.56	2758	9.46	NA	NA	2	1	
							2	
1115	6.61	2674	9.11	"	"	—	3	Recharge
							4	
							5	

Stabilized? Yes (No) Amount Water Removed: 2 Gallons

Comments:

+CCR

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Site: Otter Tail Power Co./ Big Stone

Sampling Personnel: DF

Facility ID: —

Date: 15May23

Unique Station ID: —

Sample ID: Well H6

Well Condition

Well Locked?	(Yes)	No	Protective Posts?	(Yes)	No
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	Yes	(No)

Repairs Necessary:

Well Information

Well Depth:	17.92	Well Casing Elevation:	NA
Constructed Depth:	17.70	Static Water Elevation:	
Casing Diameter:	2"	Previous Static:	
Water Level Before Purge:	7.82	Water Level After Sample:	8.70
Well Volume:	1.65 Gallons	Measurement Method:	(Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 65 Wind: L+V Sky: Sunny

Sampling Method: Grundfos (Bladder SS/T) (Disp. Bailer) (Whale) Grab Other:

15May23 DF

Dedicated Equipment: (Yes) No — Pumping Rate: 0.25 gpm

Well Purged Dry? Yes (No) — Time Pump Began: 1232 am / (pm)

Time Purged Dry? — — Time of Sampling: 1253 am / (pm)

Duplicate Sample? Yes (No) ID: — — Sample EH: 83.1

Sample Appearance: General: Clear Color: None Phase: None Odor: None

Time 7	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1239	7.56	1006	6.65	NA	NA	1.75	1	
1246	7.55	1024	6.52			3.5	2	
1253	7.54	1015	6.62			5.25	3	
							4	
							5	

Stabilized? (Yes) No — Amount Water Removed: 5.25 Gallons

Comments:

Exceptions to Protocol: +CCR

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Site: Otter Tail Power Co./ Big Stone

Sampling Personnel: DF

Facility ID: —

Date: 15May23

Unique Station ID: —

Sample ID: Well H8

Well Condition

Well Locked?	(Yes)	No	Protective Posts?	(Yes)	No
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	Yes	(No)

Repairs Necessary:

Well Information

Well Depth: 22.33

Well Casing Elevation: 1081.23

Constructed Depth: 22.05

Static Water Elevation: 1077.03

Casing Diameter: 2"

Previous Static: —

Water Level Before Purge: 4.20

Water Level After Sample: 4.50

Well Volume: 2.96 Gallons

Measurement Method: (Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 65 Wind: L+V Sky: Sunny

Sampling Method: Grundfos (Bladder SS/T) Disp. Bailer Whale Grab Other:

Dedicated Equipment: (Yes) No

Pumping Rate: 0.25 gpm

Well Purged Dry? Yes (No)

Time Pump Began: 1258 am / (pm)

Time Purged Dry? —

Time of Sampling: 1334 am / (pm)

Duplicate Sample? Yes (No) ID: —

Sample EH: 81.2

Sample Appearance: General: Clear Color: None Phase: None Odor: None

Time (12)	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1310	7.25	1552	7.68	NA	NA	3	1	
1322	7.24	1553	7.65			6	2	
1334	7.24	1553	7.66			9	3	
							4	
							5	

Stabilized? (Yes) No

Amount Water Removed: 9 Gallons

Comments:

Exceptions to Protocol: +CCR

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Site: Otter Tail Power Co./ Big Stone

Sampling Personnel: DF

Facility ID: —

Date: 15May23

Unique Station ID: —

Sample ID: Well H9

Well Condition

Well Locked?	(Yes)	No	Protective Posts?	(Yes)	No
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	Yes	(No)

Repairs Necessary:

Well Information

Well Depth: 30.71

Well Casing Elevation: 1086.21

Constructed Depth: 30.20

Static Water Elevation: 1079.46

Casing Diameter: 2"

Previous Static: —

Water Level Before Purge: 6.75

Water Level After Sample: 7.00

Well Volume: 3.91 Gallons

Measurement Method: (Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 65 Wind: LtV Sky: Sunny

Sampling Method: Grundfos (Bladder SS/T) Disp. Bailer Whale Grab Other:

Dedicated Equipment: (Yes) No

Pumping Rate: 0.25 gpm

Well Purged Dry? Yes (No)

Time Pump Began: 1339 am / (pm)

Time Purged Dry? —

Time of Sampling: 1427 am / (pm)

Duplicate Sample? Yes (No) ID: —

Sample EH: 107.0

Sample Appearance: General: Clear Color: None Phase: None Odor: None

Time (16)	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1355	6.71	3132	9.04	NA	NA	4	1	
1411	6.71	3133	9.03	|	|	8	2	
1427	6.71	3134	9.04	|	|	12	3	
				|	|		4	
				|	|		5	

Stabilized? (Yes) No

Amount Water Removed: 12 Gallons

Comments:

+CCR

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Site: Otter Tail Power Co./ Big Stone

Sampling Personnel: BW

Facility ID:

Date: 15 May 23

Unique Station ID:

Sample ID: H10

Well Condition

Well Locked? Yes (No)
Well Labeled? (Yes) No
Casing Straight? (Yes) No
Repairs Necessary: Needs lock

Protective Posts? Yes (No)
State ID Tag? Yes (No)
Grout Seal Intact? (Yes) No

Well Information

Well Depth: 35.49
Constructed Depth: 35.49
Casing Diameter: 2"
Water Level Before Purge: 11.02
Well Volume: 3.99 Gallons

Well Casing Elevation: 1090.83
Static Water Elevation: 1079.81
Previous Static: —
Water Level After Sample:
Measurement Method: (Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 75 Wind: Lgt Sky: Fair
Sampling Method: Grundfos (Bladder SS/T) Disp. Bailer Whale Grab Other:
Dedicated Equipment: (Yes) No
Well Purged Dry? (Yes) No
Time Purged Dry? 1257
Duplicate Sample? Yes (No) ID: —

Pumping Rate: .25 gpm
Time Pump Began: 1241 am / (pm)
Time of Sampling: 1302 am / (pm)
Sample EH: 194.7

Sample Appearance: General: Sl. cloudy Color: Tan Phase: Light Sed. Odor: None

Time (16)	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1257	6.36	5087	8.52	NA	NA	4	1	
							2	
1302	6.34	5094	8.34			—	3	Recharge
							4	
							5	

Stabilized? Yes (No) Amount Water Removed: 4 Gallons

Comments:

Exceptions to Protocol:

+CCR

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Sampling Personnel: BW

Site: Otter Tail Power Co./ Big Stone

Facility ID:

Date: 15 May 23

Unique Station ID:

Sample ID: H11

Well Condition

Well Locked?	Yes	(No)	Protective Posts?	Yes	(No)
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	(Yes)	No

Repairs Necessary: Needs lock

Well Information

Well Depth:	42.15	Well Casing Elevation:	1093.24
Constructed Depth:	42.15	Static Water Elevation:	1082.58
Casing Diameter:	2"	Previous Static:	—
Water Level Before Purge:	10.66	Water Level After Sample:	37.60
Well Volume:	5.14 Gallons	Measurement Method:	(Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 75 Wind: Lvv Sky: Fair

Sampling Method: Grundfos (Bladder SS/T) Disp. Bailer Whale Grab Other:

Dedicated Equipment:	(Yes) No	Pumping Rate:	.25 gpm
Well Purged Dry?	(Yes) No	Time Pump Began:	1209 am / (pm)
Time Purged Dry?	1230	Time of Sampling:	1235 am / (pm)
Duplicate Sample?	Yes (No) ID: —	Sample EH:	165.8

Sample Appearance: General: Clear Color: NOne Phase: NOne Odor: NOne

Time 21	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1230	6.87	4334	9.02	NA	NA	5.25	1	
							2	
1235	6.37	4320	8.90	↓	↓	—	3	Recharge
							4	
							5	

Stabilized? Yes (No) Amount Water Removed: 5.25 Gallons

Comments:

+CCR

Exceptions to Protocol:

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1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.mvtl.com

MEMBER ACIL

FINAL REPORT COMPLETION DATE: 10 Aug 23 AR

Date Reported: 10 Aug 2023

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Work Order #: 31-0177
Account #: 006106
PO #: 59601

Project Name: BIG STONE PLANT-CCR

Field Service Manager/Date Reviewed

Chemistry Lab Manager/Date Reviewed

Quality Assurance Director/Date Reviewed

RL = Reporting Limits
NQ = Not Present, Qualitative Only
PQ = Present, Qualitative Only
ND = Not Determined

All data for this report has been approved by MVTL Laboratory Management.

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MEMBER ACIL

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 10 Aug 2023
Lab Number: 23-A7634
Work Order #: 31-0177
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 12 Jun 2023 12:38
Sampled By: MVTL FIELD PERSONNEL
Date Received: 12 Jun 2023 15:30
PO #: 59601

Project Name: BIG STONE PLANT-CCR

Sample Description: H10

Temp at Receipt: 1.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
MS Water Digestions					13 Jun 23	KAM
Water Digestions					14 Jun 23	KH
pH, Field	7.00	units	1.00	SM4500-H+-2011	12 Jun 23 12:38	DS
pH	* 7.1	units	1.0	SM 4500 H+ B-2000	13 Jun 23 10:43	KFL
Radium 226	0.39	pCi/L	0.60		13 Jul 23 19:58	OL
Radium 228	0.40	pCi/L	3.00	EPA M9320	18 Jul 23 16:53	OL
Sulfate	2650 ~	mg/L	5.0	ASTM D516-11	15 Jun 23 8:35	LS
Chloride	6.6	mg/L	3.0	SM 4500 Cl E	15 Jun 23 8:30	KRM
Mercury	< 0.005	ug/L	0.005	EPA 245.7	16 Jun 23 13:58	RMB
Solids, Total Dissolved	4820	mg/L	10	SM 2540 C-97	14 Jun 23 9:34	CC
Calcium	489.0 ~See Narrative	mg/L	0.500	SW6010D	15 Jun 23 14:53	TMM
Lithium	0.235	mg/L	0.020	SW6010D	15 Jun 23 14:53	TMM
Barium	0.026	mg/L	0.005	SW6010D	15 Jun 23 14:53	TMM
Beryllium	< 0.005	mg/L	0.005	SW6010D	15 Jun 23 14:53	TMM
Chromium	< 0.01	mg/L	0.01	SW6010D	15 Jun 23 14:53	TMM
Cobalt	< 0.005	mg/L	0.005	SW6010D	15 Jun 23 14:53	TMM
Molybdenum	< 0.015	mg/L	0.015	SW6010D	15 Jun 23 14:53	TMM
Boron	0.284	mg/L	0.100	SW6010D	15 Jun 23 14:53	TMM
Antimony	< 1 @	ug/L	0.5	SW6020B	14 Jun 23 12:11	KAM
Arsenic	< 1 @	ug/L	0.5	SW6020B	14 Jun 23 12:11	KAM
Cadmium	0.25 @	ug/L	0.10	SW6020B	14 Jun 23 12:11	KAM
Lead	< 1 @	ug/L	0.5	SW6020B	14 Jun 23 12:11	KAM
Selenium	4.74 @ See Narrative	ug/L	0.50	SW6020B	14 Jun 23 12:11	KAM
Thallium	< 0.2 @	ug/L	0.1	SW6020B	14 Jun 23 12:11	KAM
Fluoride	0.180 @	mg/L	0.020	EPA 300.0	15 Jun 23 16:44	MDH

* Holding Time Exceeded

Radium 226 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

Radium 228 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

~ Sample diluted due to result above calibration of linear range.

OL = Analysis performed by an Outside Laboratory.

RL = Reporting Limit
Analyses performed under our Minnesota Department of Health Accreditation conform to the current TNI standards.
The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 10 Aug 2023
Lab Number: 23-A7635
Work Order #: 31-0177
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 12 Jun 2023 12:13
Sampled By: MVTL FIELD PERSONNEL
Date Received: 12 Jun 2023 15:30
PO #: 59601

Project Name: BIG STONE PLANT-CCR

Sample Description: H11

Temp at Receipt: 1.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
MS Water Digestions					13 Jun 23	KAM
Water Digestions					14 Jun 23	KH
pH, Field	6.80	units	1.00	SM4500-H+-2011	12 Jun 23 12:13	DS
pH	* 7.0	units	1.0	SM 4500 H+ B-2000	13 Jun 23 10:43	KFL
Radium 226	0.17	pCi/L	0.60		13 Jul 23 19:58	OL
Radium 228	0.77	pCi/L	3.00	EPA M9320	18 Jul 23 16:53	OL
Sulfate	2170 ~	mg/L	5.0	ASTM D516-11	15 Jun 23 8:35	LS
Chloride	3.9	mg/L	3.0	SM 4500 Cl E	15 Jun 23 8:30	KRM
Mercury	< 0.005	ug/L	0.005	EPA 245.7	16 Jun 23 13:58	RMB
Solids, Total Dissolved	4230	mg/L	10	SM 2540 C-97	14 Jun 23 9:34	CC
Calcium	547.0 ~See Narrative	mg/L	0.500	SW6010D	15 Jun 23 14:53	TMM
Lithium	0.251	mg/L	0.020	SW6010D	15 Jun 23 14:53	TMM
Barium	0.035	mg/L	0.005	SW6010D	15 Jun 23 14:53	TMM
Beryllium	< 0.005	mg/L	0.005	SW6010D	15 Jun 23 14:53	TMM
Chromium	< 0.01	mg/L	0.01	SW6010D	15 Jun 23 14:53	TMM
Cobalt	0.009	mg/L	0.005	SW6010D	15 Jun 23 14:53	TMM
Molybdenum	< 0.015	mg/L	0.015	SW6010D	15 Jun 23 14:53	TMM
Boron	0.247	mg/L	0.100	SW6010D	15 Jun 23 14:53	TMM
Antimony	< 0.5	ug/L	0.5	SW6020B	14 Jun 23 12:11	KAM
Arsenic	< 1 @	ug/L	0.5	SW6020B	14 Jun 23 12:11	KAM
Cadmium	0.35	ug/L	0.10	SW6020B	14 Jun 23 12:11	KAM
Lead	< 1 @	ug/L	0.5	SW6020B	14 Jun 23 12:11	KAM
Selenium	1.72 @ See Narrative	ug/L	0.50	SW6020B	14 Jun 23 12:11	KAM
Thallium	< 0.2 @	ug/L	0.1	SW6020B	14 Jun 23 12:11	KAM
Fluoride	0.130 @	mg/L	0.020	EPA 300.0	15 Jun 23 16:44	MDH

* Holding Time Exceeded

Radium 226 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

Radium 228 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

~ Sample diluted due to result above calibration of linear range.

OL = Analysis performed by an Outside Laboratory.

RL = Reporting Limit
Analyses performed under our Minnesota Department of Health Accreditation conform to the current TNI standards.
The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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Date Reported: 10 Aug 2023

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Work Order #: 202331-0177
Account Number: 006106
PO #: 59601

Project Name: BIG STONE PLANT-CCR

LABORATORY NARRATIVE

INORGANIC & METALS ANALYSES:
Due to the high concentration of calcium in the spiked sample, the matrix spike recovery was outside of acceptance range for samples 23-A7634 and 23-A7635. Results were reported based on the acceptable recoveries of calcium in the laboratory control spike and the relative percent difference between the matrix spikes.

Due to matrix composition, percent recovery of selenium was outside acceptable range in the matrix spike and matrix spike duplicate for samples 23-A7634 through 23-A7635. Data was reported based on acceptable laboratory control spike recovery and relative percent difference between matrix spikes.

No other problems were encountered.

MVTL

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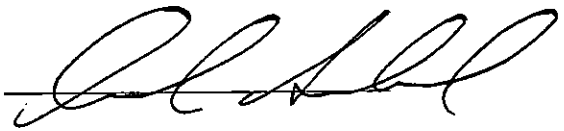
Quality Control Report

Lab IDs: 23-A7634 to 23-A7635 **Project:** BIG STONE PLANT-CCR **Work Order:** 202331-0177

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Antimony ug/L	25.0	98	85-115	25.0	23A7635q	< 0.5	25.0	100	75-125	25.0	25.4	102	1.6	10	99	90-110	< 0.5
Arsenic ug/L	25.0	97	85-115	25.0	23A7635q	< 1	26.8	107	75-125	26.8	27.5	110	2.6	10	97	90-110	< 0.5
Barium mg/L	1.000	104	85-115	1.00	23A7616qc	0.034	1.070	104	75-125	1.070	1.080	105	0.9	10	101	90-110	< 0.005
Beryllium mg/L	1.000	103	85-115	1.00	23A7616qc	< 0.005	1.000	100	75-125	1.000	1.010	101	1.0	10	103	90-110	< 0.005
Boron mg/L	1.000	101	85-115	1.00	23A7616qc	0.237	1.300	106	75-125	1.300	1.300	106	0.0	10	99	90-110	< 0.1
Cadmium ug/L	5.00	102	85-115	5.00	23A7635q	0.35	5.10	95	75-125	5.10	5.34	100	4.6	10	106	90-110	< 0.1
Calcium mg/L	50.00	103	85-115	50.0	23A7616qc	533.0	570.0	74	75-125	570.0	577.0	88	1.2	10	103	90-110	< 0.5
Chloride mg/L	-	-	-	60.0	23-A7635	3.9	65.8	103	80-120	65.8	67.5	106	2.6	10	95	90-110	< 3
Chromium mg/L	1.000	98	85-115	1.00	23A7616qc	< 0.01	0.904	90	75-125	0.904	0.911	91	0.8	10	98	90-110	< 0.01
Cobalt mg/L	1.000	103	85-115	1.00	23A7616qc	0.009	0.964	96	75-125	0.964	0.967	96	0.3	10	102	90-110	< 0.005
Fluoride mg/L				1.00	23-A7635qc	0.130	1.10	97	75-125	1.10	1.12	99	1.8	10	98	90-110	< 0.02
Lead ug/L	25.0	97	85-115	25.0	23A7635q	< 1	25.2	101	75-125	25.2	24.9	100	1.2	10	100	90-110	< 0.5
Lithium mg/L	1.000	105	82-115	1.00	23-A7616qc	0.245	1.330	108	75-125	1.330	1.350	110	1.5	10	102	90-110	< 0.02
Mercury ug/L	-	-	-	0.10	23-A7634	< 0.005	0.077	77	63-111	0.077	0.079	79	2.6	18	96	76-113	< 0.005
Molybdenum mg/L	1.000	98	85-115	1.00	23A7616qc	< 0.015	0.995	100	75-125	0.995	1.000	100	0.5	10	101	90-110	< 0.015
pH units	-	-	-	-	-	-	-	-	-	7.0	7.0	-	0.0	2.5	101	90-110	-
Selenium ug/L	25.0	105	85-115	25.0	23A7635q	1.72	35.1	134	75-125	35.1	34.9	133	0.6	10	103	90-110	< 0.5
Solids, Total Dissolved mg/L	-	-	-	-	-	-	-	-	-	4230	4110	-	2.9	7	99	85-115	< 10
Sulfate mg/L	-	-	-	5000	23-A7635	2170	6960	96	80-120	6960	7070	98	1.6	10	99	80-120	< 5
Thallium ug/L	5.00	98	85-115	5.00	23A7635q	< 0.2	5.17	103	75-125	5.17	5.18	104	0.2	10	99	90-110	< 0.1

Calcium matrix spike recovery was outside of acceptance limits, see narrative.
Selenium matrix spike / matrix spike duplicate recoveries were outside of acceptance limits, see narrative.

Approved by: 

This is an exact copy of the original document
By AS Date 12June23
pages 1-6

Minnesota Valley Testing Laboratories

1126 North Front Street **New Ulm, MN 56003**
Phone: 800 782 3557 **Fax: 507 359 2890**

Field Service Chain of Custody Record

Project	Otter Tail Power Company	**Project Type:**	Big Stone Plant CCR	**Name of Samplers:**	DS MS
Report	Otter Tail Power Company	**Carbon Copy:**	Barr Engineering		
Attn:	Paul Vukonich	Attn:		Quote Number:	
Address	P.O. Box 496	Address:		Work Order Number:	31-177
	Fergus Falls, MN 56538-0496			Lab Numbers:	
Phone:	218-739-8349				

Sample Information | **Bottle Type** | **Analysis**

Lab Number	Sample ID	Unique Station ID	Date	Time	Sample Type	Sample Location	1000 HNO3 Inner Mountain	500 None	1000 none	500 HNO3	Filter? Y or N	500 H2SO4	Filter? Y or N	1000 Amber none Pace	1000 Amber H2SO4	500 NaOH	Other: 150 H2SO4	Other 150 None	Analysis Required
A7134	H10		12June23	1238	GW				1	1	N			1					CCR 3&4
35	H11			1213	GW				1	1	N			1					CCR 3&4

Comments:

Samples Relinquished By:				Samples Received By: A. Audin	
Date:	Time:	Temp:		Date: 12 June 23	Time: 1530	Temp: 1.5C
Samples Relinquished into:	Fridge	Log in Cart	Other:		
Samples Relinquished By:				Samples Received By:	
Date:	Time:	Temp:		Date:	Time:	Temp:
Delivery:	Samplers	Other:		Seal Number(s) - If Used	
Transport:	Ambient	Ice	Other:	Seals Intact?	Yes	No

June 2023

2023 Big Stone Sampling - CCR

Landfill or ADA wells

Site	Parameter List	Well Depth (constructed)	Diameter (Inches)	Well Elevation (TOC)	Sample Equipment	Dedicated?	Pump Rate (ml/minute)	Goes Dry?	Sampling Seasons**
H2OX	[redacted]	32.20	2	1103.86	Bladder	Yes	100	Yes	April & Oct
H3OX		22.55	2	1095.26	Bladder	Yes	100	Yes	April & Oct
H4OX		27.20	2	1108.25	Bladder	Yes	100	No	April & Oct
H6		15.00	2	1097.76	Bladder	Yes	100	Yes	April & Oct
H8		22.05	2	1081.23	Bladder	Yes	100	No	April & Oct
H9		30.20	2	1086.21	Bladder	Yes	100	No	April & Oct
H10	CCR 3 and 4	35.49	2	1090.83	Bladder	Yes	100		See highlighted note below
H11	CCR 3 and 4	42.15	2	1093.24	Bladder	Yes	100		See highlighted note below

Note: Wells H10 and H11 need to be sampled 8 times for CCR this year. Background sampling like 5 years ago. We want to sample in April - November. Each event has to be about 30 days apart. Also, durning every sampling event for the CCR, we will need water levels on the CCR wells not sampled.

Note: CCR sampling is for total recoverable metals. They are not filtered in the field.

CCR 3 & 4 parameters see the first two tabs labeled CCR 3 and CCR 4

1000 None
500 HNO3 Total
1000 Amber None (Pace)

CCR - Appendix III Detection Monitoring

Field Parameters

pH*

* Field and Laboratory Measurements

Total Concentration Parameters	**Method**
Boron	6010
Calcium	6010
Chloride	SM4500 CL E
Fluoride	EPA 300
pH	SM 4500 H+B-96
Sulfate	ASTM D516
Dissolved Solids, Total	SM 2540 C-97

Note: These are non-filtered samples.

CCR - Appendix IV - Assessment Monitoring

Total Concentration Parameters	**Method**
Antimony	SW6020A
Arsenic	SW602A
Barium	SW6010C
Beryllium	SW6020A
Cadmium	SW6020A
Chromium, Total	SW6020A
Cobalt	SW6010C
Fluoride	EPA 300
Lead	SW6020A
Lithium	SW6010C
Mercury	EPA 245.7
Molybdenum	SW6020A
Selenium	SW6020A
Thallium	SW6020A
Radium 226 + 228	

Note: These are non-filtered samples.

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Sampling Personnel: DS, MS

Site: Otter Tail Power Co./ Big Stone
Facility ID:
Date: 12 June 23
Unique Station ID:
Sample ID: H10

Well Condition

Well Locked?	Yes	(No)	Protective Posts? Yes	(No)
Well Labeled?	(Yes)	No	State ID Tag? Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact? (Yes)	No

Repairs Necessary:

Well Information

Well Depth:	35.49	Well Casing Elevation:	1090.83
Constructed Depth:		Static Water Elevation:	1078.28
Casing Diameter:	2"	Previous Static:	1077.82
Water Level Before Purge:	12.55	Water Level After Sample:	23.17
Well Volume:	3.74 Gallons	Measurement Method:	(Elec. WLI) Steel Tape

Sampling Information

Weather Conditions: Temp: 75° Wind: NW@8 Sky: Partly Cloudy

Sampling Method: Grundfos (Bladder SS/T) Disp. Bailer Whale Grab Other:

Dedicated Equipment: (Yes) No
Well Purged Dry? (Yes) No
Time Purged Dry? 1233
Duplicate Sample? Yes (No) ID: —
Sample Appearance: General: Clear Color: None Phase: None Odor: None

Pumping Rate: gpm
Time Pump Began 1218 am (pm)
Time of Sampling: 1238 am (pm)
Sample EH: 227.6

(15) Time	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1233	6.97	4923	8.22	NA	NM	3.75	1	
							2	
							3	
							4	
1238	7.00	4916	8.62	—	—	—	5	recharge

Stabiliz Yes (No)
Amount Water Removed: 3.75 Gallons

Comments:

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Sampling Personnel:
DS
AS

Site: Otter Tail Power C Stone
Facility ID:
Date: 12 June 23
Unique Station ID: HI1
Sample ID:

Well Condition

Well Locked?	Yes (No)	Protective Posts? Yes	(No)
Well Labeled?	(Yes) No	State ID Tag? Yes	(No)
Casing Straight?	(Yes) No	Grout Seal Intact? (Yes)	No

Repairs Necessary:

Well Information

Well Depth:	42.15	Well Casing Elevation:	10
Constructed Depth:		Static Water Elevation:	108
Casing Diameter:	2"	Previous Static:	105
Water Level Before Purge:	11.05	Water Level After Sample:	
Well Volume:	5.07 Gallons	Measurement Method:	(Elec. WL) el Tape

Sampling Information

Weather Conditions: Temp: 75° Wind: NW@8 Sky: Partly C

Sampling Method:	~~Grundfos~~	(Bladder SST)	Disp. Bailer	Whale	Grab	Other:
Dedicated Equipment:	(Yes) No			Pumping Rate:	0.25	gpm
Well Purged Dry?	(Yes) No			Time Pump Began	1147	pm
Time Purged Dry?	1208			Time of Sampling:	1213	(pm)
Duplicate Sample?	Yes (No)	ID:		Sample EH:	224.6	
Sample Appearance:	General: Clear	Color: None		Phase: None		Odor

(1) Time	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comm
1208	6.79	4122	8.51	NA	NA	5.25	1	
							2	
							3	
							4	
1213	6.80	4134	8.70	"	"	"	5	

Stabiliz Yes (No) Amount Water Removed: 5.25 Gallo

Comments:

Exceptions to Protocol: +CCR

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

July 24, 2023

Todd Rieger
MVTL Laboratories
1126 North Front Street
New Ulm, MN 56073

RE: Project: Work order: 31-177 Otter Tail
Pace Project No.: 10657633

Dear Todd Rieger:

Enclosed are the analytical results for sample(s) received by the laboratory on June 15, 2023. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

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

Sincerely,

Piper Gibbs
piper.gibbs@pacelabs.com
(612)607-1700
Project Manager

Enclosures

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: Work order: 31-177 Otter Tail
Pace Project No.: 10657633

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10657633001	**23A7364 - H10**	Water	06/12/23 12:38	06/15/23 10:09
10657633002	**23A7364 - H11**	Water	06/12/23 12:13	06/15/23 10:09

WO#: 10657633

10657633

Pace Analytical
www.pac...

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:	MVTL
Address:	1126 NORTH FRONT BLDG #2
	NEW ULM, MN 56073
Email To:	alieder@mvtl.com
Phone:	507-233-7134
Fax:	
Requested Due Date/TAT:	standard

Section B

Report To:	Todd Rieger
Copy To:	trieger@mvtl.com
Purchase Order No.:	CL13299
Project Name:	Otter Tail Power
Project Number:	Work order: 31-177

Section C
Invoice Information:

Attention:	AP
Company Name:	MVTL
Address:	1126 NORTH FRONT BLDG 2
Pace Quote Reference:	
Pace Project Manager:	
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☑ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MN

Section D
Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	↓Analysis Test↓ Y/N	2,3,7,8 TCDD	Radium 226/228	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	23A7364 - H10	WT	G			06/12/23	12:38		1											X	N	001
2	23A7365 - H11	WT	G			06/12/23	12:13		1											X	N	002
3																					N	
4																					N	
5																					N	
6																						
7																						
8																						
9																						
10																						
11																						
12																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Barb Zins / MVTL	6/13/23	08:00am	[illegible] Pace	6-15-23	1009	1.0	Y	N	Y

SAMPLE CONDITIONS

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER:

DATE Signed (MM/DD/YY):

Wet

*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.08, 12-Oct-2007

Sample Condition Upon Receipt

Client Name: MVTL

Project #: WO#: 10657633

Courier: ☐ FedEx ☐ UPS ☐ USPS ☒ Client ☐ Pace ☐ SpeeDee ☐ Commercial ☐ See Exceptions ENV-FRM-MIN4-0142

Tracking Number: _____

Custody Seal on Cooler/Box Present? ☐ Yes ☒ No Seals Intact? ☐ Yes ☒ No Biological Tissue Frozen? ☐ Yes ☐ No ☒ N/A

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other Temp Blank? ☒ Yes ☐ No

Thermometer: ☐ T1 (0461) ☐ T2 (0436) ☐ T3 (0459) ☐ T4 (0402) ☐ T5 (0178) ☐ T6 (0235) ☒ T7 (0042) ☐ T8 (0775) ☐ T9(0727) ☐ 01339252/1710

Type of Ice: ☒ Wet ☐ Blue ☐ Dry ☐ None ☐ Melted

Did Samples Originate in West Virginia? ☐ Yes ☒ No Were All Container Temps Taken? ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6 °C Cooler temp Read w/Temp Blank: 1.1 °C

Correction Factor: -0.1 Cooler Temp Corrected w/temp blank: 1.0 °C

Average Corrected Temp (no temp blank only): _____ °C ☐ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

USDA Regulated Soil: ☒ N/A, water sample/other: _____) Date/Initials of Person Examining Contents: RM 6.15.23

Did samples originate in a quarantine zone within the United States: AL, AR, AZ CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX, or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.

Location (Check one): ☐ Duluth ☒ Minneapolis ☐ Virginia

				COMMENTS
Chain of Custody Present and Filled Out?	☒ Yes	☐ No		1.
Chain of Custody Relinquished?	☒ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	3.
Samples Arrived within Hold Time?	☒ Yes	☐ No		4. If fecal: ☐ <8 hrs ☐ >8 hr, <24 ☐ No
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E.coli ☐ BOD/cBOD ☐ Hex Chrom ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other _____
Rush Turn Around Time Requested?	☐ Yes	☒ No		6.
Sufficient Sample Volume?	☒ Yes	☐ No		7.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	8. AGW's 1ea
-Pace Containers Used?	☒ Yes	☐ No		
Containers Intact?	☒ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC? Matrix: ☒ Water ☐ Soil ☐ Oil ☐ Other	☒ Yes	☐ No		11. If no, write ID/Date/Time of container below: ☐ See Exceptions ENV-FRM-MIN4-0142
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☒ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO3, H2SO4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐ Yes	☐ No	☒ N/A	☐ NaOH ☐ HNO3 ☐ H2SO4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxins/PFAS (*If adding preservative to a container, it must be added to associated field and equipment blanks--verify with PM first.)	☐ Yes	☐ No	☒ N/A	Positive for Residual Chlorine? ☐ Yes ☐ No ☐ See Exceptions ENV-FRM-MIN4-0142
				pH Paper Lot #
				Residual Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Headspace in Methyl Mercury Container?	☐ Yes	☐ No	☒ N/A	13.
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☐ No	☒ N/A	14. ☐ See Exceptions ENV-FRM-MIN4-0142
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No	☒ N/A	
3 Trip Blanks Present?	☐ Yes	☐ No	☒ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☒ N/A	Pace Trip Blank Lot # (if purchased): _____

CLIENT NOTIFICATION/RESOLUTION Field Data Required? ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: paper gloves Date: 6/15/23

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).

Labeled By: RNC Line: 2

ANALYTICAL REPORT

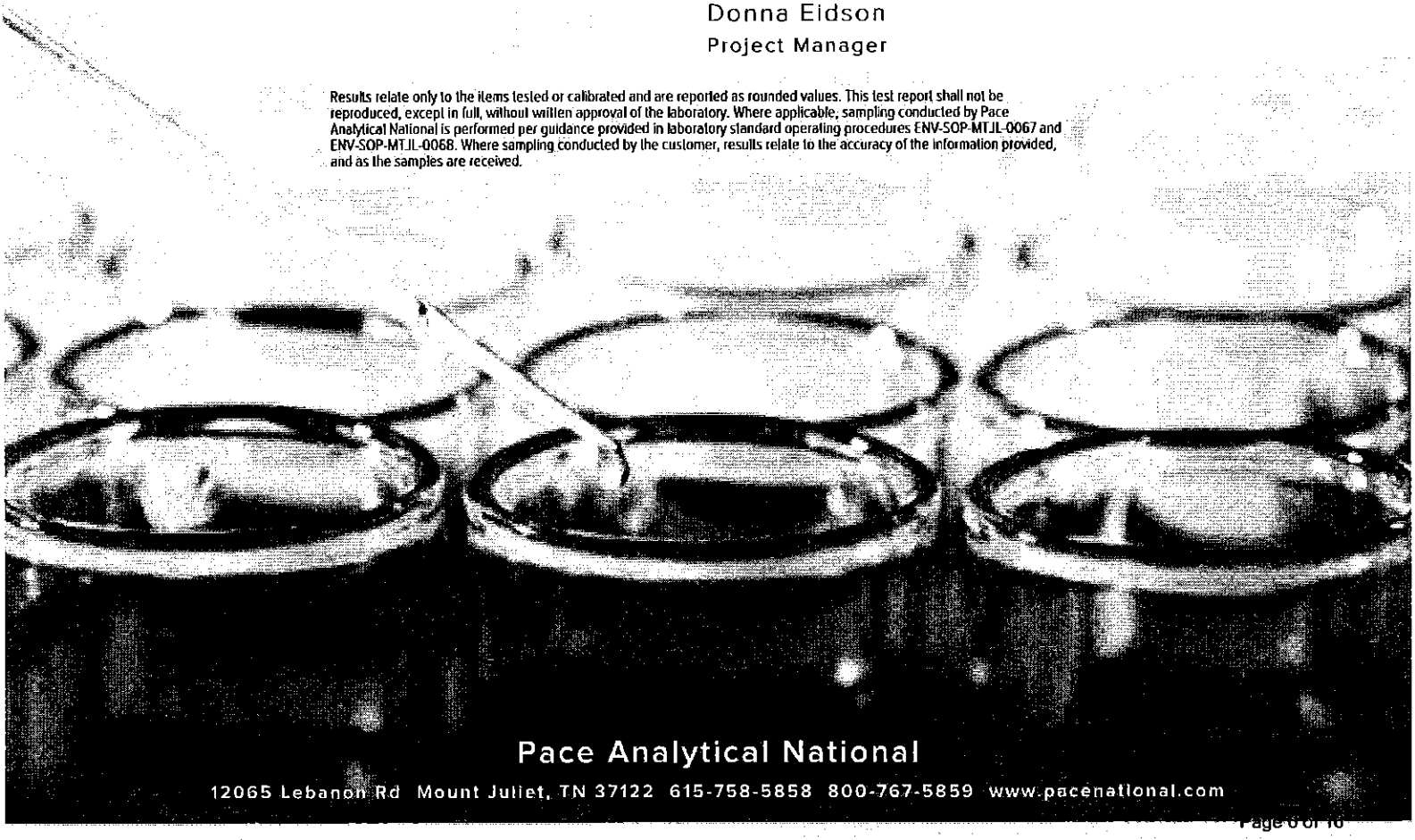
July 24, 2023

Pace Analytical - Minnesota

Sample Delivery Group:	L1627193
Samples Received:	06/17/2023
Project Number:	10657633
Description:	Work Order: 31-177 Otter tail
Site:	001
Report To:	Piper Gibbs

Entire Report Reviewed By:

Donna Eidson
Project Manager



Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

SAMPLE SUMMARY

23A7364-H10 L1627193-01 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				06/12/23 12:38	06/17/23 09:10	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2092493	1	07/11/23 10:27	07/18/23 16:53	SNR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2093326	1	07/12/23 16:57	07/13/23 19:58	RGT	Mt. Juliet, TN

23A7364-H11 L1627193-02 Non-Potable Water

			Collected by	Collected date/time	Received date/time	
				06/12/23 12:38	06/17/23 09:10	
Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2092493	1	07/11/23 10:27	07/18/23 16:53	SNR	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2093326	1	07/12/23 16:57	07/13/23 19:58	RGT	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Donna Eidson
Project Manager

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.402	J	0.331	0.595	07/18/2023 16:53	WG2092493
(T) Barium	*68.1*			*30.0-143*	*07/18/2023 16:53*	WG2092493
(T) Yttrium	*93.5*			*30.0-136*	*07/18/2023 16:53*	WG2092493

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.390		0.250	0.217	07/13/2023 19:58	WG2093326
(T) Barium-133	*105*			*30.0-143*	*07/13/2023 19:58*	WG2093326

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.772		0.328	0.577	07/18/2023 16:53	WG2092493
(T) Barium	*78.2*			*30.0-143*	*07/18/2023 16:53*	WG2092493
(T) Yttrium	*98.8*			*30.0-136*	*07/18/2023 16:53*	WG2092493

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.171	J	0.205	0.282	07/13/2023 19:58	WG2093326
(T) Barium-133	*88.7*			*30.0-143*	*07/13/2023 19:58*	WG2093326

Method Blank (MB)

(MB) R3951293-1 07/18/23 16:53

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty +/- pCi/l	MB MDA pCi/l
Radium-228	-0.0198	U	0.191	0.352
(T) Barium	*87.4*		*87.4*	
(T) Yttrium	*87.3*		*87.3*	

L1627704-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1627704-06 07/18/23 16:53 • (DUP) R3951293-5 07/18/23 16:53

Analyte	Original Result pCi/l	Original Uncertainty +/-	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty +/-	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	0.466	0.421	0.756	0.0978	0.469	0.756	1	131	0.584	U	20	3
(T) Barium	*84.6*			*78.9*	*78.9*							
(T) Yttrium	*117*			*107*	*107*							

Laboratory Control Sample (LCS)

(LCS) R3951293-2 07/18/23 16:53

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	5.26	105	80.0-120	
(T) Barium			*90.4*		
(T) Yttrium			*109*		

L1627704-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1627704-04 07/18/23 16:53 • (MS) R3951293-3 07/18/23 16:53 • (MSD) R3951293-4 07/18/23 16:53

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	33.3	0.461	36.0	18.9	107	110	1	70.0-130			3.35		20
(T) Barium		*78.2*			*90.7*	*79.3*							
(T) Yttrium		*101*			*71.0*	*99.4*							

Method Blank (MB)

(MB) R3948871-1 07/13/23 19:58

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty +/- pCi/l	MB MDA pCi/l
Radium-226	0.0202	J	0.0281	0.0410
(T) Barium-133	*100*		*100*	

L1627718-08 Original Sample (OS) • Duplicate (DUP)

(OS) L1627718-08 07/13/23 19:58 • (DUP) R3948871-5 07/13/23 19:58

Analyte	Original Result pCi/l	Original Uncertainty +/- pCi/l	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty +/- pCi/l	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.244	0.242	0.309	0.331	0.231	0.309	1	30.2	0.259		20	3
(T) Barium-133	*88.6*			*99.1*	*99.1*							

Laboratory Control Sample (LCS)

(LCS) R3948871-2 07/13/23 19:58

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.01	4.52	90.2	80.0-120	
(T) Barium-133			*93.8*		

L1627704-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1627704-05 07/13/23 19:58 • (MS) R3948871-6 07/14/23 19:10 • (MSD) R3948871-4 07/13/23 19:58

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.0	0.133	15.4	15.2	76.5	75.3	1	75.0-125			1.57		20
(T) Barium-133		*86.3*			*91.8*	*95.0*							

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The Information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDA	Minimum Detectable Activity.
Rec.	Recovery.
RER	Replicate Error Ratio.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
U	Below Detectable Limits: Indicates that the analyte was not detected.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	0W21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1,6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1,4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

Internal Transfer Chain of Custody

E150

Pace Analytical
www.pacelabs.com

☐ Samples Pre-Logged into eCOC.

State Of Origin: MN
Cert. Needed: ☑ Yes ☐ No

Workorder: 10657633 Workorder Name: Work order: 31-177 Otter Tail

Owner Received Date: 6/15/2023 Results Requested By: 7/17/2023

Report To	Subcontract To
Piper Gibbs Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700	Pace National 12065 Lebanon Rd Mt. Juliet, TN 37122 Phone (615) 758-5858

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Unpreserved	Requested Analysis: Radium 226/228	LAB USE ONLY
1	23A7364 - H10	PS	6/12/2023 12:38	10657633001	Water	1	X	-01
2	23A7364 - H11	PS	6/12/2023 12:13	10657633002	Water	1	X	-02
3								
4								
5								

L1627193

Transfers	Released By	Date/Time	Received By	Date/Time
1	[illegible] pace	6-16-23 1615	Hawa Mwaching	6-17-23 - 0910
2				
3				

Comments

Cooler Temperature on Receipt °C | Custody Seal Y or N | Received on Ice Y or N | Samples Intact Y or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N		
Sufficient volume sent:	Y N		
RAD Screen <0.5 mR/hr:	Y N		

2.9+0.2=2.9

Pace Analytical™
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	MVTL	Report To:	Todd Rieger	Attention:	AP
Address:	1126 NORTH FRONT BLDG #2	Copy To:	trieger@mvtl.com	Company Name:	MVTL
	NEW ULM, MN 56073			Address:	1126 NORTH FRONT BLDG 2
Email To:	alieder@mvtl.com	Purchase Order No.:	CL13299	Pace Quote Reference:	
Phone:	507-233-7134 Fax:	Project Name:	Otter Tail Power	Pace Project Manager:	
Requested Due Date/TAT:	standard	Project Number:	Work order: 31-177	Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☑ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MN

Section D Required Client Information

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Requested Analysis Filtered (Y/N)

ITEM #	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: 2,3,7,8 TCDD	Radium 226/228	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	WT	G			06/12/23	12:36		1										X	N	
2	WT	G			06/12/23	12:13		1										X	N	
3																			N	
4																			N	
5																			N	
6																				
7																				
8																				
9																				
10																				
11																				
12																				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	Barb Zins / MVTL	6/13/23	08:00am				

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

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

MINNESOTA VALLEY TESTING LABORATORIES, INC.
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www.mvtl.com

MEMBER ACIL

FINAL REPORT COMPLETION DATE: 8 Aug 23 AS

Date Reported: 4 Aug 2023

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Work Order #: 31-0220
Account #: 006106
PO #: 59601

Project Name: BIG STONE PLANT CCR

07 Aug 23
Field Service Manager/Date Reviewed

04Aug23
Chemistry Lab Manager/Date Reviewed

fr 04 Aug 2023
Quality Assurance Director/Date Reviewed

RL = Reporting Limits
NQ = Not Present, Qualitative Only
PQ = Present, Qualitative Only
ND = Not Determined

All data for this report has been approved by MVTL Laboratory Management.

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JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 4 Aug 2023
Lab Number: 23-A8117
Work Order #: 31-0220
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 21 Jul 2023 11:27
Sampled By: MVTL FIELD PERSONNEL
Date Received: 21 Jul 2023 14:10
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H8

Temp at Receipt: 1.0C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Solids, Total Dissolved	1050 mg/L See Narrative	10	SM 2540 C-97	25 Jul 23 9:36	CC

RL = Reporting Limit
Analyses performed under our Minnesota Department of Health Accreditation conform to the current TNI standards.
The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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MEMBER ACIL

Date Reported: 4 Aug 2023

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Work Order #: 202331-0220
Account Number: 006106
PO #: 59601

Project Name: BIG STONE PLANT CCR

LABORATORY NARRATIVE

INORGANIC & METALS ANALYSES:
In the Total Dissolved Solids analysis batch containing sample 23-A8117, there were 16 samples analyzed before a duplicate rather than 10 samples as required. Data was reported based on all other QC being acceptable.

No other problems were encountered.

MVTL

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MEMBER
ACIL

Quality Control Report

Lab ID: 23-A8117 **Project:** BIG STONE PLANT CCR **Work Order:** 202331-0220

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Solids, Total Dissolved mg/L	-	-	-	-	-	-	-	-	-	300	303	-	1.0	10	101	85-115	< 10

Approved by:

This is an exact copy of
the original document
By DF Date 21Jul23
Pages 1-2

Minnesota Valley Testing Laboratories

1126 North Front Street New Ulm, MN 56003
Phone: 800 782 3557 Fax: 507 359 2890

Field Service Chain of Custody Record

Project Otter Tail Power Company	**Project Type:** Big Stone Plant CCR	**Name of Samplers:** DF, BW
Report Otter Tail Power Company	**Carbon Copy:** Barr Engineering	
Attn: Paul Vukonich	Attn:	Quote Number:
Address P.O. Box 496	Address:	Work Order Number: 31-220
Fergus Falls, MN 56538-0496		Lab Numbers:
Phone: 218-739-8349		

Sample Information | **Bottle Type** | **Analysis**

Lab Number	Sample ID	Unique Station ID	Date	Time	Sample Type	Sample Location	1000 HNO3 Inner Mountain	500 None	1000 none	500 HNO3	Filter? Y or N	500 H2SO4	Filter? Y or N	1000 Amber none Page	1000 Amber H2SO4	500 NaOH	Other: 150 H2SO4	Other 150 None	Analysis Required
A8117	H8		21July23	1127	GW				1										TDS only

Comments:

Rush Please!

Samples Relinquished By: DF			Samples Received By: A. Friedrich		
Date: 21July23	Time: 1410	Temp: 1.0	Date: 21 July 23	Time: 1410	Temp: 1.0C
Samples Relinquished into:	Fridge	Log in Cart Other:			
Samples Relinquished By:			Samples Received By:		
Date:	Time:	Temp:	Date:	Time:	Temp:
Delivery: Samplers	Other:		Seal Number(s) - If Used		
Transport: Ambient	Ice	Other:	Seals Intact?	Yes	No

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Sampling Personnel: DF

Site: Otter Tail Power Co./ Big Stone
Facility ID: —
Date: 20July23
Unique Station ID: 1
Sample ID: Well H8

Well Condition

Well Locked?	(Yes)	No	Protective Posts?	(Yes)	No
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	Yes	(No)

Repairs Necessary:

Well Information

Well Depth:	22.33	Well Casing Elevation:	1081.23
Constructed Depth:	22.05	Static Water Elevation:	1071.48
Casing Diameter:	2"	Previous Static:	—
Water Level Before Purge:	9.75	Water Level After Sample:	10.00
Well Volume:	2.05 Gallons	Measurement Method:	~~Elec. WLI~~ Steel Tape

Sampling Information

Weather Conditions: Temp: 77 Wind: W 1 Sky: Sunny
Sampling Method: Grundfos ~~Bladder SS/T~~ Disp. Bailer Whale Grab Other:
Dedicated Equipment: (Yes) No
Well Purged Dry? Yes (No)
Time Purged Dry? —
Duplicate Sample? Yes (No) ID: —
Sample Appearance: General: Clear Color: None Phase: None Odor: None

Pumping Rate: 0.25 gpm
Time Pump Began: 1100 (am) / pm
Time of Sampling: 1127 (am) / pm
Sample EH: 90.0

Time (9)	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1109	7.15	1526	9.10	NA	NA	2.25	1	
1118	7.15	1527	9.11			4.50	2	
1127	7.14	1526	9.11			6.75	3	
							4	
							5	

Stabilized? (Yes) No
Amount Water Remove 6.75 Gallons
Comments:

Exceptions to Protocol:

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MEMBER ACIL

FINAL REPORT COMPLETION DATE: 24 Oct 23 AS

Date Reported: 23 Oct 2023

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Work Order #: 31-0235
Account #: 006106
PO #: 59601

Project Name: BIG STONE PLANT CCR

24 Oct 23
Field Service Manager/Date Reviewed

23 Oct 2023
Chemistry Lab Manager/Date Reviewed

23 Oct 2023
Quality Assurance Director/Date Reviewed

RL = Reporting Limits
NQ = Not Present, Qualitative Only
PQ = Present, Qualitative Only
ND = Not Determined

All data for this report has been approved by MVTL Laboratory Management

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JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Project Name: BIG STONE PLANT CCR

Sample Description: H10

Report Date: 23 Oct 2023
Lab Number: 23-A8447
Work Order #: 31-0235
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 21 Aug 2023 10:35
Sampled By: MVTL FIELD PERSONNEL
Date Received: 21 Aug 2023 15:17
PO #: 59601

Temp at Receipt: 2.6C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
MS Water Digestions					23 Aug 23	JN
Water Digestions					23 Aug 23	JN
pH, Field	6.88	units	1.00	SM4500-H+-2011	21 Aug 23 10:35	MS
pH	* 7.0	units	1.0	SM 4500 H+ B-2000	22 Aug 23 13:00	HO
Radium 226	0.29	pCi/L	0.60		22 Sep 23 13:29	OL
Radium 228	0.46	pCi/L	3.00	EPA M9320	10 Oct 23 21:14	OL
Sulfate	2270 ~	mg/L	5.0	ASTM D516-11	24 Aug 23 9:04	LS
Chloride	6.3	mg/L	3.0	SM 4500 Cl E	24 Aug 23 8:54	KRM
Mercury	< 0.005	ug/L	0.005	EPA 245.7	25 Aug 23 14:07	RMB
Solids, Total Dissolved	4840	mg/L	10	SM 2540 C-97	23 Aug 23 9:15	CC
Calcium	492.0	mg/L	0.500	SW6010D	25 Aug 23 10:06	SS
	~ See Narrative					
Lithium	0.271	mg/L	0.020	SW6010D	25 Aug 23 10:06	SS
Barium	0.023	mg/L	0.005	SW6010D	25 Aug 23 10:06	SS
Cobalt	< 0.005	mg/L	0.005	SW6010D	25 Aug 23 10:06	SS
Boron	0.298	mg/L	0.100	SW6010D	25 Aug 23 10:06	SS
Antimony	< 1 @	ug/L	0.5	SW6020B	24 Aug 23 13:44	KAM
Arsenic	< 1 @	ug/L	0.5	SW6020B	24 Aug 23 13:44	KAM
Beryllium	< 0.05	ug/L	0.05	SW6020B	24 Aug 23 13:44	KAM
Cadmium	< 0.2 @	ug/L	0.1	SW6020B	24 Aug 23 13:44	KAM
Chromium	< 0.5	ug/L	0.5	SW6020B	24 Aug 23 13:44	KAM
Lead	< 2.5 @	ug/L	0.5	SW6020B	24 Aug 23 13:44	KAM
Molybdenum	8.65 @	ug/L	0.50	SW6020B	24 Aug 23 13:44	KAM
Selenium	4.54 @^	ug/L	0.50	SW6020B	24 Aug 23 13:44	KAM
Thallium	< 0.5 @	ug/L	0.1	SW6020B	24 Aug 23 13:44	KAM
Fluoride	0.180 @	mg/L	0.020	EPA 300.0	25 Aug 23 11:09	MDH

RL = Reporting Limit
Analyses performed under our Minnesota Department of Health Accreditation conform to the current TNI standards.
The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Project Name: BIG STONE PLANT CCR

Sample Description: H10

Report Date: 23 Oct 2023
Lab Number: 23-A8447
Work Order #: 31-0235
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 21 Aug 2023 10:35
Sampled By: MVTL FIELD PERSONNEL
Date Received: 21 Aug 2023 15:17
PO #: 59601

Temp at Receipt: 2.6C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst

* Holding Time Exceeded

Radium 226 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

Radium 228 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

~ Sample diluted due to result above calibration of linear range.

^ The reporting limit (RL) was elevated due to instrument performance at the lower limit of quantitation (LLOQ). This will only impact results that are found to be below the elevated RL. Results above the elevated RL are unaffected.

OL = Analysis performed by an Outside Laboratory.

RL = Reporting Limit
Analyses performed under our Minnesota Department of Health Accreditation conform to the current TNI standards.
The reporting limit was elevated for any analyte requiring a dilution as coded below:
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JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 23 Oct 2023
Lab Number: 23-A8448
Work Order #: 31-0235
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 21 Aug 2023 10:45
Sampled By: MVTL FIELD PERSONNEL
Date Received: 21 Aug 2023 15:17
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H11

Temp at Receipt: 2.6C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
MS Water Digestions					23 Aug 23	JN
Water Digestions					23 Aug 23	JN
pH, Field	6.70	units	1.00	SM4500-H+-2011	21 Aug 23 10:46	DS
pH	* 6.9	units	1.0	SM 4500 H+ B-2000	22 Aug 23 13:00	HO
Radium 226	1.83	pCi/L	0.60		22 Sep 23 13:29	OL
Radium 228	0.80	pCi/L	3.00	EPA M9320	10 Oct 23 21:14	OL
Sulfate	2440 ~	mg/L	5.0	ASTM D516-11	24 Aug 23 9:04	LS
Chloride	3.5	mg/L	3.0	SM 4500 Cl E	24 Aug 23 8:54	KRM
Mercury	< 0.005	ug/L	0.005	EPA 245.7	25 Aug 23 14:07	RMB
Solids, Total Dissolved	4220	mg/L	10	SM 2540 C-97	23 Aug 23 9:15	CC
Calcium	543.0	mg/L	0.500	SW6010D	25 Aug 23 10:06	SS
	~ See Narrative					
Lithium	0.303	mg/L	0.020	SW6010D	25 Aug 23 10:06	SS
Barium	0.034	mg/L	0.005	SW6010D	25 Aug 23 10:06	SS
Cobalt	0.008	mg/L	0.005	SW6010D	25 Aug 23 10:06	SS
Boron	0.245	mg/L	0.100	SW6010D	25 Aug 23 10:06	SS
Antimony	< 1 @	ug/L	0.5	SW6020B	24 Aug 23 13:44	KAM
Arsenic	< 1 @	ug/L	0.5	SW6020B	24 Aug 23 13:44	KAM
Beryllium	< 0.1 @	ug/L	0.05	SW6020B	24 Aug 23 13:44	KAM
Cadmium	0.27 @	ug/L	0.10	SW6020B	24 Aug 23 13:44	KAM
Chromium	< 1 @	ug/L	0.5	SW6020B	24 Aug 23 13:44	KAM
Lead	< 1 @	ug/L	0.5	SW6020B	24 Aug 23 13:44	KAM
Molybdenum	4.90 @	ug/L	0.50	SW6020B	24 Aug 23 13:44	KAM
Selenium	< 2 @^	ug/L	0.5	SW6020B	24 Aug 23 13:44	KAM
Thallium	< 0.2 @	ug/L	0.1	SW6020B	24 Aug 23 13:44	KAM
Fluoride	0.140 @	mg/L	0.020	EPA 300.0	25 Aug 23 11:09	MDH

RL = Reporting Limit
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@ = Due to sample matrix # = Due to concentration of other analytes
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MEMBER ACIL

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 23 Oct 2023
Lab Number: 23-A8448
Work Order #: 31-0235
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 21 Aug 2023 10:45
Sampled By: MVTL FIELD PERSONNEL
Date Received: 21 Aug 2023 15:17
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H11

Temp at Receipt: 2.6C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst

* Holding Time Exceeded

Radium 226 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

Radium 228 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
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1-612-607-1700

~ Sample diluted due to result above calibration of linear range.

^ The reporting limit (RL) was elevated due to instrument performance at the lower limit of quantitation (LLOQ). This will only impact results that are found to be below the elevated RL. Results above the elevated RL are unaffected.

OL = Analysis performed by an Outside Laboratory.

RL = Reporting Limit
Analyses performed under our Minnesota Department of Health Accreditation conform to the current TNI standards.
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! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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www.mvtl.com

Date Reported: 23 Oct 2023

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Work Order #: 202331-0235
Account Number: 006106
PO #: 59601

Project Name: BIG STONE PLANT CCR

LABORATORY NARRATIVE

INORGANIC ANALYSES:
Due to the high concentration of calcium in the spiked sample associated with samples 23-A8447 through 23-A8448, the matrix spike recovery was outside of acceptable limits. Calcium was reported based on acceptable laboratory control spike recovery and acceptable duplication of the matrix spikes.

No other problems were encountered.

MVTL

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Quality Control Report

Lab IDs: 23-A8447 to 23-A8448 **Project:** BIG STONE PLANT CCR **Work Order:** 202331-0235

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Antimony ug/L	25.0	106	85-115	25.0	25251003qc	< 0.5	27.5	110	75-125	27.5	26.4	106	4.1	10	103	90-110	< 0.5
Arsenic ug/L	25.0	103	85-115	25.0	25251003qc	< 0.5	26.8	107	75-125	26.8	26.9	108	0.4	10	103	90-110	< 0.5
Barium mg/L	1.000	106	85-115	1.00	23A8450qc	0.030	1.040	101	75-125	1.040	1.030	100	1.0	10	100	90-110	< 0.005
Beryllium ug/L	2.50	102	85-115	2.50	25251003qc	< 0.05	2.66	106	75-125	2.66	2.61	104	1.9	10	106	90-110	< 0.05
Boron mg/L	1.000	104	85-115	1.00	23A8450qc	0.219	1.210	99	75-125	1.210	1.200	98	0.8	10	98	90-110	< 0.1
Cadmium ug/L	5.00	105	85-115	5.00	25251003qc	< 0.1	5.05	101	75-125	5.05	4.89	98	3.2	10	102	90-110	< 0.1
Calcium mg/L	50.00	106	85-115	50.0	23A8450qc	542.0	608.0	132	75-125	608.0	594.0	104	2.3	10	102	90-110	< 0.5
Chloride mg/L	-	-	-	60.0	23-A8450	3.6	64.0	101	86-117	64.0	63.0	99	1.6	5	98	90-110	< 0.5
Chromium ug/L	25.0	102	85-115	25.0	25251003qc	1.03	26.7	103	75-125	26.7	26.0	100	2.7	10	104	90-110	< 0.5
Cobalt mg/L	1.000	105	85-115	1.00	23A8450qc	0.010	0.995	98	75-125	0.995	0.994	98	0.1	10	100	90-110	< 0.005
Fluoride mg/L	-	-	-	1.00	23-A8447	0.180	1.09	91	75-125	1.09	1.10	92	0.9	10	94	90-110	< 0.02
Lead ug/L	25.0	101	85-115	25.0	25251003qc	< 0.5	26.8	107	75-125	26.8	26.8	107	0.0	10	102	90-110	< 0.5
Lithium mg/L	1.000	108	85-115	1.00	23-A8450qc	0.278	1.320	104	75-125	1.320	1.310	103	0.8	10	103	90-110	< 0.02
Mercury ug/L	- -	- -	- -	0.10	23-A8481	< 0.005	0.073	73	63-111	0.073	0.073	73	0.0	18	98	76-113	< 0.005 < 0.005
Molybdenum ug/L	25.0	101	85-115	25.0	25251003qc	0.76	24.8	96	75-125	24.8	26.2	102	5.5	10	102	90-110	< 0.5
pH units	-	-	-	-	-	-	-	-	-	6.9	6.9	-	0.0	2.5	101	90-110	-
Selenium ug/L	25.0	106	85-115	25.0	25251003qc	< 1	30.4	122	75-125	30.4	28.0	112	8.2	10	106	90-110	< 0.5
Solids, Total Dissolved mg/L	-	-	-	-	-	-	-	-	-	4220	4190	-	0.7	7	100	85-115	< 10
Sulfate mg/L	-	-	-	500	23-A8450	2320	2900	116	68-132	2900	2850	106	1.7	5	100	80-120	< 5
Thallium ug/L	5.00	101	85-115	5.00	25251003qc	< 0.1	5.38	108	75-125	5.38	5.43	109	0.9	10	102	90-110	< 0.1

Approved by: _____

The calcium matrix spike recovery was above the acceptance limits, see narrative.

This is an exact copy of the original document

By AL Date 21 Aug 23

pages 1-6

Minnesota Valley Testing Laboratories

1126 North Front Street New Ulm, MN 56003
Phone: 800 782 3557 Fax: 507 359 2890

Field Service Chain of Custody Record

Project	Otter Tail Power Company	**Project Type:**	Big Stone Plant CCR	**Name of Samplers:**	MS DS
Report	Otter Tail Power Company	**Carbon Copy:**	Barr Engineering		
Attn:	Paul Vukonich	Attn:		Quote Number:	
Address	P.O. Box 496	Address:		Work Order Number:	31-235
	Fergus Falls, MN 56538-0496			Lab Numbers:	
Phone:	218-739-8349				

Sample Information | **Bottle Type** | **Analysis**

Lab Number	Sample ID	Unique Station ID	Date	Time	Sample Type	Sample Location	1000 HNO3 Inner Mountain	500 None	1000 none	500 HNO3	Filter? Y or N	500 H2SO4	Filter? Y or N	1000 Amber none Pace	1000 Amber H2SO4	500 NaOH	Other: 150 H2SO4	Other 150 None	Analysis Required
A8447	H10		21Aug23	1035	GW				1	1	N			1					CCR 3&4
48	H11		1	1046	GW				1	1	N			1					CCR 3&4

Comments:

Samples Relinquished By:				Samples Received By:	
Date: 21Aug23	Time: 1517	Temp: 2.6°C		Date: 21 Aug 23	Time: 1517	Temp: 2.6C
Samples Relinquished into:	Fridge	Log in Cart	Other:			
Samples Relinquished By:				Samples Received By:		
Date:	Time:	Temp:		Date:	Time:	Temp:
Delivery:	Samplers	Other:		Seal Number(s) - If Used		
Transport:	Ambient	Ice	Other:	Seals Intact?	Yes	No

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Sampling Personnel: MS

Site: Otter Tail Power Co./ Big Stone
Facility ID:
Date: 21 Aug 23
Unique Station ID:
Sample ID: H10

Well Condition

Well Locked?	(Yes)	No	Protective Posts? Yes		(No)
Well Labeled?	(Yes)	No	State ID Tag? Yes		(No)
Casing Straight?	(Yes)	No	Grout Seal Intact? (Yes)		No

Repairs Necessary:

Well Information

Well Depth: 35.46
Constructed Depth:
Casing Diameter: 2"
Water Level Before Purge: 15.47
Well Volume: 3.26 Gallons

Well Casing Elevation: 1090.83
Static Water Elevation: 1075.36
Previous Static: —
Water Level After Sample: 27.28
Measurement Method: (Elec. WLI) Steel Tape

Sampling Information

Weather Conditions: Temp: SE 10 Wind: 69 Sky: Fair

Sampling Method: Grundfos (Bladder SS/T) Disp. Bailer Whale Grab Other:

Dedicated Equipment:	(Yes) No	Pumping Rate:	125 gpm
Well Purged Dry?	(Yes) No	Time Pump Began	1017 (am) / pm
Time Purged Dry?	1030	Time of Sampling:	1035 (am) / pm
Duplicate Sample?	Yes (No) ID: —	Sample EH:	166.5
Sample Appearance:	General: Clear Color: none	Phase: none	Odor: none

(13) Time	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1030	6.83	4552	8.73	N/A	N/A	3.25	1	
1035	6.88	4693	8.93			—	2	recharge
							3	
							4	
							5	

Stabiliz Yes (No)

Amount Water Removed: Gallons

Comments:

-OK recharge

Exceptions to Protocol:

W.L. @ 1130 am = 23.99

Start purge @ 1132 am @ 0.25 gpm until dry @ 1150 am WL below Pump

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Sampling Personnel: DS

Site: Otter Tail Power Co./ Big Stone
Facility ID:
Date: 2/Aug 23
Unique Station ID:
Sample ID: H11

Well Condition

Well Locked?	Yes	(No)	Protective Posts?	Yes	(No)
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	(Yes)	No

Repairs Necessary:

Well Information

Well Depth:	42.15	Well Casing Elevation:	1093.24
Constructed Depth:	—	Static Water Elevation:	1079.25
Casing Diameter:	2"	Previous Static:	1082.58
Water Level Before Purge:	13.95	Water Level After Sample:	33.68
Well Volume:	4.60 Gallons	Measurement Method:	(Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 68 Wind: W@10 Sky: Clear

Sampling Method: Grundfos ~~Bladder SS/T~~ Disp. Bailer Whale Grab Other:

Dedicated Equipment:	(Yes) No	Pumping Rate:	0.25 gpm
Well Purged Dry?	(Yes) No	Time Pump Began	1022 (am) / pm
Time Purged Dry?	1041	Time of Sampling:	1046 (am) / pm
Duplicate Sample?	Yes (No) ID: —	Sample EH:	-13.3

Sample Appearance: General: Clear Color: None Phase: None Odor: None

(A) Time	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1024	6.66	4219	9.21	1.32	5.2	4.75	1	
							2	
							3	
							4	
1046	6.70	4298	9.68	3.15	0.2	—	5	recharge

Stabiliz Yes (No)

Amount Water Removed: 4.75 Gallons

Comments:

Exceptions to Protocol: State + CCR

W.L. @1135: 32.44

Started purge @1137 @.25 g/min.

went dry @1157

August 2023

2023 Big Stone Sampling - CCR

Landfill or ADA wells

Site	Parameter List	Well Depth (constructed)	Diameter (Inches)	Well Elevation (TOC)	Sample Equipment	Dedicated?	Pump Rate (ml/minute)	Goes Dry?	Sampling Seasons**
H2OX	~~CCR 3~~ WL only	32.20	2	1103.86	Bladder	Yes	100	Yes	April & Oct
H3OX	~~CCR 3~~	22.55	2	1095.26	Bladder	Yes	100	Yes	April & Oct
H4OX	~~CCR 3~~	27.20	2	1108.25	Bladder	Yes	100	No	April & Oct
H6	~~CCR 3~~	15.00	2	1097.76	Bladder	Yes	100	Yes	April & Oct
H8	~~CCR 3~~	22.05	2	1081.23	Bladder	Yes	100	No	April & Oct
H9	~~CCR 3~~	30.20	2	1086.21	Bladder	Yes	100	No	April & Oct
H10	CCR 3 and 4	35.49	2	1090.83	Bladder	Yes	100		See highlighted note below
H11	CCR 3 and 4	42.15	2	1093.24	Bladder	Yes	100		See highlighted note below

Note: Wells H10 and H11 need to be sampled 8 times for CCR this year. Background sampling like 5 years ago. We want to sample in April - November. Each event has to be about 30 days apart. Also, durning every sampling event for the CCR, we will need water levels on the CCR wells not sampled.

Note: CCR sampling is for total recoverable metals. They are not filtered in the field.

CCR 3 & 4 parameters see the first two tabs labeled CCR 3 and CCR 4

CCR - Appendix III Detection Monitoring

Field Parameters

pH*

* Field and Laboratory Measurements

Total Concentration Parameters	**Method**
Boron	6010
Calcium	6010
Chloride	SM4500 CL E
Fluoride	EPA 300
pH	SM 4500 H+B-96
Sulfate	ASTM D516
Dissolved Solids, Total	SM 2540 C-97

Note: These are non-filtered samples.

CCR - Appendix IV - Assessment Monitoring

Total Concentration Parameters	**Method**
Antimony	SW6020A
Arsenic	SW602A
Barium	SW6010C
Beryllium	SW6020A
Cadmium	SW6020A
Chromium, Total	SW6020A
Cobalt	SW6010C
Fluoride	EPA 300
Lead	SW6020A
Lithium	SW6010C
Mercury	EPA 245.7
Molybdenum	SW6020A
Selenium	SW6020A
Thallium	SW6020A
Radium 226 + 228	

Note: These are non-filtered samples.

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

October 16, 2023

Todd Rieger
MVTL Laboratories
1126 North Front Street
New Ulm, MN 56073

RE: Project: 31-0235 Otter Tail Power
Pace Project No.: 10666268

Dear Todd Rieger:

Enclosed are the analytical results for sample(s) received by the laboratory on August 23, 2023. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

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

Sincerely,

Piper J. Gibbs

Piper Gibbs
piper.gibbs@pacelabs.com
(612)607-1700
Project Manager

Enclosures

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: 31-0235 Otter Tail Power
Pace Project No.: 10666268

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10666268001	23A8447-H10	Water	08/21/23 10:35	08/23/23 09:54
10666268002	23A8448-H11	Water	08/21/23 10:45	08/23/23 09:54

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Reque

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

WO# : 10666268

10666268

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	MVTL	Report To:	Todd Rieger	Attention:	AP
Address:	1126 NORTH FRONT BLDG #2	Copy To:	trieger@mvtl.com	Company Name:	MVTL
	NEW ULM, MN 56073			Address:	1126 NORTH FRONT BLDG 2
Email To:	alieder@mvtl.com	Purchase Order No.:	CL13299	Pace Quote Reference:	
Phone:	507-233-7134 Fax:	Project Name:	Otter Tail Power	Pace Project Manager:	
Requested Due Date/TAT:	standard	Project Number:	Work order: 31-0235	Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☑ GROUND WATER ☐ DRINKING WATER

☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MN

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information: SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: 2,3,7,8 TCDD method 16	Radium 226/228	PFAs State Pricing	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	23A8447 - H10		WT				08/21/23	10:35		1												X		N	
2	23A8448 - H11		WT				08/21/23	10:45		1												X		N	
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

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)
				Radium adjusted/ Pace	8-23-23	9:54	2.9	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

*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.

Sample Condition Upon Receipt

Client Name: MVTL

Project #: **WO#: 10666268**

PM: PG Due Date: 09/22/23

CLIENT: MVTL

Courier: ☐ FedEx ☐ UPS ☐ USPS ☑ Client ☐ Pace ☐ SpeeDee ☐ Commercial

Tracking Number: _____ ☐ See Exceptions ENV-FRM-MIN4-0142

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No Seals Intact? ☐ Yes ☑ No Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other Temp Blank? ☑ Yes ☐ No

Thermometer: ☐ T1 (0461) ☐ T2 (0436) ☐ T3 (0459) ☐ T4 (0402) ☐ T5 (0178) ☐ T6 (0235) ☐ T7 (0042) ☐ T8 (0775) ☑ T9(0727) ☐ 01339252/1710

Type of Ice: ☑ Wet ☐ Blue ☐ Dry ☐ None ☐ Melted

Did Samples Originate in West Virginia? ☐ Yes ☑ No Were All Container Temps Taken? ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6 °C

Cooler temp Read w/Temp Blank: 3.4 °C

Correction Factor: -0.5

Cooler Temp Corrected w/temp blank: 2.9 °C

Average Corrected Temp (no temp blank only): _____ °C ☐ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

USDA Regulated Soil: (☑ N/A, (water) sample/other: _____)

Date/Initials of Person Examining Contents: EL 8-23-23

Did samples originate in a quarantine zone within the United States: AL, AR, AZ CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX, or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.

Location (Check one): ☐ Duluth ☑ Minneapolis ☐ Virginia

				COMMENTS
Chain of Custody Present and Filled Out?	☑ Yes	☐ No		1.
Chain of Custody Relinquished?	☐ Yes	☑ No		2.
Sampler Name and/or Signature on COC?	☐ Yes	☑ No	☐ N/A	3.
Samples Arrived within Hold Time?	☑ Yes	☐ No		4. If fecal: ☐ <8 hrs ☐ >8 hr, <24 ☐ No
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/Ecoli ☐ BOD/cBOD ☐ Hex Chrom ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other
Rush Turn Around Time Requested?	☐ Yes	☑ No		6.
Sufficient Sample Volume?	☑ Yes	☐ No		7.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	8.
-Pace Containers Used?	☑ Yes	☐ No		
Containers Intact?	☑ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC?	☑ Yes	☐ No		11. If no, write ID/Date/Time of container below: ☐ See Exceptions ENV-FRM-MIN4-0142
Matrix: ☑ Water ☐ Soil ☐ Oil ☐ Other				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO3, H2SO4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐ Yes	☐ No	☑ N/A	☐ NaOH ☐ HNO3 ☐ H2SO4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxins/PFAS (*If adding preservative to a container, it must be added to associated field and equipment blanks--verify with PM first.)	☐ Yes	☐ No	☑ N/A	Positive for Residual Chlorine? ☐ Yes ☐ No ☐ See Exceptions ENV-FRM-MIN4-0142
				pH Paper Lot #
				Residual Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Headspace in Methyl Mercury Container?	☐ Yes	☐ No	☑ N/A	13.
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☐ No	☑ N/A	14. ☐ See Exceptions ENV-FRM-MIN4-0142
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No	☑ N/A	
3 Trip Blanks Present?	☐ Yes	☐ No	☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No	☑ N/A	Pace Trip Blank Lot # (if purchased): _____

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: Peyton Gibbs Date: 8/23/23

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).

Labeled By: EL Line: 2

B078

Internal Transfer Chain of Custody

Pace

☐ Samples Pre-Logged into eCOC.

State Of Origin: MN
Cert. Needed: ☑ Yes ☐ No
Owner Received Date: 8/23/2023 Results Requested By: 9/22/2023

Workorder: 10666268 Workorder Name: 31-0235 Otter Tail Power

Report To	Subcontract To
Piper Gibbs Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700	Pace National 12065 Lebanon Rd Mt. Juliet, TN 37122 Phone (615) 758-5858

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: HNO3	Requested Analysis: Radium 226/228	LAB USE ONLY
1	23A8447-H10	PS	8/21/2023 10:35	10666268001	Water	1	X	-01
2	23A8448-H11	PS	8/21/2023 10:45	10666268002	Water	1	X	-02
3								
4								
5								

Transfers	Released By	Date/Time	Received By	Date/Time
1	[illegible]	9/7/23 7:00	[illegible]	9/8/23 9:00
2				
3				

Comments: ship without ice

9/9

Cooler Temperature on Receipt °C | Custody Seal Y or N | Received on Ice (Y) or N | Samples Intact (Y) or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

6976 5639 7049

Sample Receipt Checklist

COC Seal Present/Intact:	(Y) N	** Applicable VOA Zero Headspace:	Y N
COC Signed/Accurate:	Y N	Pres. Correct/Check:	Y N
Bottles arrive intact:	Y N		
Correct Bottles Used:	Y N	NEAS 2-5702 2-5	
Sufficient Volume Sent:	Y N		
RA Screen <0.5 mR/hr:	(Y) N		

ANALYTICAL REPORT

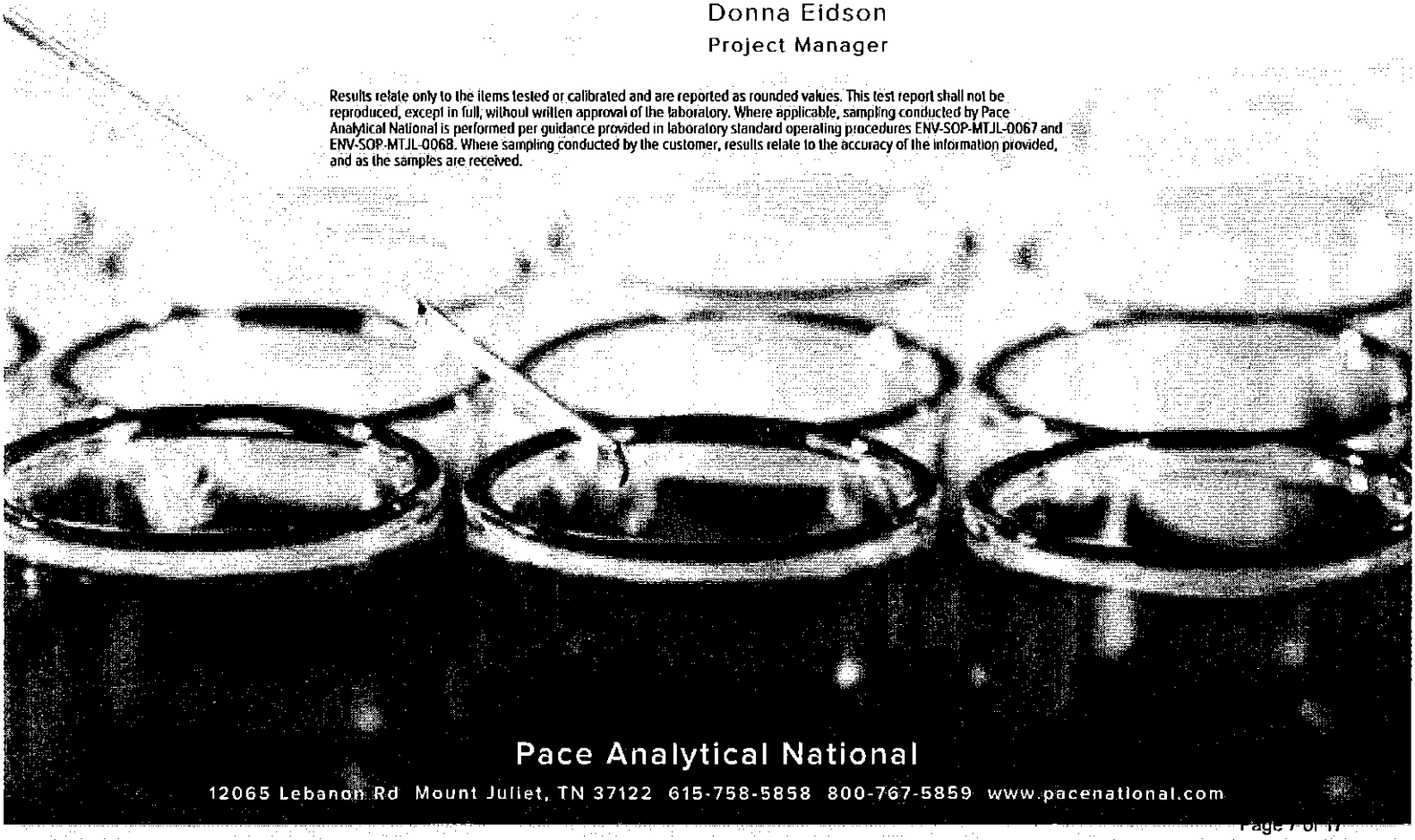
October 16, 2023

Pace Analytical - Minnesota

Sample Delivery Group:	L1654185
Samples Received:	09/08/2023
Project Number:	10666268
Description:	31-0235 Otter Tail Power
Site:	001
Report To:	Piper Gibbs

Entire Report Reviewed By:

Donna Eidson
Project Manager



Pace Analytical National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

TABLE OF CONTENTS

SAMPLE SUMMARY

23A8447-H10 L1654185-01 Non-Potable Water

Collected by	Collected date/time	Received date/time
	08/21/23 10:35	09/08/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2141139	1	09/28/23 12:39	10/10/23 21:14	DDD	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2135792	1	09/20/23 16:26	09/22/23 13:29	RGT	Mt. Juliet, TN

23A8447-H11 L1654185-02 Non-Potable Water

Collected by	Collected date/time	Received date/time
	08/21/23 10:45	09/08/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2141139	1	09/28/23 12:39	10/10/23 21:14	DDD	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2135792	1	09/20/23 16:26	09/22/23 13:29	RGT	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Donna Eidson
Project Manager

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.465	J	0.265	0.476	10/10/2023 21:14	WG2141139
(T) Barium	*94.8*			*30.0-143*	*10/10/2023 21:14*	WG2141139
(T) Yttrium	*108*			*30.0-136*	*10/10/2023 21:14*	WG2141139

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty +/-	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.290		0.217	0.220	09/22/2023 13:29	WG2135792
(T) Barium-133	*103*			*30.0-143*	*09/22/2023 13:29*	WG2135792

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.798		0.293	0.518	10/10/2023 21:14	WG2141139
(T) Barium	*75.1*			*30.0-143*	*10/10/2023 21:14*	WG2141139
(T) Yttrium	*109*			*30.0-136*	*10/10/2023 21:14*	WG2141139

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	Uncertainty + / -	MDA pCi/l	Analysis Date date / time	Batch
RADIUM-226	1.83		0.496	0.198	09/22/2023 13:29	WG2135792
(T) Barium-133	*91.4*			*30.0-143*	*09/22/2023 13:29*	WG2135792

Method Blank (MB)

(MB) R3986066-2 10/10/23 21:14

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty +/- pCi/l	MB MDA pCi/l
Radium-228	0.552		0.250	0.216
(T) Barium	*90.6*		*90.6*	
(T) Yttrium	*97.8*		*97.8*	

L1654164-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1654164-06 10/10/23 21:14 • (DUP) R3986066-5 10/10/23 21:14

Analyte	Original Result pCi/l	Original Uncertainty +/-	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty +/-	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	3.28	0.527	0.888	4.84	0.426	0.642	1	38.6	2.31		20	3
(T) Barium	*85.5*			*89.8*	*89.8*							
(T) Yttrium	*110*			*102*	*102*							

Laboratory Control Sample (LCS)

(LCS) R3986066-1 10/09/23 21:19

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	5.75	115	80.0-120	
(T) Barium			*88.2*		
(T) Yttrium			*96.6*		

L1654164-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1654164-02 10/10/23 21:14 • (MS) R3986066-3 10/10/23 21:14 • (MSD) R3986066-4 10/10/23 21:14

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	16.7	4.01	19.8	20.5	94.7	98.6	1	70.0-130			3.18		20
(T) Barium		*107*			*84.9*	*75.5*							
(T) Yttrium		*106*			*110*	*100*							

Method Blank (MB)

(MB) R3977554-1 09/22/23 13:29

Analyte	MB Result pCi/l	MB Qualifier	MB Uncertainty +/- pCi/l	MB MDA pCi/l
Radium-226	0.107	J	0.0977	0.123
(T) Barium-133	*62.4*		*62.4*	

L1654251-06 Original Sample (OS) • Duplicate (DUP)

(OS) L1654251-06 09/22/23 13:29 • (DUP) R3977554-5 09/22/23 13:29

Analyte	Original Result pCi/l	Original Uncertainty +/-	Original MDA pCi/l	DUP Result pCi/l	DUP Uncertainty +/-	DUP MDA pCi/l	Dilution	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.177	0.231	0.331	0.0924	0.222	0.374	1	63.0	0.265	U	20	3
(T) Barium-133	*90.1*			*69.8*	*69.8*							

Laboratory Control Sample (LCS)

(LCS) R3977554-2 09/22/23 13:29

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.01	4.85	96.9	80.0-120	
(T) Barium-133			*73.3*		

L1654251-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1654251-01 09/22/23 13:29 • (MS) R3977554-3 09/22/23 13:29 • (MSD) R3977554-4 09/22/23 13:29

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.0	1.09	20.0	19.6	94.3	92.5	1	75.0-125			1.77		20
(T) Barium-133		*85.8*			*83.7*	*60.8*							

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDA	Minimum Detectable Activity.
Rec.	Recovery.
RER	Replicate Error Ratio.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
U	Below Detectable Limits: Indicates that the analyte was not detected.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey–NELAP	TN002
California	2932	New Mexico [1]	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina [1]	DW21704
Georgia	NELAP	North Carolina [3]	41
Georgia [1]	923	North Dakota	R-140
Idaho	TN00003	Ohio–VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky [1 6]	KY90010	South Carolina	84004002
Kentucky [2]	16	South Dakota	n/a
Louisiana	AI30792	Tennessee [1 4]	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas [5]	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA – ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA – ISO 17025 [5]	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA–Crypto	TN00003		

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

B078

Internal Transfer Chain of Custody

☐ Samples Pre-Logged into eCOC.

State Of Origin: MN
Cert. Needed: ☑ Yes ☐ No

Workorder: 10666268 Workorder Name: 31-0235 Otter Tail Power

Owner Received Date: 8/23/2023 Results Requested By: 9/22/2023

Report To

Piper Gibbs
Pace Analytical Minnesota
1700 Elm Street
Minneapolis, MN 55414
Phone (612)607-1700

Subcontract To

Pace National
12065 Lebanon Rd
Mt. Juliet, TN 37122
Phone (615) 758-5858

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: HNO3	Requested Analysis: Radium 226/228	LAB USE ONLY (L1654165)
1	23A8447-H10	PS	8/21/2023 10:35	10666268001	Water	1	X	-01
2	23A8448-H11	PS	8/21/2023 10:45	10666268002	Water	1	X	-02
3								
4								
5								

Transfers	Released By	Date/Time	Received By	Date/Time
1	[signature]	9/7/23 1700	[signature]	9-8-23 9:00
2				
3				

Comments

ship without ice

9/9

Cooler Temperature on Receipt °C | Custody Seal (Y) or N | Received on Ice (Y) or ~~N~~ | Samples Intact (Y) or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.*

6976 5639 7049

Sample Receipt Checklist

COC Seal Present/Intact: Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
RA Screen <0.5 mR/hr: Y N

If Applicable
VOA Zero Headspace: Y N
Pres. Correct/Check: Y N

NFAS
2-5702-2-5

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	MVTL	Report To:	Todd Rieger	Attention:	AP
Address:	1126 NORTH FRONT BLDG #2	Copy To:	trieger@mvtl.com	Company Name:	MVTL
	NEW ULM, MN 56073			Address:	1126 NORTH FRONT BLDG 2
Email To:	alieder@mvtl.com	Purchase Order No.:	CL13299	Pace Quote Reference:	
Phone:	507-233-7134 Fax:	Project Name:	Otter Tail Power	Pace Project Manager:	
Requested Due Date/TAT:	standard	Project Number:	Work order: 31-0235	Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☑ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MN

Section D Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

Requested Analysis Filtered (Y/N)

ITEM #	Sample ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: 2,3,7,8 TCDD method 16	Radium 226/228	PFAs State Pricing	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	23A8447 - H10	WT				08/21/23	10:35		1											X		N	
2	23A8448 - H11	WT				08/21/23	10:45		1											X		N	
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

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

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

MEMBER ACIL

FINAL REPORT COMPLETION DATE: 27 Nov 23 AK

Date Reported: 22 Nov 2023

JOSH HOLLEN
OTTER TAIL POWER CO
PC BOX 496
FERGUS FALLS MN 56538-0496

Work Order #: 31-0271
Account #: 006106
PO #: 59601

Project Name: BIG STONE PLANT CCR

Field Service Manager/Date Reviewed: 22 Nov 23

Chemistry Lab Manager/Date Reviewed: 22 Nov 23

Quality Assurance Director/Date Reviewed: 22 NOV 2023

RL = Reporting Limits
NQ = Not Present, Qualitative Only
PQ = Present, Qualitative Only
ND = Not Determined

All data for this report has been approved by MVTL Laboratory Management.

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JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 22 Nov 2023
Lab Number: 23-A9310
Work Order #: 31-0271
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 17 Oct 2023 12:10
Sampled By: MVTL FIELD PERSONNEL
Date Received: 17 Oct 2023 16:30
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H20X

Temp at Receipt: 0.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions					19 Oct 23	JN
pH, Field	6.52	units	1.00	SM4500-H+-2011	17 Oct 23 12:10	BMW
pH	* 7.2	units	1.0	SM 4500 H+ B-2000	18 Oct 23 10:53	HO
Sulfate	1720 ~	mg/L	5.0	ASTM D516-11	19 Oct 23 11:10	SS
Chloride	3.5	mg/L	3.0	SM 4500 Cl E	19 Oct 23 10:05	KRM
Solids, Total Dissolved	3610	mg/L	10	SM 2540 C-97	19 Oct 23 9:20	CC
Calcium	521.0	mg/L	0.500	SW6010D	23 Oct 23 12:34	RMV
	~See Narrative					
Boron	0.258	mg/L	0.100	SW6010D	23 Oct 23 12:34	RMV
Fluoride	0.320	mg/L	0.020	EPA 300.0	28 Oct 23 0:59	RMV

* Holding Time Exceeded

~ Sample diluted due to result above calibration of linear range.

RL = Reporting Limit
Analyses performed under our Minnesota Department of Health Accreditation conform to the current TNI standards.
The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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www.mvtl.com
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JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Project Name: BIG STONE PLANT CCR

Sample Description: H30X

Report Date: 22 Nov 2023
Lab Number: 23-A9311
Work Order #: 31-0271
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 17 Oct 2023 10:22
Sampled By: MVTL FIELD PERSONNEL
Date Received: 17 Oct 2023 16:30
PO #: 59601

Temp at Receipt: 0.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions					19 Oct 23	JN
pH, Field	6.43	units	1.00	SM4500-H+-2011	17 Oct 23 10:22	BMW
pH	* 7.2	units	1.0	SM 4500 H+ B-2000	18 Oct 23 10:53	HO
Sulfate	1340 ~	mg/L	5.0	ASTM D516-11	19 Oct 23 11:10	SS
Chloride	65.3	mg/L	3.0	SM 4500 Cl E	19 Oct 23 10:22	KRM
Solids, Total Dissolved	2880	mg/L	10	SM 2540 C-97	19 Oct 23 9:20	CC
Calcium	405.0	mg/L	0.500	SW6010D	23 Oct 23 12:34	RMV
	-See Narrative					
Boron	7.310 ~	mg/L	0.100	SW6010D	23 Oct 23 12:34	RMV
Fluoride	0.370	mg/L	0.020	EPA 300.0	28 Oct 23 9:59	RMV

* Holding Time Exceeded

~ Sample diluted due to result above calibration of linear range.

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Analyses performed under our Minnesota Department of Health Accreditation conform to the current TNI standards.
The reporting limit was elevated for any analyte requiring a dilution as coded below:
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! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 22 Nov 2023
Lab Number: 23-A9312
Work Order #: 31-0271
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 17 Oct 2023 11:04
Sampled By: MVTL FIELD PERSONNEL
Date Received: 17 Oct 2023 16:30
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H40X

Temp at Receipt: 0.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions					19 Oct 23	JN
pH, Field	6.52	units	1.00	SM4500-H+-2011	17 Oct 23 11:04	BMW
pH	* 7.2	units	1.0	SM 4500 H+ B-2000	18 Oct 23 10:53	HO
Sulfate	987 ~	mg/L	5.0	ASTM D516-11	19 Oct 23 11:10	SS
Chloride	41.7	mg/L	3.0	SM 4500 Cl E	19 Oct 23 10:22	KRM
Solids, Total Dissolved	2160	mg/L	10	SM 2540 C-97	19 Oct 23 9:20	CC
Calcium	321.0	mg/L	0.500	SW6010D	23 Oct 23 13:13	RMV
Boron	0.564	mg/L	0.100	SW6010D	23 Oct 23 13:13	RMV
Fluoride	0.480	mg/L	0.020	EPA 300.0	28 Oct 23 0:59	RMV

* Holding Time Exceeded

~ Sample diluted due to result above calibration of linear range.

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Analyses performed under our Minnesota Department of Health Accreditation conform to the current TNI standards.
The reporting limit was elevated for any analyte requiring a dilution as coded below:
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! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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MEMBER ACIL

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 22 Nov 2023
Lab Number: 23-A9313
Work Order #: 31-0271
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 17 Oct 2023 11:57
Sampled By: MVTL FIELD PERSONNEL
Date Received: 17 Oct 2023 16:30
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H6

Temp at Receipt: 0.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions					19 Oct 23	JN
pH, Field	7.56	units	1.00	SM4500-H+-2011	17 Oct 23 11:04	DGF
pH	* 7.6	units	1.0	SM 4500 H+ B-2000	18 Oct 23 10:53	HO
Sulfate	80.6	mg/L	5.0	ASTM D516-11	19 Oct 23 11:10	SS
Chloride	< 3	mg/L	3	SM 4500 Cl E	19 Oct 23 10:22	KRM
Solids, Total Dissolved	558	mg/L	10	SM 2540 C-97	19 Oct 23 9:20	CC
Calcium	64.70 @	mg/L	0.500	SW6010D	23 Oct 23 13:13	RMV
Boron	2.350 @	mg/L	0.100	SW6010D	23 Oct 23 13:13	RMV
Fluoride	0.430	mg/L	0.020	EPA 300.0	28 Oct 23 0:59	RMV

* Holding Time Exceeded

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The reporting limit was elevated for any analyte requiring a dilution as coded below:
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! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 22 Nov 2023
Lab Number: 23-A9314
Work Order #: 31-0271
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 17 Oct 2023 12:35
Sampled By: MVTL FIELD PERSONNEL
Date Received: 17 Oct 2023 16:30
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H8

Temp at Receipt: 0.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions					19 Oct 23	JN
pH, Field	7.22	units	1.00	SM4500-H+-2011	17 Oct 23 12:35	DGF
pH	* 7.5	units	1.0	SM 4500 H+ B-2000	18 Oct 23 10:53	HO
Sulfate	321 ~	mg/L	5.0	ASTM D516-11	19 Oct 23 11:49	SS
Chloride	3.4	mg/L	3.0	SM 4500 Cl E	19 Oct 23 10:22	KRM
Solids, Total Dissolved	973	mg/L	10	SM 2540 C-97	19 Oct 23 9:20	CC
Calcium	128.0	mg/L	0.500	SW6010D	23 Oct 23 13:13	RMV
Boron	3.360	mg/L	0.100	SW6010D	23 Oct 23 13:13	RMV
Fluoride	0.510	mg/L	0.020	EPA 300.0	28 Oct 23 0:59	RMV

* Holding Time Exceeded

~ Sample diluted due to result above calibration of linear range.

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! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Project Name: BIG STONE PLANT CCR

Sample Description: H9

Report Date: 22 Nov 2023
Lab Number: 23-A9315
Work Order #: 31-0271
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 17 Oct 2023 13:19
Sampled By: MVTL FIELD PERSONNEL
Date Received: 17 Oct 2023 16:30
PO #: 59601

Temp at Receipt: 0.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions					19 Oct 23	JN
pH, Field	6.62	units	1.00	SM4500-H+-2011	17 Oct 23 13:19	DGF
pH	* 7.0	units	1.0	SM 4500 H+ B-2000	18 Oct 23 10:53	HO
Sulfate	1620 ~	mg/L	5.0	ASTM D516-11	19 Oct 23 11:49	SS
Chloride	81.6	mg/L	3.0	SM 4500 Cl E	19 Oct 23 10:22	KRM
Solids, Total Dissolved	2900	mg/L	10	SM 2540 C-97	19 Oct 23 9:20	CC
Calcium	640.0 ~	mg/L	0.500	SW6010D	23 Oct 23 13:13	RMV
Boron	1.230	mg/L	0.100	SW6010D	23 Oct 23 13:13	RMV
Fluoride	0.310	mg/L	0.020	EPA 300.0	28 Oct 23 0:59	RMV

* Holding Time Exceeded

~ Sample diluted due to result above calibration of linear range.

RL = Reporting Limit
Analyses performed under our Minnesota Department of Health Accreditation conform to the current TNI standards.
The reporting limit was elevated for any analyte requiring a dilution as coded below:
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! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 22 Nov 2023
Lab Number: 23-A9316
Work Order #: 31-0271
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 17 Oct 2023 12:34
Sampled By: MVTL FIELD PERSONNEL
Date Received: 17 Oct 2023 16:30
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H10

Temp at Receipt: 0.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
MS Water Digestions					24 Oct 23	JN
Water Digestions					19 Oct 23	JN
pH, Field	6.51	units	1.00	SM4500-H+-2011	17 Oct 23 12:34	BMW
pH	* 7.2	units	1.0	SM 4500 H+ B-2000	18 Oct 23 10:53	HO
Radium 226	0.07	pCi/L	0.60		27 Oct 23 18:42	OL
Radium 228	0.24	pCi/L	3.00	EPA M9320	27 Oct 23 15:46	OL
Sulfate	2590 ~	mg/L	5.0	ASTM D516-11	19 Oct 23 11:49	SS
Chloride	6.3	mg/L	3.0	SM 4500 Cl E	19 Oct 23 10:22	KRM
Mercury	< 0.005	ug/L	0.005	EPA 245.7	24 Oct 23 14:54	RMB
Solids, Total Dissolved	4840	mg/L	10	SM 2540 C-97	19 Oct 23 9:20	CC
Calcium	509.0 ~	mg/L	0.500	SW6010D	23 Oct 23 13:13	RMV
Lithium	0.298	mg/L	0.020	SW6010D	23 Oct 23 13:13	RMV
Barium	0.027	mg/L	0.005	SW6010D	23 Oct 23 13:13	RMV
Beryllium	< 0.005	mg/L	0.005	SW6010D	23 Oct 23 13:13	RMV
Cobalt	< 0.005	mg/L	0.005	SW6010D	23 Oct 23 13:13	RMV
Boron	0.358	mg/L	0.100	SW6010D	23 Oct 23 13:13	RMV
Antimony	< 2.5 @	ug/L	0.5	SW6020B	25 Oct 23 17:15	KAM
Arsenic	< 2.5 @	ug/L	0.5	SW6020B	25 Oct 23 17:15	KAM
Cadmium	< 0.5 @	ug/L	0.1	SW6020B	25 Oct 23 17:15	KAM
Chromium	< 2.5 @	ug/L	0.5	SW6020B	25 Oct 23 17:15	KAM
Lead	< 2.5 @	ug/L	0.5	SW6020B	25 Oct 23 17:15	KAM
Molybdenum	12.3 @	ug/L	0.50	SW6020B	25 Oct 23 17:15	KAM
Selenium	3.79	ug/L	0.50	SW6020B	25 Oct 23 17:15	KAM
	@ See Narrative					
Thallium	< 0.5 @	ug/L	0.1	SW6020B	25 Oct 23 17:15	KAM
Fluoride	0.190	mg/L	0.020	EPA 300.0	28 Oct 23 0:59	RMV

* Holding Time Exceeded

Radium 226 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

Radium 228 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

~ Sample diluted due to result above calibration of linear range.

OL = Analysis performed by an Outside Laboratory.

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! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
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MEMBER ACIL

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 22 Nov 2023
Lab Number: 23-A9317
Work Order #: 31-0271
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 17 Oct 2023 13:49
Sampled By: MVTL FIELD PERSONNEL
Date Received: 17 Oct 2023 16:30
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H11

Temp at Receipt: 0.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
MS Water Digestions					24 Oct 23	JN
Water Digestions					19 Oct 23	JN
pH, Field	6.59	units	1.00	SM4500-H+-2011	17 Oct 23 13:49	DS
pH	* 6.9	units	1.0	SM 4500 H+ B-2000	18 Oct 23 10:53	HO
Radium 226	0.04	pCi/L	0.60		27 Oct 23 18:42	OL
Radium 228	0.54	pCi/L	3.00	EPA M9320	27 Oct 23 15:46	OL
Sulfate	2580 ~	mg/L	5.0	ASTM D516-11	19 Oct 23 11:49	SS
Chloride	3.6	mg/L	3.0	SM 4500 Cl E	19 Oct 23 10:22	KRN
Mercury	< 0.005	ug/L	0.005	EPA 245.7	24 Oct 23 14:54	RMB
Solids, Total Dissolved	4220	mg/L	10	SM 2540 C-97	19 Oct 23 9:20	CC
Calcium	573.0 ~	mg/L	0.500	SW6010D	23 Oct 23 13:13	RMV
Lithium	0.332	mg/L	0.020	SW6010D	23 Oct 23 13:13	RMV
Barium	0.030	mg/L	0.005	SW6010D	23 Oct 23 13:13	RMV
Beryllium	< 0.005	mg/L	0.005	SW6010D	23 Oct 23 13:13	RMV
Cobalt	< 0.005	mg/L	0.005	SW6010D	23 Oct 23 13:13	RMV
Boron	0.271	mg/L	0.100	SW6010D	23 Oct 23 13:13	RMV
Antimony	< 2.5 @	ug/L	0.5	SW6020B	25 Oct 23 17:15	KAM
Arsenic	< 2.5 @	ug/L	0.5	SW6020B	25 Oct 23 17:15	KAM
Cadmium	< 0.5 @	ug/L	0.1	SW6020B	25 Oct 23 17:15	KAM
Chromium	< 2.5 @	ug/L	0.5	SW6020B	25 Oct 23 17:15	KAM
Lead	< 2.5 @	ug/L	0.5	SW6020B	25 Oct 23 17:15	KAM
Molybdenum	3.03 @	ug/L	0.50	SW6020B	25 Oct 23 17:15	KAM
Selenium	< 2.5 @ See Narrative	ug/L	0.5	SW6020B	25 Oct 23 17:15	KAM
Thallium	< 0.5 @	ug/L	0.1	SW6020B	25 Oct 23 17:15	KAM
Fluoride	0.140	mg/L	0.020	EPA 300.0	28 Oct 23 0:59	RMV

* Holding Time Exceeded

Radium 226 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

Radium 228 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

~ Sample diluted due to result above calibration of linear range.

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! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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MEMBER ACIL

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 22 Nov 2023
Lab Number: 23-A9318
Work Order #: 31-0271
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 17 Oct 2023 13:19
Sampled By: MVTL FIELD PERSONNEL
Date Received: 17 Oct 2023 16:30
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H12

Temp at Receipt: 0.5C

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
MS Water Digestions					24 Oct 23	JN
Water Digestions					20 Oct 23	JN
pH, Field	7.99	units	1.00	SM4500-H+-2011	17 Oct 23 13:19	DS
pH	* 8.2	units	1.0	SM 4500 H+ B-2000	18 Oct 23 11:13	HO
Radium 226	0.18	pCi/L	0.60		27 Oct 23 18:42	OL
Radium 228	0.46	pCi/L	3.00	EPA M9320	7 Oct 23 15:46	OL
Sulfate	20.8	mg/L	5.0	ASTM D516-11	19 Oct 23 11:49	SS
Chloride	< 3	mg/L	3	SM 4500 Cl E	19 Oct 23 10:22	KRM
Mercury	0.012	ug/L	0.005	EPA 245.7	24 Oct 23 14:54	RMB
Solids, Total Dissolved	197	mg/L	10	SM 2540 C-97	19 Oct 23 9:20	CC
Calcium	25.60	mg/L	0.500	SW6010D	24 Oct 23 12:27	RMV
	See Narrative					
Lithium	< 0.02	mg/L	0.02	SW6010D	23 Oct 23 14:25	RMV
Barium	0.058	mg/L	0.005	SW6010D	23 Oct 23 14:25	RMV
Beryllium	< 0.005	mg/L	0.005	SW6010D	23 Oct 23 14:25	RMV
Cobalt	< 0.005	mg/L	0.005	SW6010D	23 Oct 23 14:25	RMV
Boron	0.402	mg/L	0.100	SW6010D	23 Oct 23 14:25	RMV
Antimony	< 0.5	ug/L	0.5	SW6020B	25 Oct 23 17:15	KAM
Arsenic	2.74	ug/L	0.50	SW6020B	25 Oct 23 17:15	KAM
Cadmium	< 0.1	ug/L	0.1	SW6020B	25 Oct 23 17:15	KAM
Chromium	3.71	ug/L	0.50	SW6020B	25 Oct 23 17:15	KAM
Lead	1.53	ug/L	0.50	SW6020B	25 Oct 23 17:15	KAM
Molybdenum	34.2	ug/L	0.50	SW6020B	25 Oct 23 17:15	KAM
Selenium	< 0.5	ug/L	0.5	SW6020B	25 Oct 23 17:15	KAM
	See Narrative					
Thallium	< 0.1	ug/L	0.1	SW6020B	25 Oct 23 17:15	KAM
Fluoride	0.290	mg/L	0.020	EPA 300.0	28 Oct 23 0:59	RMV

* Holding Time Exceeded

Radium 226 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

Radium 228 subcontracted to:
Pace Analytical Services Inc.
1700 Elm Street Suite 200
Minneapolis, MN 55414
1-612-607-1700

OL = Analysis performed by an Outside Laboratory.

RL = Reporting Limit
Analyses performed under our Minnesota Department of Health Accreditation conform to the current TNI standards.
The reporting limit was elevated for any analyte requiring a dilution as coded below:
@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response
CERTIFICATION: MN LAB # 027-015-125 ND WW/DW # R-040

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

Date Reported: 22 Nov 2023

JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Work Order #: 202331-0271
Account Number: 006106
PO #: 59601

Project Name: BIG STONE PLANT CCR

LABORATORY NARRATIVE

INORGANIC & METALS ANALYSES:
Due to the matrix of the spiked sample the recovery for calcium was outside of acceptance range in the matrix spike for samples 23-A9310 and 23-A9311. Data was reported based on the acceptable recovery of calcium in the laboratory control spike and the relative percent difference between matrix spikes.

Due to the high concentration of calcium in the spiked sample the recovery for calcium was outside of acceptance range in the matrix spike duplicate for samples 23-A9318. Data was reported based on the acceptable recovery of calcium in the laboratory control spike and the relative percent difference between matrix spikes.

Due to matrix composition, percent recoveries of selenium in the matrix spike and duplicate associated with samples 23-A9316 through 23-A9318 were outside acceptable range. Data reported based on acceptable laboratory control spike recovery and relative percent difference between matrix spike recoveries.

No other problems were encountered.

MVTL

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1201 Lincoln Highway ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
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Quality Control Report

Lab IDs: 23-A9310 to 23-A9318 **Project:** BIG STONE PLANT CCR **Work Order:** 202331-0271

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Antimony ug/L	25.0	110	85-115	25.0	23A9316q	< 2.5	27.6	110	75-125	27.6	27.5	110	0.4	10	107	90-110	< 0.5
Arsenic ug/L	25.0	101	85-115	25.0	23A9316q	< 2.5	28.3	113	75-125	28.3	28.5	114	0.7	10	101	90-110	< 0.5
Barium mg/L	1.000	101	85-115	1.00	23A9317q	0.030	1.060	103	75-125	1.060	1.040	101	1.9	10	96	90-110	< 0.005
	1.000	100	85-115	1.00	23A9290fq	0.011	0.984	97	75-125	0.984	1.040	103	5.5	10	97	90-110	< 0.005
Beryllium mg/L	1.000	100	85-115	1.00	23A9317q	< 0.005	1.010	101	75-125	1.010	0.9900	99	2.0	10	101	90-110	< 0.005
	1.000	100	85-115	1.00	23A9290fq	< 0.005	1.010	101	75-125	1.010	1.010	101	0.0	10	101	90-110	< 0.005
Boron mg/L	1.000	107	85-115	1.00	23A9299q	< 0.5	1.210	121	75-125	1.210	1.170	117	3.4	10	98	90-110	< 0.1
	1.000	104	85-115	1.00	23A9317q	0.271	1.390	112	75-125	1.390	1.360	109	2.2	10	99	90-110	< 0.1
	1.000	104	85-115	1.00	23A9290fq	1.190	2.370	118	75-125	2.370	2.370	118	0.0	10	100	90-110	< 0.1
Cadmium ug/L	5.00	99	85-115	5.00	23A9316q	< 0.5	5.07	101	75-125	5.07	4.96	99	2.2	10	96	90-110	< 0.1
Calcium mg/L	50.00	105	85-115	50.0	23A9299q	568.0	638.0	140	75-125	638.0	611.0	86	4.3	10	102	90-110	< 0.5
	50.00	104	85-115	50.0	23A9317q	573.0	614.0	82	75-125	614.0	612.0	78	0.3	10	102	90-110	< 0.5
	50.00	102	85-115	50.0	23A9290fq	567.0	621.0	108	75-125	621.0	644.0	154	3.6	10	102	90-110	< 0.5
Chloride mg/L	-	-	-	60.0	23-A9299	3.6	65.1	102	80-120	65.1	63.6	100	2.3	10	98	90-110	< 3
	-	-	-	60.0	23-A9322	46.0	107	102	80-120	107	105	98	1.9	10	97	90-110	< 3
Chromium ug/L	25.0	101	85-115	25.0	23A9316q	< 2.5	24.9	100	75-125	24.9	25.5	102	2.4	10	103	90-110	< 0.5
Cobalt mg/L	1.000	103	85-115	1.00	23A9317q	< 0.005	0.990	99	75-125	0.990	0.960	96	3.1	10	100	90-110	< 0.005
	1.000	102	85-115	1.00	23A9290fq	< 0.005	0.968	97	75-125	0.968	0.966	97	0.2	10	101	90-110	< 0.005
Fluoride mg/L	-	-	-	0.20	a9311qc	0.370	0.560	95	80-120	0.560	0.570	100	1.8	10	102	90-110	< 0.02
Lead ug/L	25.0	100	85-115	25.0	23A9316q	< 2.5	26.7	107	75-125	26.7	26.6	106	0.4	10	101	90-110	< 0.5
Lithium mg/L	1.000	104	85-115	1.00	23-A9317	0.332	1.440	111	75-125	1.440	1.400	107	2.8	10	101	90-110	< 0.02
	1.000	102	85-115	1.00	23-A9290qc	0.145	1.160	102	75-125	1.160	1.230	108	5.9	10	101	90-110	< 0.02
Mercury ug/L	-	-	-	0.10	23-A9318	0.012	0.120	108	63-111	0.120	0.120	108	0.0	18	100	76-113	< 0.005
Molybdenum ug/L	25.0	91	85-115	25.0	23A9316q	12.3	36.3	96	75-125	36.3	36.9	98	1.6	10	91	90-110	< 0.5
pH units	-	-	-	-	-	-	-	-	-	6.9	6.9	-	0.0	2.5	101	90-110	-
	-	-	-	-	-	-	-	-	-	8.2	8.2	-	0.0	2.5	101	90-110	-

MVTL

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MEMBER
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Quality Control Report

Lab IDs: 23-A9310 to 23-A9318 **Project:** BIG STONE PLANT CCR **Work Order:** 202331-0271

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Selenium ug/L	25.0	110	85-115	25.0	23A9316q	3.79	36.2	130	75-125	36.2	35.2	126	2.8	10	107	90-110	< 0.5
Solids, Total Dissolved mg/L	-	-	-	-	-	-	-	-	-	197	204	-	3.5	10	99	85-115	< 10
Sulfate mg/L	-	-	-	500	23-A9295	610	1160	110	80-120	1160	1150	108	0.9	10	103	80-120	< 5
	-	-	-	500	23-A9321	213	806	119	80-120	806	804	118	0.2	10	105	80-120	< 5
Thallium ug/L	5.00	99	85-115	5.00	23A9316q	< 0.5	5.41	108	75-125	5.41	5.41	108	0.0	10	101	90-110	< 0.1

One matrix spike and one matrix spike duplicate failed to recover acceptably for Calcium, see narrative.
Selenium matrix spike / matrix spike duplicate failed to recover acceptably, see narrative.

Approved by: 

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

November 07, 2023

Todd Rieger
MVTL Laboratories
1126 North Front Street
New Ulm, MN 56073

RE: Project: 31-0271 Otterlail Power
Pace Project No.: 10673317

Dear Todd Rieger:

Enclosed are the analytical results for sample(s) received by the laboratory on October 20, 2023. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

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

Sincerely,

Piper Gibbs
piper.gibbs@pacelabs.com
(612)607-1700
Project Manager

Enclosures

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: 31-0271 Ottertail Power
Pace Project No.: 10673317

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10673317001	23A9316 - H10	Water	10/17/23 12:34	10/20/23 09:46
10673317002	23A9317 - H11	Water	10/17/23 13:49	10/20/23 09:46
10673317003	23A9318 - H12	Water	10/17/23 13:19	10/20/23 09:46

Pace Analytical
www.pacelabs.com

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:	MVTL	Report To:	Todd Rieger	Attention:	AP
Address:	1126 NORTH FRONT BLDG #2	Copy To:	trieger@mvtl.com	Company Name:	MVTL
	NEW ULM, MN 56073			Address:	1126 NORTH FRONT BLDG 2
Email To:	alieder@mvtl.com	Purchase Order No.:	CL13299	Pace Quote Reference:	
Phone:	507-233-7134 Fax:	Project Name:	Ottertail Power	Pace Project Manager:	
Requested Due Date/TAT:	standard	Project Number:	Work order: 31-0271	Pace Profile #:	

REGULATORY AGENCY: ☐ NPDES ☑ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MN

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Requested Analysis Filtered (Y/N): Analysis Test (Y/N)	2,3,7,8 TCDD method1613	Radium 226/228	PFAs State Pricing	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	23A9316 - H10	WW				10/17/23	12:34		1											X		N	001
2	23A9317 - H11	WW				10/17/23	13:49		1											X		N	002
3	23A9318 - H12	WW				10/17/23	13:19		1											X		N	003
4																							
5																							
6																							
7																							
8	EQuIS LabMN EDD is needed																						
9																							
10																							
11																							
12																							

WO#: 10673317

10673317

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)
					10-20-23	0946	2.5	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

*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.

DC#_Title: ENV-FRM-MIN4-0150 v13_Sample Condition Upon Receipt (SCUR)
Effective Date: 4/14/2023

Sample Condition Upon Receipt

Client Name: Minnesota Valley Testing

Project #:

WO#: 10673317

PM: PG Due Date: 11/20/23
CLIENT: MVTL

Courier: ☐ FedEx ☐ UPS ☐ USPS ☑ Client ☐ Pace ☐ SpeeDee ☐ Commercial

☐ See Exceptions ENV-FRM-MIN4-0142

Tracking Number: _____

Custody Seal on Cooler/Box Present? ☐ Yes ☑ No Seals Intact? ☐ Yes ☑ No

Biological Tissue Frozen? ☐ Yes ☐ No ☑ N/A

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other

Temp Blank? ☑ Yes ☐ No

Thermometer: ☐ T1 (0461) ☐ T2 (0436) ☐ T3 (0459) ☑ T4 (0402) ☐ T5 (0178) ☐ T6 (0235) ☐ T7 (0042) ☐ T8 (0775) ☐ T9(0727) ☐ 01339252/1710

Type of Ice: ☑ Wet ☐ Blue ☐ Dry ☐ None ☑ Melted

Did Samples Originate in West Virginia? ☐ Yes ☑ No

Were All Container Temps Taken? ☐ Yes ☑ No ☐ N/A

Temp should be above freezing to 6 °C

Cooler temp Read w/Temp Blank: 4.5 °C

Average Corrected Temp (no temp blank only): _____ °C

Correction Factor: +0.1

Cooler Temp Corrected w/temp blank: 4.4 °C

☐ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

USDA Regulated Soil: (☐ N/A, water sample/other: _____)

Date/Initials of Person Examining Contents: 1032 10/23/23

Did samples originate in a quarantine zone within the United States: AL, AR, AZ CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX, or VA (check maps)? ☐ Yes ☑ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☑ No

If Yes to either question, fill out a Regulated Soil Checklist (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.

Location (Check one): ☐ Duluth ☑ Minneapolis ☐ Virginia

			COMMENTS
Chain of Custody Present and Filled Out?	☑ Yes	☐ No	1.
Chain of Custody Relinquished?	☑ Yes	☐ No	2.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No ☐ N/A	3.
Samples Arrived within Hold Time?	☑ Yes	☐ No	4. If fecal: ☐ <8 hrs ☐ >8 hr, <24 ☐ No
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No	5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E.coli ☐ BOD/cBOD ☐ Hex Chrom ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other _____
Rush Turn Around Time Requested?	☐ Yes	☑ No	6.
Sufficient Sample Volume?	☑ Yes	☐ No	7.
Correct Containers Used?	☑ Yes	☐ No ☐ N/A	8.
-Pace Containers Used?	☑ Yes	☐ No	
Containers Intact?	☑ Yes	☐ No	9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No ☑ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC?	☑ Yes	☐ No	11. If no, write ID/Date/Time of container below: ☐ See Exceptions ENV-FRM-MIN4-0142
Matrix: ☑ Water ☐ Soil ☐ Oil ☐ Other			
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No ☐ N/A	12. Sample # H10-H12
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO3, H2SO4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☑ Yes	☐ No ☐ N/A	☐ NaOH ☑ HNO3 ☐ H2SO4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxins/PFAS (*If adding preservative to a container, it must be added to associated field and equipment blanks--verify with PM first.)	☐ Yes	☐ No ☑ N/A	Positive for Residual Chlorine? ☐ Yes ☐ No ☐ See Exceptions ENV-FRM-MIN4-0142
			pH Paper Lot #
			Residual Chlorine: 0-6 Roll 760422; 0-6 Strip: ; 0-14 Strip:
Headspace in Methyl Mercury Container?	☐ Yes	☐ No ☑ N/A	13.
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☐ No ☑ N/A	14. ☐ See Exceptions ENV-FRM-MIN4-0142
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No ☑ N/A	
3 Trip Blanks Present?	☐ Yes	☐ No ☑ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☐ No ☑ N/A	Pace Trip Blank Lot # (if purchased): _____

Field Data Required? ☐ Yes ☐ No

CLIENT NOTIFICATION/RESOLUTION

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: Paige J. Gibbs Date: 10/23/23

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).

Labeled By: NF Line: 3

Qualtrax ID: 52742

Internal Transfer Chain of Custody

C150 Pace

Workorder: 10673317 Workorder Name: 31-0271 Ottertail Power

☐ Rush Multiplier_____X
☐ Samples Pre-Logged into eCOC

State Of Origin: MN
Cert. Needed: ☑ Yes ☐ No
Owner Received Date: 10/20/2023 Results Requested By: 11/28/2023

Report To

Piper Gibbs
Pace Analytical Minnesota
1700 Elm Street
Minneapolis, MN 55414
Phone (612)607-1700

Subcontract To

Pace National
12065 Lebanon Rd
Mt. Juliet, TN 37122
Phone (615) 758-5858

L1669578

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: HNO3	Requested Analysis: Radium 226/228	LAB USE ONLY
1	23A9316 - H10	PS	10/17/2023 12:34	10673317001	Water	2	X	-01
2	23A9317 - H11	PS	10/17/2023 13:49	10673317002	Water	2	X	-02
3	23A9318 - H12	PS	10/17/2023 13:19	10673317003	Water	2	X	-03
4								
5								

Transfers	Released By	Date/Time	Received By	Date/Time
1	Bri Ceeh/PACE	10/23/23 1630	[signature]	10-24-23 0900
2				
3				

Comments:

Cooler Temperature on Receipt 4.9 °C Custody Seal Y or N Received on Ice Y or N Samples Intact Y or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.

PH-10BDH4321 TRC-2352362
CR6-20221V
PH-10BDH4321 TRC-2352362
CR6-20221V

Sample Receipt Checklist
COC Seal Present/Intact: Y
COC Signed/Accurate: Y
Bottles arrive intact: Y
Correct bottles used: Y
Sufficient volume sent: Y
RA Screen <0.5 mR/hr: Y
If Applicable
VOA Zero Headspace: _Y_N
Pres. Correct/Check: _Y_N

6476 5640 1160

INTER_LABORATORY WORK ORDER # 10673317
(To be completed by sending lab)

Ship To:
Pace National
12065 Lebanon Rd
Mt. Juliet, TN 37122
Phone (615) 758-5858

Sending Project No:	10673317
Receiving Project No:	
Check Box for Consolidated Invoice:	☐
Date Prepared:	10/23/23
REQUESTED COMPLETION DATE:	11/28/2023

Sending Region	IR10-Minnesota	Sending Project Mgr.	Piper Gibbs
Receiving Region	IR850-Pace National	External Client	MVTL Laboratories
State of Sample Origin	MN	QC Deliverable	STD REPORT

All questions should be addressed to sending project manager.

Requested Reportable Units _____ Report Wet or Dry Weight? Dry Weight ☐ IRWO Lab Need to run? Cert. Needed _____

WORK REQUESTED

Method Description	Container Type	Quantity of containers	Preservative	Quantity of Samples	Acode	Acode Desc
raldum 226/228	BP1N	6	HNO3	3	SI-38RAD	SUB PASI RAD

Special Requirements: Report C, QC Limits (C),FR Only no EDD (0)

FOR ANALYTICAL WORK COMPLETED THIS SECTION ALSO

Return Samples to Sending Region: ☐ Yes ☑ No

DISPOSITION of FORM

Original sent to the receiving lab - Copy kept at the sending lab.
When work completed: Original sent to the ABM at the receiving laboratory. Copies are made to corporate as needed.

ANALYTICAL REPORT

November 07, 2023

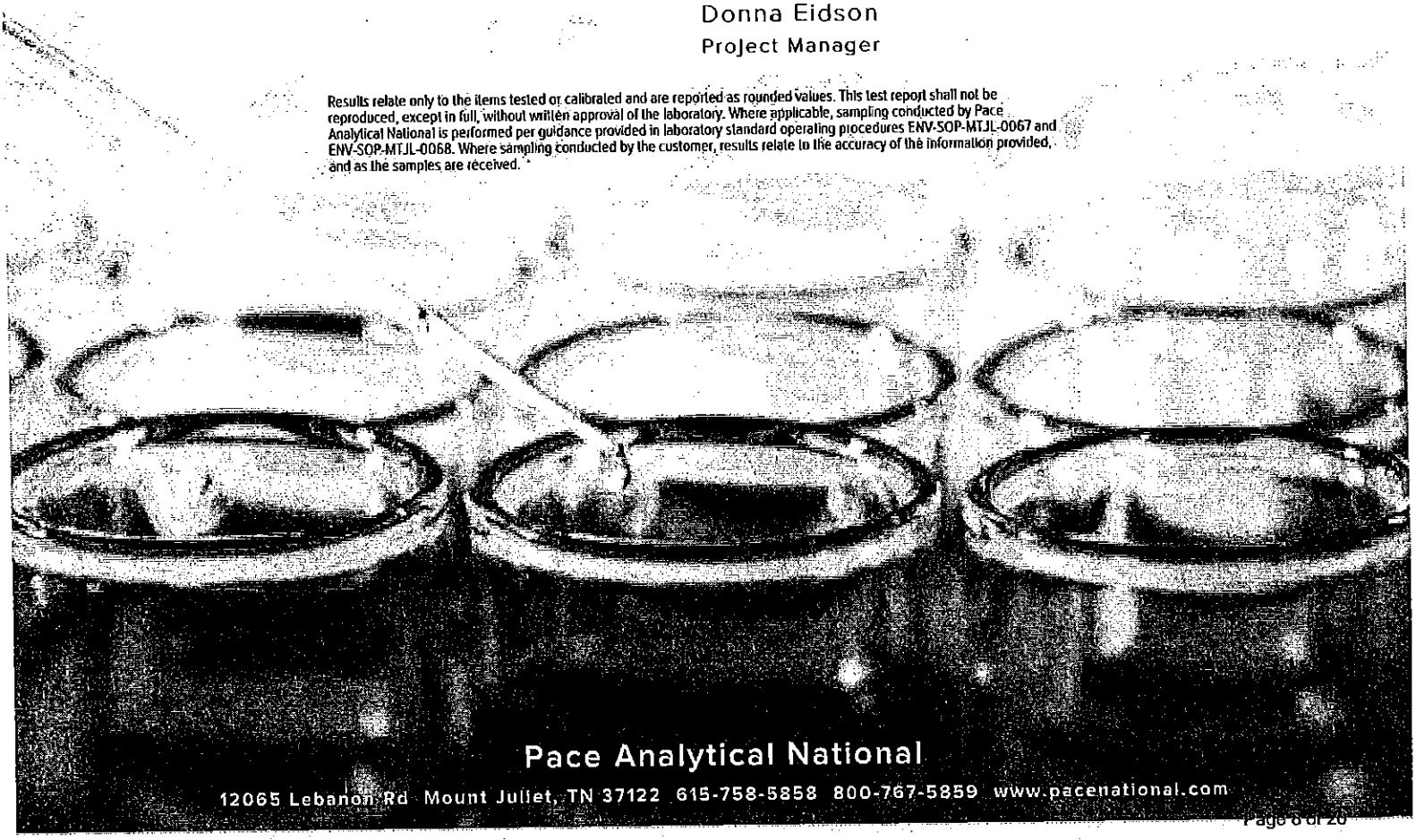
Pace Analytical - Minnesota

Sample Delivery Group:	L1669578
Samples Received:	10/24/2023
Project Number:	10673317
Description:	31-0271 Ottertail Power
Report To:	Piper Gibbs

Entire Report Reviewed By:

Donna Eidson
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.



Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

ACCOUNT:	PROJECT:	SDG:	DATE/TIME:	PAGE:
		L1669578	11/07/23 08:45	1 of 13

TABLE OF CONTENTS

SAMPLE SUMMARY

23A9316 - H10 L1669578-01 Non-Potable Water

			Collected by	Collected date/time	Received date/time
				10/17/23 12:34	10/24/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2157309	1	10/24/23 21:37	10/27/23 15:46	DDD	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2158333	1	10/26/23 11:44	10/27/23 18:42	RGT	Mt. Juliet, TN

23A9317 - H11 L1669578-02 Non-Potable Water

			Collected by	Collected date/time	Received date/time
				10/17/23 13:49	10/24/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2157309	1	10/24/23 21:37	10/27/23 15:46	DDD	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2158333	1	10/26/23 11:44	10/27/23 18:42	RGT	Mt. Juliet, TN

23A9318 - H12 L1669578-03 Non-Potable Water

			Collected by	Collected date/time	Received date/time
				10/17/23 13:19	10/24/23 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Radiochemistry by Method 904/9320	WG2157309	1	10/24/23 21:37	10/27/23 15:46	DDD	Mt. Juliet, TN
Radiochemistry by Method SM7500Ra B M	WG2158333	1	10/26/23 11:44	10/27/23 18:42	RGT	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All radiochemical sample results for solids are reported on a dry weight basis with the exception of tritium, carbon-14 and radon, unless wet weight was requested by the client. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Donna Eidson
Project Manager

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	2 sigma CE +/-	TPU +/-	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.238	J	0.287		0.506		10/27/2023 15:46	WG2157309
(T) Barium	*94.4*					*30.0-143*	*10/27/2023 15:46*	WG2157309
(T) Yttrium	*111*					*30.0-136*	*10/27/2023 15:46*	WG2157309

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	2 sigma CE +/-	TPU +/-	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.0723	U	0.186		0.328		10/27/2023 18:42	WG2158333
(T) Barium-133	*72.0*					*30.0-143*	*10/27/2023 18:42*	WG2158333

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	2 sigma CE +/-	TPU +/-	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.538		0.242		0.418		10/27/2023 15:46	WG2157309
(I) Barium	*116*					*30.0-143*	*10/27/2023 15:46*	WG2157309
(I) Yttrium	*103*					*30.0-136*	*10/27/2023 15:46*	WG2157309

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	2 sigma CE +/-	TPU +/-	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.0392	U	0.107		0.203		10/27/2023 18:42	WG2158333
(I) Barium-133	*88.5*					*30.0-143*	*10/27/2023 18:42*	WG2158333

Radiochemistry by Method 904/9320

Analyte	Result pCi/l	Qualifier	2 sigma CE +/-	TPU +/-	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-228	0.465		0.228		0.395		10/27/2023 15:46	WG2157309
(T) Barium	*120*					*30.0-143*	*10/27/2023 15:46*	WG2157309
(T) Yttrium	*84.7*					*30.0-136*	*10/27/2023 15:46*	WG2157309

Radiochemistry by Method SM7500Ra B M

Analyte	Result pCi/l	Qualifier	2 sigma CE +/-	TPU +/-	MDA pCi/l	Lc pCi/l	Analysis Date date / time	Batch
RADIUM-226	0.182	J	0.170		0.196		10/27/2023 18:42	WG2158333
(T) Barium-133	*95.3*					*30.0-143*	*10/27/2023 18:42*	WG2158333

1 Cp
2 Tc
3 Ss
4 Cn
5 Sr
6 Qc
7 Gl
8 Al
9 Sc

WG2157309

Radiochemistry by Method 904/9320

QUALITY CONTROL SUMMARY

L1669578-01,02,03

Method Blank (MB)

(MB) R3993619-1 10/27/23 15:46

Analyte	MB Result pCi/l	MB Qualifier	MB 2 sigma CE +/-	MB MDA pCi/l	MB Lc pCi/l
Radium-228	-0.113	U	0.152	0.278	
(T) Barium	*112*		*112*		
(T) Yttrium	*130*		*130*		

L1662857-12 Original Sample (OS) • Duplicate (DUP)

(OS) L1662857-12 10/27/23 15:46 • (DUP) R3993619-5 10/27/23 15:46

Analyte	Original Result pCi/l	Original 2 sigma CE +/-	Original MDA pCi/l	Original Lc pCi/l	DUP Result pCi/l	DUP 2 sigma CE +/-	DUP MDA pCi/l	DUP Lc pCi/l	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-228	0.565	0.302	0.525		0.195	0.303	0.541		97.4	0.864	U	20	3
(T) Barium	*115*				*132*	*132*							
(T) Yttrium	*119*				*130*	*130*							

Laboratory Control Sample (LCS)

(LCS) R3993619-2 10/27/23 15:46

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-228	5.00	5.13	103	80.0-120	
(T) Barium			*140*		
(T) Yttrium			*135*		

L1663046-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1663046-03 10/27/23 15:46 • (MS) R3993619-3 10/27/23 15:46 • (MSD) R3993619-4 10/27/23 15:46

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-228	16.7	0.215	18.9	18.0	112	106	1	70.0-130			5.14		20
(T) Barium		*130*			*140*	*137*							
(T) Yttrium		*62.1*			*94.0*	*99.9*							

WG2158333

Radiochemistry by Method SM7500Ra B M

QUALITY CONTROL SUMMARY

L1669578-01,02,03

Method Blank (MB)

(MB) R3996031-1 10/27/23 17:17

Analyte	MB Result pCi/l	MB Qualifier	MB 2 sigma CE +/-	MB MDA pCi/l	MB Lc pCi/l
Radium-226	-0.00314	U	0.00869	0.0367	
(T) Barium-133	*58.0*		*58.0*		

L1662857-11 Original Sample (OS) • Duplicate (DUP)

(OS) L1662857-11 10/27/23 18:42 • (DUP) R3996031-5 10/27/23 18:42

Analyte	Original Result pCi/l	Original 2 sigma CE +/-	Original MDA pCi/l	Original Lc pCi/l	DUP Result pCi/l	DUP 2 sigma CE +/-	DUP MDA pCi/l	DUP Lc pCi/l	DUP RPD %	DUP RER	DUP Qualifier	DUP RPD Limits %	DUP RER Limit
Radium-226	0.260	0.220	0.235		0.0920	0.255	0.425		95.5	0.499	U	20	3
(T) Barium-133	*91.5*				*73.3*	*73.3*							

Laboratory Control Sample (LCS)

(LCS) R3996031-2 10/27/23 18:42

Analyte	Spike Amount pCi/l	LCS Result pCi/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Radium-226	5.00	5.68	114	80.0-120	
(T) Barium-133			*64.9*		

L1662857-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1662857-01 10/27/23 18:42 • (MS) R3996031-3 10/27/23 18:42 • (MSD) R3996031-4 10/27/23 18:42

Analyte	Spike Amount pCi/l	Original Result pCi/l	MS Result pCi/l	MSD Result pCi/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	MS RER	RPD Limits %
Radium-226	20.0	0.249	21.4	21.8	106	108	1	75.0-125			1.99		20
(T) Barium-133		*76.2*			*83.3*	*83.2*							

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDA	Minimum Detectable Activity.
Rec.	Recovery.
RER	Replicate Error Ratio.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(T)	Tracer - A radioisotope of known concentration added to a solution of chemically equivalent radioisotopes at a known concentration to assist in monitoring the yield of the chemical separation.
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
U	Below Detectable Limits: Indicates that the analyte was not detected.

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660
Alaska	17-026
Arizona	AZ0612
Arkansas	88-0469
California	2932
Colorado	TN00003
Connecticut	PH-0197
Florida	E87487
Georgia	NELAP
Georgia [1]	923
Idaho	TN00003
Illinois	200008
Indiana	C-TN-01
Iowa	364
Kansas	E-10277
Kentucky [1 6]	KY90010
Kentucky [2]	16
Louisiana	AI30792
Louisiana	LA018
Maine	TN00003
Maryland	324
Massachusetts	M-TN003
Michigan	9958
Minnesota	047-999-395
Mississippi	TN00003
Missouri	340
Montana	CERT0086
A2LA – ISO 17025	1461.01
A2LA – ISO 17025 [5]	1461.02
Canada	1461.01
EPA–Crypto	TN00003

Nebraska	NE-OS-15-05
Nevada	TN000032021-1
New Hampshire	2975
New Jersey–NELAP	TN002
New Mexico [1]	TN00003
New York	11742
North Carolina	Env375
North Carolina [1]	DW21704
North Carolina [3]	41
North Dakota	R-140
Ohio–VAP	CL0069
Oklahoma	9915
Oregon	TN200002
Pennsylvania	68-02979
Rhode Island	LA000356
South Carolina	84004002
South Dakota	n/a
Tennessee [1 4]	2006
Texas	T104704245-20-18
Texas [5]	LAB0152
Utah	TN000032021-11
Vermont	VT2006
Virginia	110033
Washington	C847
West Virginia	233
Wisconsin	998093910
Wyoming	A2LA
AIHA-LAP,LLC EMLAP	100789
DOD	1461.01
USDA	P330-15-00234

[1] Drinking Water [2] Underground Storage Tanks [3] Aquatic Toxicity [4] Chemical/Microbiological [5] Mold [6] Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

[1] Cp
[2] Tc
[3] Ss
[4] Cn
[5] Sr
[6] Qc
[7] Gl
[8] Al
[9] Sc

Internal Transfer Chain of Custody

C150 Pace

☐ Rush Multiplier_____X
☐ Samples Pre-Logged into eCOC

State Of Origin: MN
Cert. Needed: ☑ Yes ☐ No
Owner Received Date: 10/20/2023 Results Requested By: 11/28/2023

Workorder: 10673317 Workorder Name: 31-0271 Ottertail Power

Report To

Piper Gibbs
Pace Analytical Minnesota
1700 Elm Street
Minneapolis, MN 55414
Phone (612)607-1700

Subcontract To

Pace National
12065 Lebanon Rd
Mt. Juliet, TN 37122
Phone (615) 758-5858

Requested Analysis: raidum 226/228

L1669578

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: HNO3	raidum 226/228	LAB USE ONLY
1	23A9316 - H10	PS	10/17/2023 12:34	10673317001	Water	2	X	-01
2	23A9317 - H11	PS	10/17/2023 13:49	10673317002	Water	2	X	-02
3	23A9318 - H12	PS	10/17/2023 13:19	10673317003	Water	2	X	-03
4								
5								

Transfers	Released By	Date/Time	Received By	Date/Time
1	Bri Cole/PACE	10/23/23 1630	[signature]	10-24-23 0900
2				
3				

Comments

Cooler Temperature on Receipt 4.9 °C | Custody Seal Y or N | Received on Ice Y or N | Samples Intact Y or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.
This chain of custody is considered complete as is since this information is available in the owner laboratory.

PH-10BDH4321 TRC-2352387
CR6-20221V
PH-10BDH4321 TRC-2352387
CR6-20221V

Sample Receipt Checklist

COC Seal Present/Intact: Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
RA Screen <0.5 mR/hr: Y N

If Applicable
VOA Zero Headspace: Y N
Pres. Correct/Check: Y N

6476 5640 1160

Pace

Ship To:
Pace National
12065 Lebanon Rd
Mt. Juliet, TN 37122
Phone (615) 758-5858

INTER_LABORATORY WORK ORDER # 10673317
(To be completed by sending lab)

Sending Project No:	10673317
Receiving Project No:	
Check Box for Consolidated Invoice:	☐
Date Prepared:	10/23/23
REQUESTED COMPLETION DATE:	11/28/2023

Sending Region	IR10-Minnesota	Sending Project Mgr.	Piper Gibbs
Receiving Region	IR850-Pace National	External Client	MVTL Laboratories
State of Sample Origin	MN	QC Deliverable	STD REPORT

All questions should be addressed to sending project manager.

Requested Reportable Units _____ Report Wet or Dry Weight? Dry Weight ☐ IRWO Lab Need to run? Cert. Needed _____

WORK REQUESTED

Method Description	Container Type	Quantity of containers	Preservative	Quantity of Samples	Acode	Acode Desc
raidum 226/228	BP1N	6	HNO3	3	SI-38RAD	SUB PASI RAD

Special Requirements: Report C, QC Limits (C),FR Only no EDD (0)

FOR ANALYTICAL WORK COMPLETED THIS SECTION ALSO

Return Samples to Sending Region: ☐ Yes ☑ No

DISPOSITION of FORM

Original sent to the receiving lab - Copy kept at the sending lab.
When work completed: Original sent to the ABM at the receiving laboratory. Copies are made to corporate as needed.

This is an exact copy of
the original document
By AB Date 17 Oct 23
Pages 1-13

Minnesota Valley Testing Laboratories

1126 North Front Street New Ulm, MN 56003
Phone: 800 782 3557 Fax: 507 359 2890

Field Service Chain of Custody Record

Project	Otter Tail Power Company	**Project Type:**	Big Stone Plant CCR	**Name of Samplers:**	JH, DF, BW, DS
Report	Otter Tail Power Company	**Carbon Copy:**	Barr Engineering	Quote Number:	
Attn:	Paul Vukonich	Attn:		Work Order Number:	31-271
Address	P.O. Box 496	Address:		Lab Numbers:	
	Fergus Falls, MN 56538-0496				
Phone:	218-739-8349				

Sample Information | **Bottle Type** | **Analysis**

Lab Number	Sample ID	Unique Station ID	Date	Time	Sample Type	Sample Location	1000 HNO3 Inner Mountain	500 None	1000 none	500 HNO3	Filter? Y or N	500 H2SO4	Filter? Y or N	1000 HNO3 Pace	1000 Amber H2SO4	500 NaOH	Other: 150 H2SO4	Other 150 None	Analysis Required
A9310	H2OX		17Oct23	1240	GW				1	1	N								CCR 3
11	H3OX			1022	GW				1	1	N								CCR 3
12	H4OX			1104	GW				1	1	N								CCR 3
13	H6			1157	GW				1	1	N								CCR 3
14	H8			1235	GW				1	1	N								CCR 3
15	H9			1319	GW				1	1	N								CCR 3
16	H10			1234	GW				1	1	N			2					CCR 3&4
17	H11			1349	GW				1	1	N			2					CCR 3&4
18	H12		"	1319	GW				1	1	N			2					CCR 3&4

Comments:

Samples Relinquished By:	DF			Samples Received By:	A. Reuden
Date:	17Oct23	Time: 1630	Temp: 05TMA	Date: 17 Oct 23	Time: 1630	Temp: 0.5C
Samples Relinquished into:	Fridge	Log in Cart	Other:			
Samples Relinquished By:				Samples Received By:		
Date:		Time:	Temp:	Date:	Time:	Temp:
Delivery:	Samplers	Other:		Seal Number(s) - If Used		
Transport:	Ambient	Ice	Other:	Seals Intact?	Yes	No

October 2023

2023 Big Stone Sampling - CCR

Landfill or ADA wells

Site	Parameter List	Well Depth (constructed)	Diameter (Inches)	Well Elevation (TOC)	Sample Equipment	Dedicated?	Pump Rate (ml/minute)	Goes Dry?	Sampling Seasons**
H2OX	CCR 3	32.20	2	1103.86	Bladder	Yes	100	Yes	April & Oct
H3OX	CCR 3	22.55	2	1095.26	Bladder	Yes	100	Yes	April & Oct
H4OX	CCR 3	27.20	2	1108.25	Bladder	Yes	100	No	April & Oct
H6	CCR 3	15.00	2	1097.76	Bladder	Yes	100	Yes	April & Oct
H8	CCR 3	22.05	2	1081.23	Bladder	Yes	100	No	April & Oct
H9	CCR 3	30.20	2	1086.21	Bladder	Yes	100	No	April & Oct
H10	CCR 3 and 4	35.49	2	1090.83	Bladder	Yes	100		See highlighted note below
H11	CCR 3 and 4	42.15	2	1093.24	Bladder	Yes	100		See highlighted note below

Note: Wells H10 and H11 need to be sampled 8 times for CCR this year. Background sampling like 5 years ago. We want to sample in April - November. Each event has to be about 30 days apart. Also, durning every sampling event for the CCR, we will need water levels on the CCR wells not sampled.

Note: CCR sampling is for total recoverable metals. They are not filtered in the field.

CCR 3 & 4 parameters see the first two tabs labeled CCR 3 and CCR 4

CCR - Appendix III Detection Monitoring

Field Parameters

pH*

* Field and Laboratory Measurements

Total Concentration Parameters	**Method**
Boron	6010
Calcium	6010
Chloride	SM4500 CL E
Fluoride	EPA 300
pH	SM 4500 H+B-96
Sulfate	ASTM D516
Dissolved Solids, Total	SM 2540 C-97

Note: These are non-filtered samples.

CCR - Appendix IV - Assessment Monitoring

Total Concentration Parameters	**Method**
Antimony	SW6020A
Arsenic	SW602A
Barium	SW6010C
Beryllium	SW6020A
Cadmium	SW6020A
Chromium, Total	SW6020A
Cobalt	SW6010C
Fluoride	EPA 300
Lead	SW6020A
Lithium	SW6010C
Mercury	EPA 245.7
Molybdenum	SW6020A
Selenium	SW6020A
Thallium	SW6020A
Radium 226 + 228	

Note: These are non-filtered samples.

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Site: Otter Tail Power Co./ Big Stone

Sampling Personnel: BW

Facility ID:

Date: 17 Oct 23

Unique Station ID:

Sample ID: Well H2OX

Well Condition

Well Locked?	(Yes)	No	Protective Posts?	Yes	(No)
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	(Yes)	No

Repairs Necessary:

Well Information

Well Depth:	32.83	Well Casing Elevation:	1103.91
Constructed Depth:	32.20	Static Water Elevation:	1096.69
Casing Diameter:	2"	Previous Static:	1096.58
Water Level Before Purge:	7.22	Water Level After Sample:	Below Pump
Well Volume:	4.17 Gallons	Measurement Method:	(Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 51 Wind: LVV Sky: Fair

Sampling Method: Grundfos (Bladder SS/T) Disp. Bailer Whale Grab Other:

Dedicated Equipment:	(Yes) No	Pumping Rate:	.25 gpm
Well Purged Dry?	(Yes) No	Time Pump Began:	1148 (am) / pm
Time Purged Dry?	1205	Time of Sampling:	1210 (am) / (pm)
Duplicate Sample?	Yes (No) ID: —	Sample EH:	152.2

Sample Appearance: General: Clear Color: None Phase: None Odor: None

Time 17	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1205	6.52	3850	9.57	NA	NA	4.25	1	
							2	
1210	6.52	3849	9.59	"	"	—	3	Recharge
							4	
							5	

Stabilized? Yes (No) Amount Water Removed: 4.25 Gallons

Comments:

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Site: Otter Tail Power Co./ Big Stone

Sampling Personnel: BW

Facility ID:

Date: 17 Oct 23

Unique Station ID:

Sample ID: Well H3OX

Well Condition

Well Locked?	(Yes)	No	Protective Posts?	Yes	(No)
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	Yes	(No)

Repairs Necessary:

Well Information

Well Depth:	22.68	Well Casing Elevation:	1095.19
Constructed Depth:	22.55	Static Water Elevation:	1087.14
Casing Diameter:	2"	Previous Static:	1087.28
Water Level Before Purge:	8.00	Water Level After Sample:	Below pump
Well Volume:	2.39 Gallons	Measurement Method:	(Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 47 Wind: Lvr Sky: Fair

Sampling Method: Grundfos (Bladder SSP) Disp. Bailer Whale Grab Other:

Dedicated Equipment:	(Yes) No	Pumping Rate:	2.5 gpm
Well Purged Dry?	(Yes) ~~No~~ BW 17oct23	Time Pump Began:	1007 (am) / pm
Time Purged Dry?	1017	Time of Sampling:	1022 (am) / pm
Duplicate Sample?	Yes (No) ID: —	Sample EH:	328.2

Sample Appearance: General: Clear Color: None Phase: None Odor: None

Time (10)	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1017	6.40	3465	12.97	NA	NA	2.5	1	
				↓	↓		2	
1022	6.43	3479	13.36	↓	↓	—	3	Recharge
							4	
							5	

Stabilized? (Yes) No Amount Water Removed: 2.5 Gallons

Comments:

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Site: Otter Tail Power Co./ Big Stone

Sampling Personnel: BW

Facility ID:

Date: 17 Oct 23

Unique Station ID:

Sample ID: Well H4OX

Well Condition

Well Locked?	(Yes)	No	Protective Posts?	Yes	(No)
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	(Yes)	No

Repairs Necessary:

Well Information

Well Depth:	27.48	Well Casing Elevation:	1108.22
Constructed Depth:	27.20	Static Water Elevation:	1091.14
Casing Diameter:	2"	Previous Static:	1091.11
Water Level Before Purge:	17.08	Water Level After Sample:	Below pump
Well Volume:	1.70 Gallons	Measurement Method:	(Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 50 Wind: LGV Sky: Fair

Sampling Method: Grundfos (Bladder SS/T) Disp. Baller Whale Grab Other:

Dedicated Equipment:	(Yes) No	Pumping Rate:	.25 gpm
Well Purged Dry?	(Yes) No	Time Pump Began:	1052 (am) / pm
Time Purged Dry?	1059	Time of Sampling:	1104 (am) / pm
Duplicate Sample?	Yes (No) ID: —	Sample EH:	261.7

Sample Appearance: General: Clear Color: None Phase: None Odor: None

Time ?	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1059	6.51	2580	9.14	NM	NM	1.75	1	
							2	
1104	6.52	2571	9.10	"	"	—	3	Recharge
							4	
							5	

Stabilized? Yes (No) Amount Water Removed: 1.75 Gallons

Comments:

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Sampling Personnel: DF

Site: Otter Tail Power Co./ Big Stone

Facility ID: —

Date: 17Oct23

Unique Station ID: —

Sample ID: Well H6

Well Condition

Well Locked?	(Yes)	No	Protective Posts?	(Yes)	No
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	Yes	(No)

Repairs Necessary:

Well Information

Well Depth: 17.92

Well Casing Elevation: NA

Constructed Depth: 17.70

Static Water Elevation:

Casing Diameter: 2"

Previous Static:

Water Level Before Purge: 15.76

Water Level After Sample: below Pump

Well Volume: 0.35 Gallons

Measurement Method: (Elec. Wtl) Steel Tape

Sampling Information

Weather Conditions: Temp: 55 Wind: SE 7 Sky: Sunny

Sampling Method: Grundfos (Bladder SS) Disp. Baller Whale Grab Other:

Dedicated Equipment: (Yes) No

Pumping Rate: 0.25 gpm

Well Purged Dry? (Yes) No

Time Pump Began: 1150 (am) / pm

Time Purged Dry? 1152

Time of Sampling: 1157 am / (pm)

Duplicate Sample? Yes (No) ID: —

Sample EH: 101.3

Sample Appearance: General: Sl. Cloudy Color: Tan Phase: None Odor: None

Time (2)	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1152	7.56	977	13.26	NA	NA	0.35	1	
							2	
							3	
							4	
17Oct23 DF 1157						—	5	Recharge

Stabilized? Yes (No) Amount Water Removed: 0.35 Gallons

Comments:

— Insufficient volume for recharge reading

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Site: Otter Tail Power Co./ Big Stone

Sampling Personnel: DF

Facility ID: —

Date: 17Oct23

Unique Station ID: —

Sample ID: Well H8

Well Condition

Well Locked?	(Yes)	No	Protective Posts?	(Yes)	No
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	Yes	(No)

Repairs Necessary:

Well Information

Well Depth:	22.33	Well Casing Elevation:	1081.23
Constructed Depth:	22.05	Static Water Elevation:	1074.63
Casing Diameter:	2"	Previous Static:	—
Water Level Before Purge:	6.60	Water Level After Sample:	9.25
Well Volume:	2.57 Gallons	Measurement Method:	(Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 55 Wind: SE 7 Sky: Sunny

Sampling Method: Grundfos (Bladder Sub) Disp. Baller Whale Grab Other:

Dedicated Equipment:	(Yes) No	Pumping Rate:	0.25 gpm
Well Purged Dry?	Yes (No)	Time Pump Began:	1202 am / (pm)
Time Purged Dry?	—	Time of Sampling:	1235 am / (pm)
Duplicate Sample?	Yes (No) ID: —	Sample EH:	106.2

Sample Appearance: General: Clear Color: None Phase: None Odor: None

Time 11	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1213	7.24	1474	11.01	NA	NA	2.75	1	
1224	7.23	1475	11.02	"	"	5.5	2	
1235	7.22	1475	11.02	"	"	8.25	3	
				"	"		4	
				"	"		5	

Stabilized? (Yes) No Amount Water Removed: 8.25 Gallons

Comments:

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Sampling Personnel: DF

Site: Otter Tail Power Co./ Big Stone

Facility ID: —

Date: 1/30+23

Unique Station ID: —

Sample ID: Well H9

Well Condition

Well Locked?	(Yes)	No	Protective Posts?	(Yes)	No
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	Yes	(No)

Repairs Necessary:

Well Information

Well Depth: 30.71

Constructed Depth: 30.20

Casing Diameter: 2"

Water Level Before Purge: 11.57

Well Volume: 3.12 Gallons

Well Casing Elevation: 1086.21

Static Water Elevation: 1074.64

Previous Static: —

Water Level After Sample: 15.60

Measurement Method: (Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 55 Wind: SE 7 Sky: Sunny

Sampling Method: Grundfos (Bladder Pump) Disp. Baller Whale Grab Other:

Dedicated Equipment: (Yes) No

Well Purged Dry? Yes (No)

Time Purged Dry? —

Duplicate Sample? Yes (No) ID: —

Pumping Rate: 0.25 gpm

Time Pump Began: 1240 am / (pm)

Time of Sampling: 1319 am / (pm)

Sample EH: 121.7

Sample Appearance: General: Clear Color: None Phase: None Odor: None

Time 13	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1253	6.62	3340	9.97	NA	NA	3.25	1	
1306	6.62	3340	9.97			6.50	2	
1319	6.62	3343	9.96			9.75	3	
							4	
							5	

Stabilized? (Yes) No

Amount Water Removed: 9.75 Gallons

Comments:

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Site: Otter Tail Power Co./ Big Stone

Sampling Personnel: BW

Facility ID:

Date: 17 oct 23

Unique Station ID:

Sample ID: H10

Well Condition

Well Locked?	(Yes)	No	Protective Posts?	Yes	(No)
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	(Yes)	No

Repairs Necessary:

Well Information

Well Depth: 38-53

Well Casing Elevation: 1090.83

Constructed Depth: 35.49

Static Water Elevation: 1073.73

Casing Diameter: 2"

Previous Static: —

Water Level Before Purge: 17.10

Water Level After Sample: Below pump

Well Volume: 3-50 Gallons

Measurement Method: (Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 52 Wind: LGV Sky: Fair

Sampling Method: Grundfos (Bladder SS/T) Disp. Bailer Whale Grab Other:

Dedicated Equipment: (Yes) No

Pumping Rate: .25 gpm

Well Purged Dry? (Yes) No

Time Pump Began: 1215 am / (pm)

Time Purged Dry? 1229

Time of Sampling: 1234 am / (pm)

Duplicate Sample? Yes (No) ID: —

Sample EH: 217-9

Sample Appearance: General: Clear Color: NOR Phase: NOR Odor: None

Time 14	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1229	6.47	4989	9.37	NA	NA	3-5	1	
							2	
1234	6-51	4986	9.38	↓	↓	—	3	Recharge
							4	
							5	

Stabilized? Yes (No)

Amount Water Removed: 3-5 Gallons

Comments:

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Site: Otter Tail Power Co./ Big Stone

Sampling Personnel: DS

Facility ID:

Date: 17 Oct 23

Unique Station ID:

Sample ID: H11

Well Condition

Well Locked? (Yes) No

Well Labeled? (Yes) No

Casing Straight? (Yes) No

Protective Posts? Yes (No)

State ID Tag? Yes (No)

Grout Seal Intact? (Yes) No

Repairs Necessary:

Well Information

Well Depth: 44.32

Constructed Depth: 42.15

Casing Diameter: 2"

Water Level Before Purge: 14.81

Well Volume: 4.81 Gallons

Well Casing Elevation: 1093.24

Static Water Elevation: 1078.43

Previous Static: N/A

Water Level After Sample: 38.42

Measurement Method: (Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 57° Wind: SE 7 Sky: Clear

Sampling Method: Grundfos (Bladder SS/T) Disp. Baller Whale Grab Other:

Dedicated Equipment (Yes) No

Well Purged Dry? (Yes) No

Time Purged Dry? 1344

Duplicate Sample? Yes (No) ID:

Pumping Rate: 0.25 gpm

Time Pump Began: 1324 am (pm)

Time of Sampling: 1349 am / (pm)

Sample EH: 95.0

Sample Appearance: General: Clear Color: None Phase: None Odor: None

(20) Time	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1344	6.50	4485	9.12	NA	NA	5	1	
							2	
							3	
							4	
1349	6.59	4477	9.89	NA	NA	–	5	Recharge

Stabilized? Yes (No)

Amount Water Removed: 5 Gallons

Comments:

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Assessment

Site: Otter Tail Power Co./ Big Stone

Sampling Personnel: DS

Facility ID:

Date: 17oct23

Unique Station ID:

Sample ID: H12

Well Condition

Well Locked?	Yes	(No)	Protective Posts?	Yes	(No)
Well Labeled?	(Yes)	No	State ID Tag?	Yes	(No)
Casing Straight?	(Yes)	No	Grout Seal Intact?	Yes	(No)

Repairs Necessary:

Well Information

Well Depth:	22.63	Well Casing Elevation:	NA
Constructed Depth:	24.00	Static Water Elevation:	
Casing Diameter:	2"	Previous Static:	
Water Level Before Purge:	18.14	Water Level After Sample:	18.97
Well Volume:	0.73 Gallons	Measurement Method:	(Elec. WL) Steel Tape

Sampling Information

Weather Conditions: Temp: 57° Wind: SE 7 Sky: Clear

Sampling Method: (Grundfos) Bladder SS/T Disp. Bailer Whale Grab Other:

Dedicated Equipment:	(Yes) No	Pumping Rate:	gpm
Well Purged Dry?	Yes No	Time Pump Began:	1310 am / (pm)
Time Purged Dry?		Time of Sampling:	1319 am / (pm)
Duplicate Sample?	Yes (No) ID: —	Sample EH:	-18.3

Sample Appearance: General: Sl Cloudy Color: Sl Tan Phase: None Odor: None

Time (2)	pH	Specific Cond.	Temp °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1313	8.00	319	11.33	NA	NA	0.75	1	
1316	8.00	315	11.30	"	"	1.5	2	
1319	7.99	312	11.29	"	"	2.25	3	
							4	
							5	

Stabilized? (Yes) No Amount Water Removed: 2.25 Gallons

Comments:

Exceptions to Protocol:

Pace Analytical™
www.pacelabs.com

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:	MVTL
Address:	1126 NORTH FRONT BLDG #2
	NEW ULM, MN 56073
Email To:	alieder@mvtl.com
Phone: 507-233-7134	Fax:
Requested Due Date/TAT:	standard

Section B — Required Project Information:

Report To:	Todd Rieger
Copy To:	trieger@mvtl.com
Purchase Order No.:	CL13299
Project Name:	Ottertail Power
Project Number:	Work order: 31-0271

Section C — Invoice Information:

Attention:	AP
Company Name:	MVTL
Address:	1126 NORTH FRONT BLDG 2
Pace Quote Reference:	
Pace Project Manager:	
Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☑ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MN

Section D — Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
WIPE	WP
AIR	AR
OTHER	OT
TISSUE	TS

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	2,3,7,8 TCDD method161	Radium 226/228	PFAs State Pricing	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	23A9316 - H10	WW				10/17/23	12:34		1											X		N	
2	23A9317 - H11	WW				10/17/23	13:49		1											X		N	
3	23A9318 - H12	WW				10/17/23	13:19		1											X		N	
4																							
5																							
6																							
7																							
8	EQuIS LabMN EDD is needed																						
9																							
10																							
11																							
12																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

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

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Level Measurements

Sampling Personnel: DS, MS

Site: Otter Tail Power - Big Stone Plant

Facility ID:

Date: 12 June 23

Well Number	Well 10	Well 11	Well 12	Well 1	H1OX	H1INT	H2OX
Unique Station ID	NA	NA	NA	NA	NA	NA	NA
Date	12 June 23						
Time	1042	1040	1038	1035	1041	1040	1107
Well Casing Elevation	1098.7	1104	1071.89	1090.71	1115.89	1115.81	1103.86
Depth to Water	17.01	94.55	66.84	65.30	22.96	23.70	7.40
Static Elevation	1061.69	1009.45	1005.05	1025.41	1092.93	1092.11	1096.46
Casing Diameter	4"	4"	4"	4"	2"	2"	2"
Well Depth	47.01	127.22	112.40	78.00	32.33	60.15	32.83
Well Volume	19.60	21.35	29.77	8.30	1.52	5.94	4.14
Well Locked	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Labeled	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Straight	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Protective Posts	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Grout Seal Intact	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Dedicated Equipment	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no

Well Number	H2INT	H30X	H3INT	H4OX	H4INT	H5	H6
Unique Station ID	NA	NA	NA	NA	NA	NA	NA
Date	12 June 23						
Time	1108	1124	1125	1111	1112	1050	1045
Well Casing Elevation	1103.91	1095.26	1095.17	1108.25	1108.61	1122.8	1097.76
Depth to Water	61.50	7.76	27.92	17.13	17.10	11.38	10.69
Static Elevation	1042.41	1087.5	1067.25	1091.12	1091.51	1111.42	1087.07
Casing Diameter	2"	2"	2"	2"	2"	2"	2"
Well Depth	62.45	22.68	54.42	27.48	60.10	44.99	17.92
Well Volume	0.15	~~7.76~~ 2.93	4.32	1.19	7.01	5.48	1.17
Well Locked	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Labeled	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Straight	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Protective Posts	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Grout Seal Intact	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Dedicated Equipment	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Level Measurements

Sampling Personnel: DS, MS

Site: Otter Tail Power – Big Stone Plant

Facility ID:

Date: 12 June 23

Well Number	H7	H8	H9				
Unique Station ID	NA	NA	NA				
Date	12 June 23						
Time	1055	1056	1100				
Well Casing Elevation	1106.06	1081.23	1086.21				
Depth to Water	19.26	8.71	10.29				
Static Elevation	1086.8	1072.52	1075.92				
Casing Diameter	2"	2"	2"				
Well Depth	35.60	22.33	30.71				
Well Volume	2.66	2.22	~~2.22~~ 3.33				
Well Locked	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Labeled	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Straight	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Protective Posts	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Grout Seal Intact	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Dedicated Equipment	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no

Well Number							
Unique Station ID							
Date							
Time							
Well Casing Elevation							
Depth to Water							
Static Elevation							
Casing Diameter							
Well Depth							
Well Volume							
Well Locked	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Labeled	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Straight	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Protective Posts	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Grout Seal Intact	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Dedicated Equipment	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Level Measurements

Sampling Personnel: BW

Site: Otter Tail Power / Big Stone

Facility ID:

Date: 21 July 23

Well Number	Well 10	Well 11	Well 12	Well 1	H1OX	H1INT	H2OX
Unique Station ID	NA	NA	NA	NA	NA	NA	NA
Date	21 July 23						
Time		1030	1017	1054	954	955	1012
Well Casing Elevation	1098.7	1104	1071.89	1090.71	1115.89	1115.81	1103.86
Depth to Water		94.79	66.30	65.38	25.46	26.11	9.62
Static Elevation		1009.21	1005.59	1025.33	1090.43	1089.70	1094.24
Casing Diameter	4"	4"	4"	4"	2"	2"	2"
Well Depth	47.01	127.22	112.40	78.00(est.)	32.33	60.15	32.83
Well Volume		21.20	30.13	8.25	1.12	5.55	3.80
Well Locked	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Labeled	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Straight	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Protective Posts	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Grout Seal Intact	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Dedicated Equipment	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no

* Well 10 is surrounded by a huge wasp nest! No WL!

Well Number	H2INT	H30X	H3INT	H4OX	H4INT	H5	H6
Unique Station ID	NA	NA	NA	NA	NA	NA	NA
Date	21 July 23						
Time	1013	958	959	1004	1005	1041	947
Well Casing Elevation	1103.91	1095.26	1095.17	1108.25	1108.61	1122.8	1097.76
Depth to Water	61.67	8.05	28.12	18.46	18.98	12.31	13.27
Static Elevation	1042.24	1087.21	1067.05	1089.79	1089.63	1110.49	1084.49
Casing Diameter	2"	2"	2"	2"	2"	2"	2"
Well Depth	62.45	22.68	54.42	27.48	60.10	44.99	17.92
Well Volume	.14	2.39	4.29	1.47	6.71	5.33	.76
Well Locked	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Labeled	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Straight	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Protective Posts	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Grout Seal Intact	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Dedicated Equipment	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Level Measurements

Sampling Personnel: BW

Site: OHarta'l Power/Bigstone

Facility ID:

Date: 21 July 23

Well Number	H7	H8	H9				
Unique Station ID	NA	NA	NA				
Date	21 July 23						
Time	1049		943				
Well Casing Elevation	1106.06	1081.23	1086.21				
Depth to Water	21.94		11.97				
Static Elevation	1084.12		1074.24				
Casing Diameter	2"		2"				
Well Depth	35.60	22.33	30.71				
Well Volume	2.23		3.06				
Well Locked	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Labeled	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Straight	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Protective Posts	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Grout Seal Intact	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Dedicated Equipment	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no

M8 is Pumped

Well Number							
Unique Station ID							
Date							
Time							
Well Casing Elevation							
Depth to Water							
Static Elevation							
Casing Diameter							
Well Depth							
Well Volume							
Well Locked	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Labeled	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Straight	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Protective Posts	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Grout Seal Intact	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Dedicated Equipment	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Level Measurements

Sampling Personnel: DS MS

Site: Otter Tail Power Co / Big Stone

Facility ID:

Date: 21Aug23

Well Number	Well 10	Well 11	Well 12	Well 1	H1OX	H1INT	H2OX
Unique Station ID	NA	NA	NA	NA	NA	NA	NA
Date	21Aug23						
Time	1106	1109	1130	1145	1112	1114	10:49
Well Casing Elevation	1098.7	1104	1071.89	1090.71	1115.89	1115.81	1103.86
Depth to Water	18.18	98.17	66.12	66.03	26.37	26.91	10.60
Static Elevation	1080.52	1005.83	1005.77	1024.68	1089.52	1088.90	1093.26
Casing Diameter	4"	4"	4"	4"	2"	2"	2"
Well Depth	47.01	127.22	112.40	78.00	32.33	60.15	32.83
Well Volume	18.84	18.98	30.24	7.82	0.97	5.42	3.62
Well Locked	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Labeled	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Straight	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Protective Posts	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Grout Seal Intact	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Dedicated Equipment	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no

Well Number	H2INT	H30X	H3INT	H4OX	H4INT	H5	H6
Unique Station ID	NA	NA	NA	NA	NA	NA	NA
Date	21Aug23						
Time	1048	1054	1055	1100	1058	1136	1116
Well Casing Elevation	1103.91	1095.26	1095.17	1108.25	1108.61	1122.8	1097.76
Depth to Water	61.56	7.28	28.11	18.57	17.83	12.46	13.67
Static Elevation	1041.46	1087.98	1067.06	1089.68	1090.78	1110.34	1084.09
Casing Diameter	2"	2"	2"	2"	2"	2"	2"
Well Depth	62.45	22.68	54.42	27.48	60.10	44.90	17.92
Well Volume	0.14	2.51	4.29	1.45	6.89	5.29	0.69
Well Locked	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Labeled	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Straight	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Protective Posts	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Grout Seal Intact	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Dedicated Equipment	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073 507 354 8517

Groundwater Level Measurements

Sampling Personnel: MS DS

Site: OTP - Big Stone

Facility ID: -

Date: 21Aug23

Well Number	H7	H8	H9				
Unique Station ID	NA	NA	NA				
Date	21Aug23	"	"				
Time	1123	1118	1100				
Well Casing Elevation	1106.06	1081.23	1086.21				
Depth to Water	23.67	6.30	10.63				
Static Elevation	1082.39	1074.93	1075.58				
Casing Diameter	2"	2"	2"				
Well Depth	35.60	22.33	30.71				
Well Volume	1.94	2.61	3.27				
Well Locked	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Labeled	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Straight	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Protective Posts	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Grout Seal Intact	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Dedicated Equipment	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no

Well Number							
Unique Station ID							
Date							
Time							
Well Casing Elevation							
Depth to Water							
Static Elevation							
Casing Diameter							
Well Depth							
Well Volume							
Well Locked	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Labeled	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Well Straight	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Protective Posts	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Grout Seal Intact	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no
Dedicated Equipment	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no	yes / no

Appendix C

Groundwater Flow Calculations

Big Stone Ash Disposal Area Groundwater Velocity Calculation

Date 5/15/2023

Kh	2.10E-04	cm/s	*Groundwater Monitoring System Report (Barr, 2016)*
	5.95E-01	ft/day	
n	0.25		*Groundwater Monitoring System Report (Barr, 2016)*

	Top of Casing Elevation (1)	**Depth to Water**	**Water Level Elevation**
	ft amsl	ft below TOC	ft amsl
H3OX	1095.26	6.90	1088.36
H9	1086.21	6.75	1079.46

(1) Groundwater Monitoring System Report (Barr, 2016)

horizontal distance, ft

	H3OX
H9	2272.3

difference in WL elevation, ft

	H3OX
H9	8.90

horizontal gradient, ft/ft

	H3OX
H9	0.00392

V, ft/d

	H3OX
H9	0.00933

V, ft/yr

	H3OX
H9	3.4

V avg, ft/y

3.4

Big Stone Ash Disposal Area Groundwater Velocity Calculation

Date 6/12/2023

Kh	2.10E-04	cm/s	*Groundwater Monitoring System Report (Barr, 2016)*
	5.95E-01	ft/day	
n	0.25		*Groundwater Monitoring System Report (Barr, 2016)*

	Top of Casing Elevation (1)	Depth to Water	Water Level Elevation
	ft amsl	ft below TOC	ft amsl
H3OX	1095.26	7.76	1087.50
H9	1086.21	10.29	1075.92

(1) Groundwater Monitoring System Report (Barr, 2016)

horizontal distance, ft

	H3OX
H9	2272.3

difference in WL elevation, ft

	H3OX
H9	11.58

horizontal gradient, ft/ft

	H3OX
H9	0.00510

V, ft/d

	H3OX
H9	0.01213

V, ft/yr

	H3OX
H9	4.4

V avg, ft/y

4.4

Big Stone Ash Disposal Area Groundwater Velocity Calculation

Date 7/21/2023

Kh	2.10E-04	cm/s	*Groundwater Monitoring System Report (Barr, 2016)*
	5.95E-01	ft/day	
n	0.25		*Groundwater Monitoring System Report (Barr, 2016)*

	Top of Casing Elevation (1)	Depth to Water	Water Level Elevation
	ft amsl	ft below TOC	ft amsl
H3OX	1095.26	8.05	1087.21
H9	1086.21	11.97	1074.24

(1) Groundwater Monitoring System Report (Barr, 2016)

horizontal distance, ft

	H3OX
H9	2272.3

difference in WL elevation, ft

	H3OX
H9	12.97

horizontal gradient, ft/ft

	H3OX
H9	0.00571

V, ft/d

	H3OX
H9	0.01359

V, ft/yr

	H3OX
H9	5.0

V avg, ft/y

5.0

Big Stone Ash Disposal Area Groundwater Velocity Calculation

Date 10/17/2023

Kh	2.10E-04	cm/s	*Groundwater Monitoring System Report (Barr, 2016)*
	5.95E-01	ft/day	
n	0.25		*Groundwater Monitoring System Report (Barr, 2016)*

	Top of Casing Elevation (1)	Depth to Water	Water Level Elevation
	ft amsl	ft below TOC	ft amsl
H3OX	1095.26	8.00	1087.26
H9	1086.21	11.57	1074.64

(1) Groundwater Monitoring System Report (Barr, 2016)

horizontal distance, ft

	H3OX
H9	2272.3

difference in WL elevation, ft

	H3OX
H9	12.62

horizontal gradient, ft/ft

	H3OX
H9	0.00555

V, ft/d

	H3OX
H9	0.01322

V, ft/yr

	H3OX
H9	4.8

V avg, ft/y

4.8

Appendix D

Additional Groundwater Elevations

Appendix D
Additional 2023 Water Elevations
Big Stone Plant
Otter Tail Power Company

Location	Well Casing Elevation ft AMSL	6/12/2023 ft AMSL	7/21/2023 ft AMSL	8/21/2023 ft AMSL
H10	1090.83	1078.28	1076.58	1075.36
H11	1093.24	1082.19	1080.23	1079.29
H1INT	1115.81	1092.11	1089.7	1088.9
H1OX	1115.89	1092.93	1090.43	1089.52
H2I	1103.91	1042.41	1042.34	1042.35
H2OX	1103.86	1096.46	1094.34	1093.26
H3I	1095.17	1067.25	1067.05	1067.06
H3OX	1095.26	1087.5	1087.21	1087.98
H4I	1108.61	1091.51	1089.63	1090.78
H4OX	1108.25	1091.12	1089.79	1089.68
H5	1122.8	1111.42	1110.49	1110.34
H6	1097.76	1087.07	1084.49	1084.09
H7	1106.06	1086.8	1084.12	1082.39
H8	1081.23	1072.52	1071.48	1074.93
H9	1086.21	1075.92	1074.24	1075.58
WELL 1	1090.71	1025.41	1025.33	1024.68
WELL 10	1098.7	1081.69	--	1080.52
WELL 11	1104	1009.45	1009.21	1005.83
WELL 12	1071.89	1005.05	1005.59	1005.77

Notes:

-- Not Measured

Appendix E

Alternative Source Demonstration: Calcium, Fall of 2022

Alternative Source Demonstration: Calcium, Fall 2022

Big Stone Plant

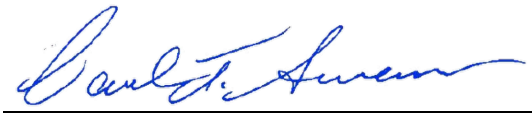
Prepared for
Otter Tail Power Co.

April 2023

4300 MarketPointe Drive, Suite 200
Minneapolis, MN 55435
952.832.2600
www.barr.com

Certification

I hereby certify that the written demonstration provided herein, supported by the data in the referenced documents, is accurate and consistent with our review of the groundwater and other data collected to date, as required under the CCR Rule (§257.94(e)(2)). Based on this review I have determined that a source other than the CCR unit regulated under the CCR Rule at the Site caused the statistically significant increase over the background for calcium in monitoring well H6 that is downgradient from that unit.



Paul Swenson
PE #: add PE number

April 25, 2023
Date

Alternative Source Demonstration: Calcium, Fall 2022

April 2023

Contents

List of Figures

Abbreviations

ADA	Ash Disposal Area
ASD	Alternative Source Demonstration
CCR	Coal Combustion Residuals
EPA	U.S. Environmental Protection Agency
OTP	Otter Tail Power Company
SAP	Sampling and Analysis Plan
SSI	Statistically Significant Increase
TDS	Total Dissolved Solids

1 Introduction

Otter Tail Power Company (OTP) operates the Big Stone Plant (Big Stone), located near Big Stone City, South Dakota. Big Stone is a coal-fired electrical generating plant, the operation of which results in coal combustion residuals (CCR) as a by-product. Management of CCR from plant operations includes placing CCR in an on-site landfill, referred to as the Ash Disposal Area (ADA). The ADA is required to comply with the provisions of the US Environmental Protection Agency (EPA) CCR Rule (40 CFR Parts 257 and 261, Disposal of Coal Combustion Residuals from Electric Utilities) for existing CCR landfills.

A statistically significant increase (SSI) over background was identified for calcium at downgradient monitoring well H6 during the fall 2022 detection monitoring event.

Well	Parameter	Fall 2022 Concentration	Interwell Prediction Limit	Intrawell Prediction Limit
H6	Calcium	748 mg/L	543 mg/L	62.1 mg/L

The CCR Rule §257.94(e)(2) allows for an alternative source demonstration (ASD) in the event of an identified SSI in an appendix III water quality parameter in a downgradient monitoring well:

> *The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report.*

The purpose of this work is to evaluate the data collected as part of the fall 2022 monitoring event, along with historical data, to demonstrate that the SSI is the result of a source other than the CCR unit or due to natural variation in groundwater quality or an error in sampling, analysis, or statistical evaluation. This report provides written documentation of an ASD supporting continuation of detection monitoring in accordance with §257.94(e)(2) of the CCR Rule.

2 ASD Hypotheses

2.1 Sampling Error

Based on field notes and discussion with field staff, proper low-flow sampling methods consistent with the Sampling and Analysis Plan (SAP, Carlson McCain, 2017) were not used during sample collection at H6 during the fall 2022 detection monitoring event. Specifically, the well was not purged and allowed to stabilize prior to sample collection. In addition, due to seasonal constraints of low water level and winter conditions, the well could not be resampled once the error was discovered.

A dedicated bladder pump is installed in monitoring well H6 for sampling. During the fall 2022 sampling event, the water level was below the level of the pump intake. The pump was removed for sampling, and a sample was collected using a disposable bailer.

The preamble to the CCR Rule (VI(K)(3)) notes that "Groundwater sampling should be conducted utilizing EPA protocol low stress (low-flow) purging and sampling methodology, including measurement and stabilization of key indicator parameters prior to sampling." Well stabilization is conducted prior to groundwater sampling in order to obtain a sample representative of aquifer conditions. Properly constructed and developed groundwater monitoring wells allow for the collection of representative samples with low turbidity (U.S. EPA, 1986, 1992). However, even correctly installed wells can produce turbid samples in certain geologic materials. Thus, purging and stabilization are necessary to yield reproducible sampling results. Due to limited recharge, monitoring well H6 was not sufficiently purged and did not stabilize during the fall 2022 sampling.

Monitoring well H6 has been documented as being slow to recharge (Barr, 2016), and recent dry climatic conditions have resulted in a lowered water table. Obtaining sufficient groundwater volume for analysis at H6 has proven challenging, particularly during the drier fall season. As a result, the sample sent for laboratory chemical analysis in fall 2022 consisted of the initial draw of water from the well without stabilization. Although field parameters were not measured due to the limited volume, the sample was noted to be cloudy with heavy sediment, suggesting a high turbidity. Attempts were made to resample well H6 to obtain a more representative sample. However, water levels in the well remained low, with insufficient volume for sampling and analysis.

In summary, because of limited water availability at monitoring well H6, the sampling protocol was changed from the SAP, yielding a sample with a high concentration of suspended solids, which is not representative of typical aquifer conditions. Therefore, the SSI is attributed to error in sampling.

2.2 Chemistry Inconsistent with CCR

The previous section concluded that the SSI was the result of a non-representative sample with high turbidity, indicating the presence of suspended solids. The CCR Rule requires measurement of "total recoverable metals" because suspended and colloidal particles can also be a means of transport for contaminants. However, the suspended solids responsible for the calcium SSI at monitoring well H6 are

believed to be natural aquifer material and not mobilized CCR contaminants, as indicated by the behavior of additional groundwater parameters. Further details supporting this hypothesis are provided below.

If the ADA is the source of a release to groundwater that caused the SSI for calcium at H6, elevated concentrations of other parameters indicative of a CCR release should appear at about the same time because an ADA release would contain a mixture of multiple CCR parameters. Conversely, if concentrations in H6 are not elevated for the remaining CCR parameters, it is unlikely that the elevated calcium is the result of a release from the ADA.

The other six appendix III detection monitoring parameters (boron, chloride, fluoride, pH, sulfate, and total dissolved solids (TDS)) in the fall 2022 sample from H6 were measured at concentrations consistent with previous values (Figure 1). The lack of an increase in other appendix III indicator parameters is evidence that the calcium SSI at H6 did not result from an ADA release.

More specifically, if the elevated suspended solids at H6 are associated with CCR, other total recoverable metals associated with CCR would increase along with calcium. Among the CCR detection monitoring parameters, only calcium and boron are measured in the total recoverable metals fraction. Despite the tenfold increase in calcium concentration, boron decreased slightly between spring and fall 2022 (Figure 1). Therefore, elevated calcium and apparent elevated suspended solids are unlikely to be associated with a release from the ADA.

The shallow geology at Big Stone is composed of glacial till from the Late Wisconsin Des Moines Lobe, consisting largely of lean clay with seams and lenses or zones of sand and silt (Barr, 2016). Till in this area is generally calcareous (Gilbertson, 1990). Therefore, the aquifer contains fine-grained, calcium-bearing material, and this material is more likely to be transported by groundwater into monitoring wells if low-flow sampling methods are not used.

In summary, the H6 sample that exhibited a calcium SSI did not have elevated concentrations of other parameters that would be expected with a release from the ADA. In addition, high calcium is consistent with solids from the aquifer matrix. Therefore, the sample chemistry supports the hypothesis that a release from the ADA did not cause the SSI.

3 Conclusion

The concentration of calcium in the sample from monitoring well H6 in fall 2022 was not representative of long-term groundwater quality. Instead, the SSI is attributed to an error in sampling. Due to low water volume at monitoring well H6 during the fall 2022 detection monitoring event, the well was not sufficiently purged and was sampled using a bailer. As a result, the sample contained a high amount of suspended solids, and the concentration of calcium in the total available metals fraction was anomalously high. Moreover, the other six appendix III detection monitoring parameters (boron, chloride, fluoride, pH, sulfate, and TDS) in the fall 2022 sample from H6 were measured at concentrations consistent with previous values, which contradicts a release from the ADA as the cause of the SSI. Therefore, the calcium SSI is attributed to a source other than the Ash Disposal Area.

4 References

Barr Engineering, 2016. Groundwater Monitoring System Report, Ash Disposal Area, Big Stone Plant. Prepared for Otter Tail Power Company. December 2016.

Carlson McCain, 2017. CCR Groundwater Sampling and Analysis Plan (Including Statistical Method Selection and Certification), Big Stone Plant Ash Disposal Area. Prepared for Otter Tail Power Company. October 2017.

Gilbertson, J.P., 1990. Quaternary geology along the eastern flank of the Coteau des Prairies, Grant County, South Dakota. Masters Thesis, University of Minnesota.

U.S. EPA, 1992. RCRA Ground-Water Monitoring: Draft Technical Guidance. https://www.epa.gov/sites/default/files/2015-06/documents/rcra_gwm92.pdf

U.S. EPA, 1986. RCRA Ground-Water Monitoring Technical Enforcement Guidance Document. OSWER-9950.

Figure

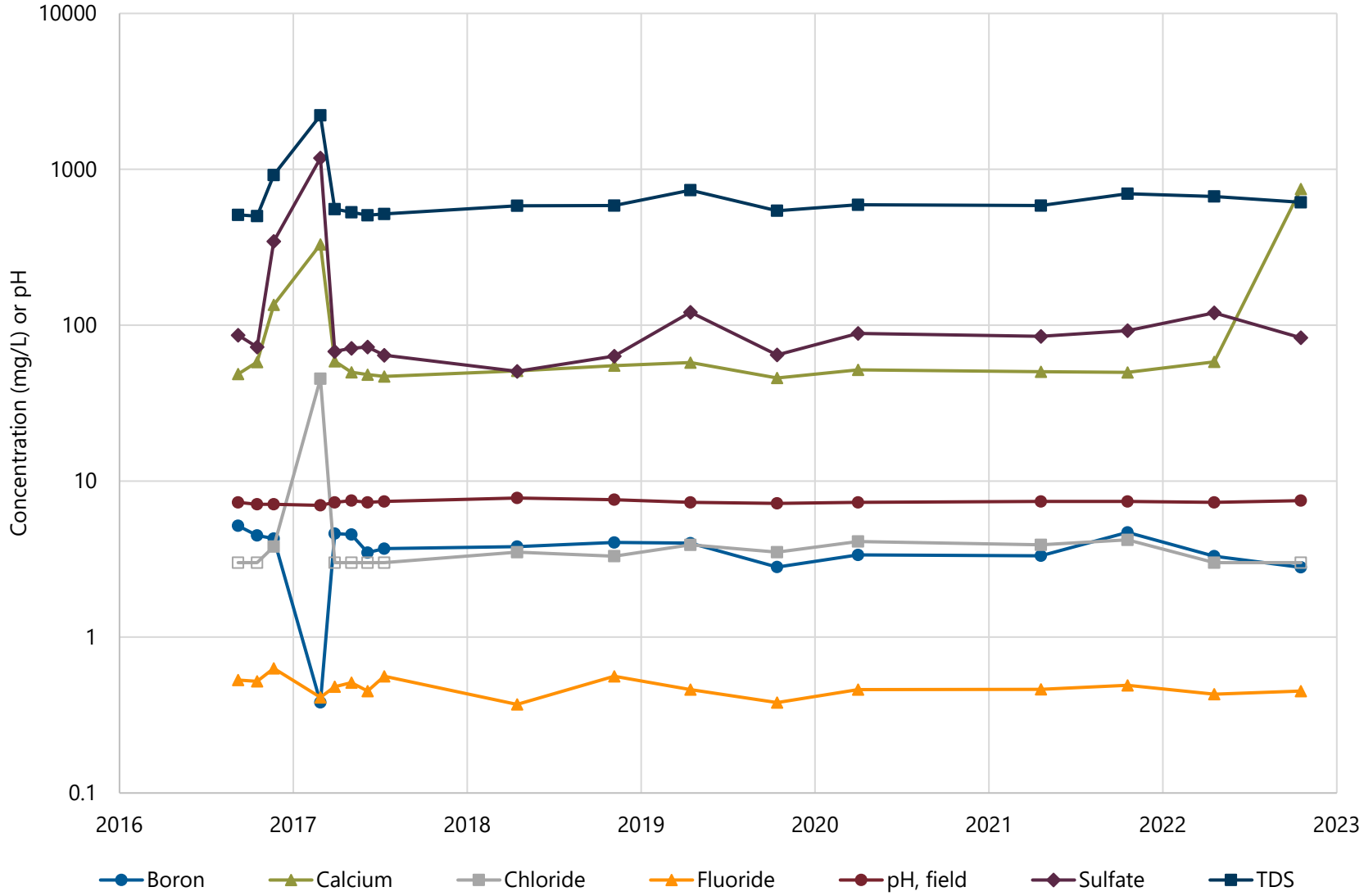


Figure 1 **Concentrations of appendix III parameters at H6**