



2021 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 2022

2021 Annual Groundwater Monitoring and Corrective Action Report

Ash Disposal Area

Big Stone Plant
Big Stone City, South Dakota

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Contents

- Executive Summary..... iv
- 1.0 Introduction 1
 - 1.1 Purpose..... 1
 - 1.2 Status of the Groundwater Monitoring and Corrective Action Program 1
 - 1.3 CCR Rule Requirements 1
- 2.0 Groundwater Monitoring and Corrective Action Program 3
 - 2.1 Groundwater Monitoring System..... 3
 - 2.1.1 Documentation 3
 - 2.1.2 Changes to Monitoring System 3
 - 2.2 Monitoring and Analytical Results 3
 - 2.3 Key Actions Completed/Problems Encountered 3
 - 2.4 Key Activities for Upcoming Year 4
- 3.0 References 6

List of Tables

| | |
|---------|-------------------------------------|
| Table 1 | CCR Rule Requirements |
| Table 2 | Groundwater Analytical Data Summary |

List of Figures

| | |
|----------|--|
| Figure 1 | Ash Disposal Area Location |
| Figure 2 | Monitoring Well Locations and Ground Elevation Contours; April 20, 2021 |
| Figure 3 | Monitoring Well Locations and Groundwater Elevation Contours; October 19, 2021 |

List of Appendices

| | |
|------------|-------------------------------------|
| Appendix A | Laboratory Reports and Field Sheets |
| Appendix B | Groundwater Flow Calculations |

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 §257.94(e)(6). The CCR unit operated under the detection monitoring program described in §257.94 at the start and at the end of the 2021 annual reporting period. 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 and the corrective action provisions of the CCR Rule were not triggered.

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 2021 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

Baseline monitoring was completed in 2017, as documented in the 2017 Annual Groundwater Monitoring and Corrective Action Report, Ash Disposal Area (Barr, 2018). The detection monitoring program, which is the evaluation of groundwater monitoring data for SSIs over background levels for the constituents listed in appendix III to the CCR Rule, began on October 17, 2017, and continued through 2021. In 2021, 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 and the corrective action provisions of the CCR Rule were not triggered.

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 | Not applicable – no wells were installed or decommissioned |
| §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 3, Appendices |
| §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 2021. 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 2022 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

The groundwater monitoring system was unchanged in 2021.

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. A total of 12 groundwater samples were collected and analyzed for the constituents listed in appendix III (Part 257) in 2021 under the detection monitoring program, consistent with the requirements of §257.94(c). Dates of sampling are reported on the field data sheets, and analytical laboratory reports are presented in Appendix A. Results are summarized in Table 2.

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

2.3 Key Actions Completed/Problems Encountered

The following key actions were completed for the groundwater monitoring program during 2021:

- Completed semiannual groundwater sampling under the detection monitoring program.
- Determined, pursuant to §257.93(h), that a statistically significant increase over background levels did not occur for any of the constituents listed in appendix III at any downgradient monitoring well during the 2021 detection monitoring sampling events. Statistical analysis was conducted according to the Statistical Analysis Plan, Appendix B of the CCR Groundwater Sampling and Analysis Plan (Carlson McCain, 2017).

Problems were not encountered during the reporting period.

2.4 Key Activities for Upcoming Year

The following key groundwater monitoring program activities are planned for 2022:

- Continue the detection monitoring program in accordance with the CCR Rule.
- Evaluate analytical results from the 2022 semiannual detection monitoring events for SSIs according to the Statistical Analysis Plan (Carlson McCain, 2017).

**Table 2
Groundwater Analytical Data Summary
Big Stone Plant
Otter Tail Power Company**

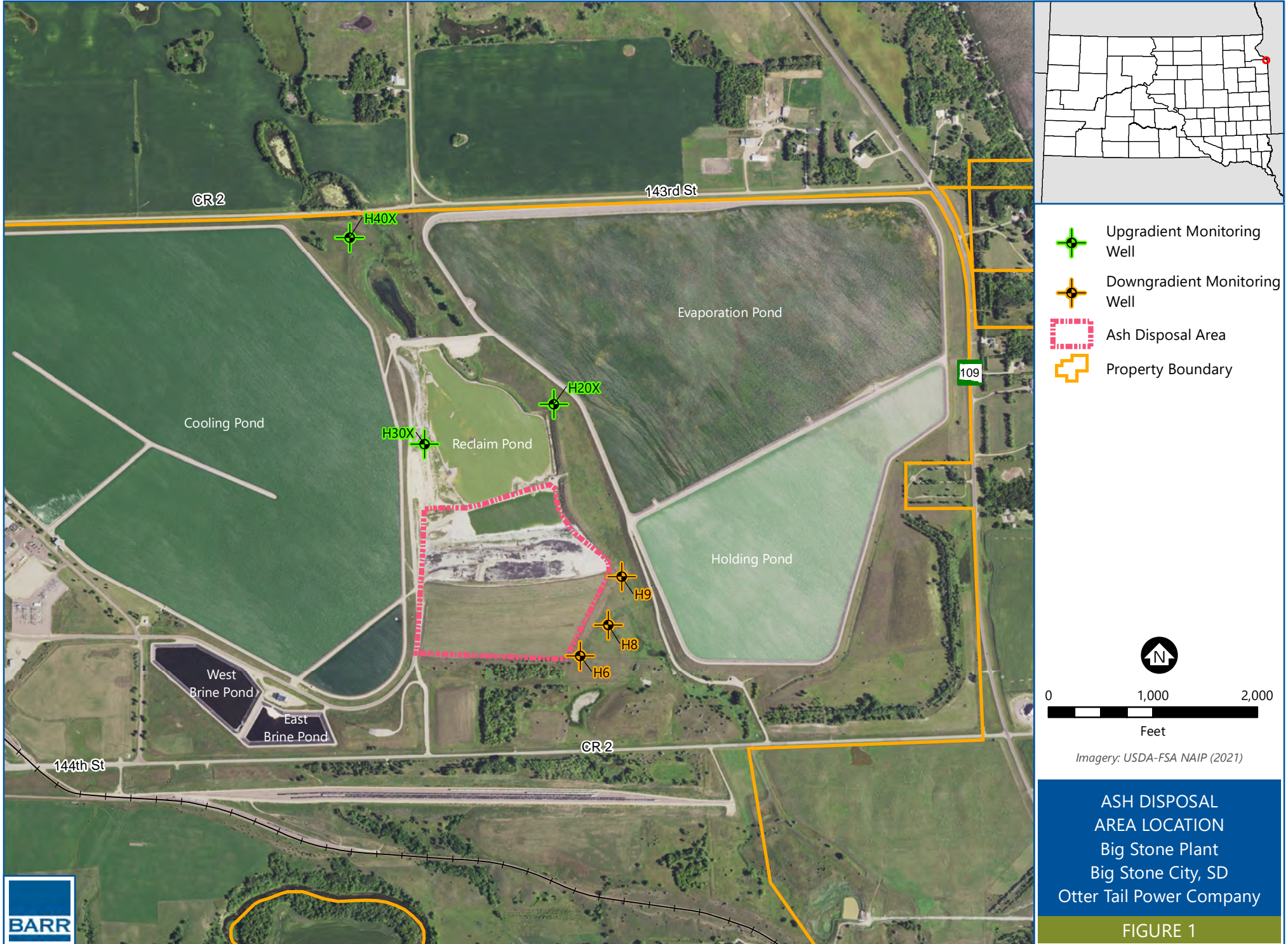
| Location | | | H2OX | H2OX | H3OX | H3OX | H4OX | H4OX | H6 | H6 | H8 | H8 | H9 | H9 |
|-------------------------|-------------------|----------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| Date | | | 4/20/2021 | 10/19/2021 | 4/20/2021 | 10/19/2021 | 4/20/2021 | 10/19/2021 | 4/20/2021 | 10/19/2021 | 4/20/2021 | 10/19/2021 | 4/20/2021 | 10/19/2021 |
| Parameter | Analysis Location | Units | | | | | | | | | | | | |
| Appendix III Parameters | | | | | | | | | | | | | | |
| Boron | Lab | mg/l | 0.259 | < 0.5 U | 6.460 | 5.700 | 0.467 | 0.492 | 3.320 | 4.690 | 3.550 | 3.620 | 1.210 | 1.170 |
| Calcium | Lab | mg/l | 530.0 | 506.0 | 405.0 | 386.0 | 331.0 | 348.0 | 50.30 | 49.80 | 114.0 | 122.0 | 624.0 | 616.0 |
| Chloride | Lab | mg/l | 4.0 | 4.5 | 73.5 | 70.3 | 44.9 | 45.0 | 3.9 | 4.2 | 4.1 | 3.7 | 56.1 | 55.9 |
| Fluoride | Lab | mg/l | 0.318 | 0.310 | 0.396 | 0.400 | 0.514 | 0.500 | 0.462 | 0.490 | 0.530 | 0.530 | 0.304 | 0.310 |
| pH | Field | pH units | 7.04 | 7.44 | 6.74 | 7.99 | 6.82 | 8.07 | 7.40 | 7.43 | 7.23 | 7.24 | 6.50 | 6.63 |
| Solids, total dissolved | Lab | mg/l | 3860 | 3790 | 3190 | 2780 | 2250 | 2120 | 585 | 697 | 900 | 907 | 2880 | 2680 |
| Sulfate, as SO4 | Lab | mg/l | 2380 | 2420 | 1540 | 1420 | 1110 | 1130 | 84.8 | 92.2 | 240 | 232 | 1480 | 1480 |
| Groundwater elevation | Field | ft amsl | 1097.80 | 1096.96 | 1088.71 | 1088.80 | 1092.25 | 1092.35 | 1087.64 | 1087.76 | 1077.17 | 1077.08 | 1078.99 | 1078.52 |

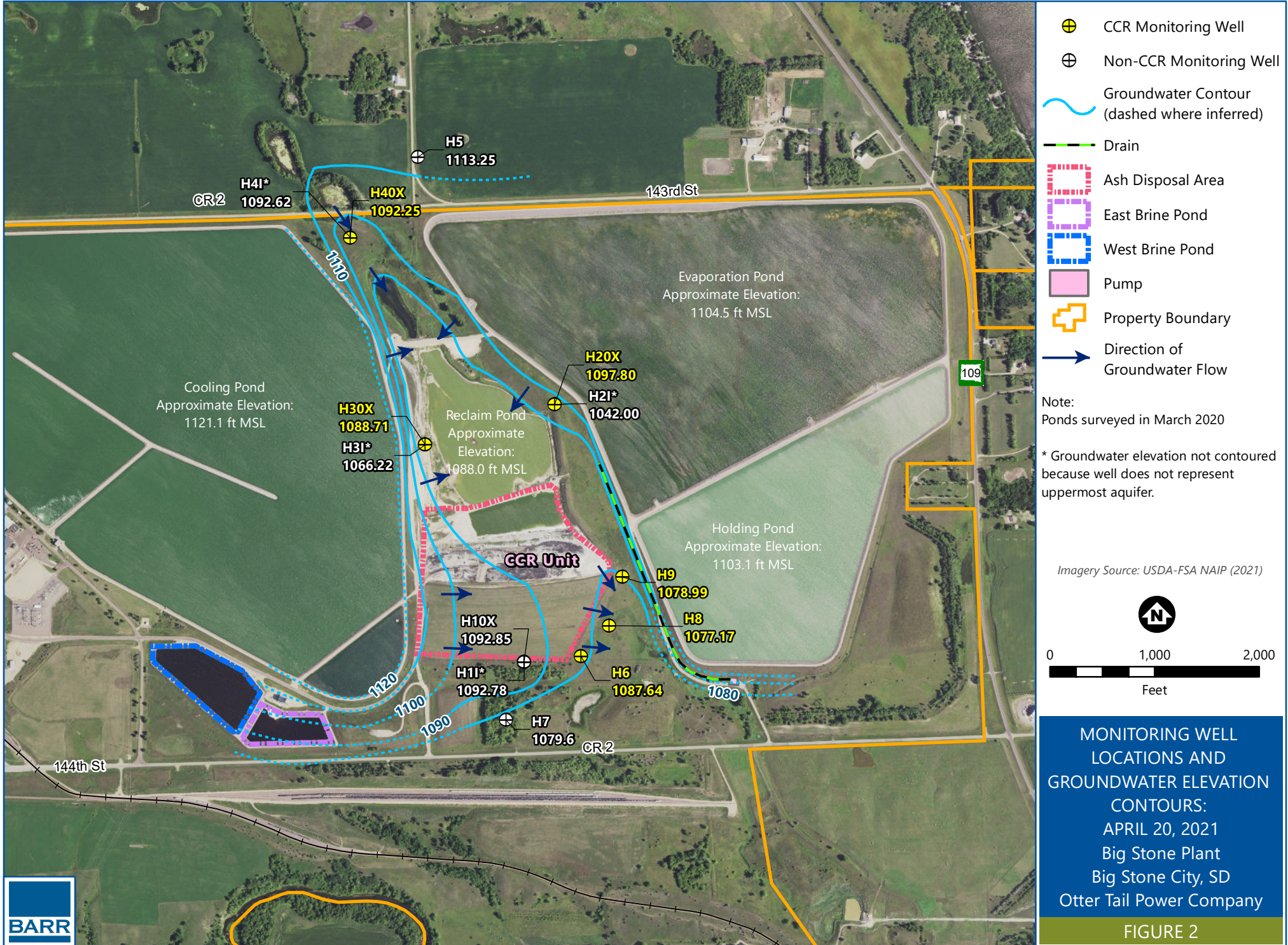
U The analyte was analyzed for, but was not detected.

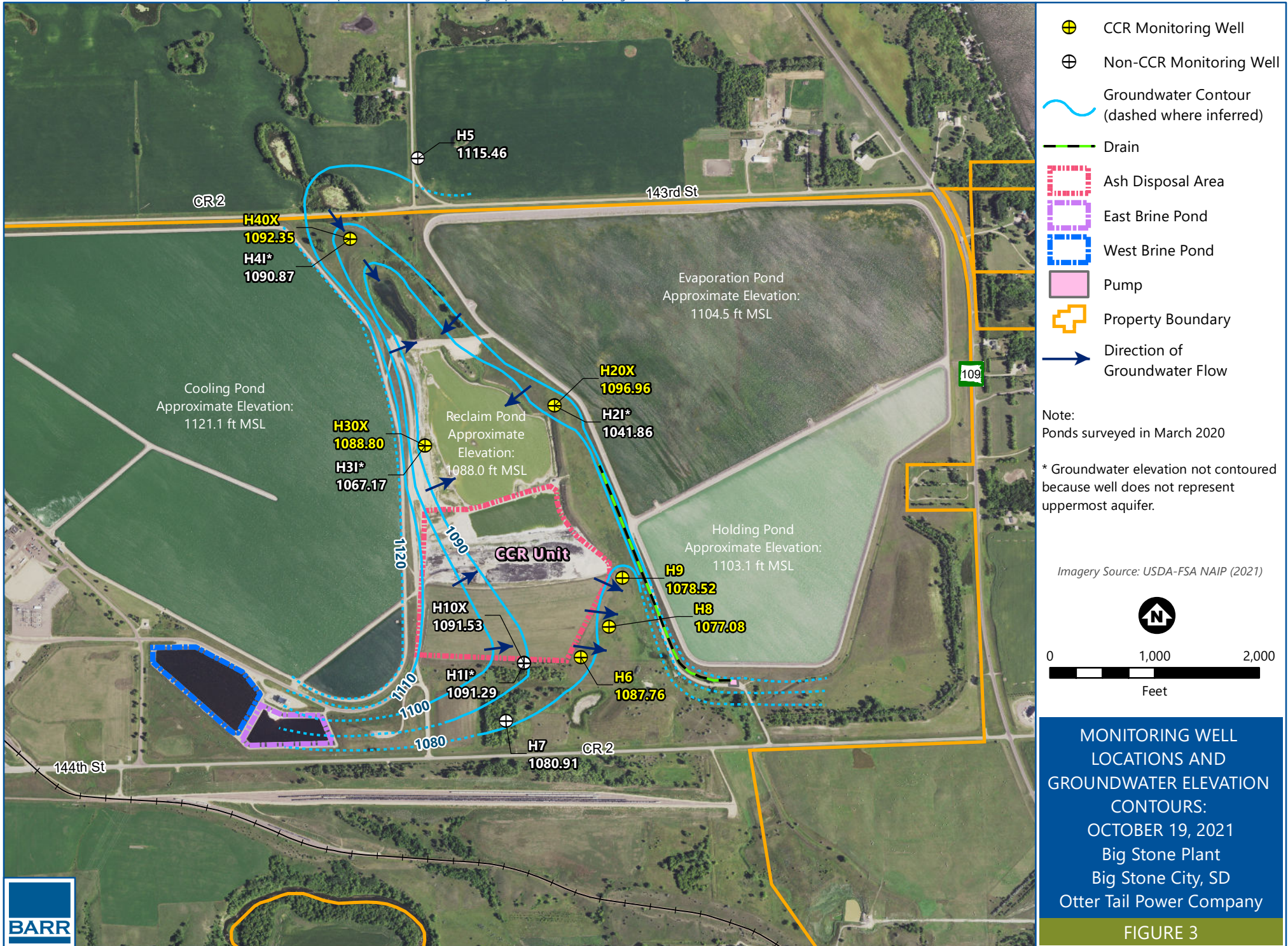
3.0 References

- 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.

Figures







Appendices

Appendix A

Laboratory Reports and Field Sheets



MINNESOTA VALLEY TESTING LABORATORIES, INC.

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Page: 1 of 7

FINAL REPORT COMPLETION DATE: 14 May 21 AB

Date Reported: 4 May 2021

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

Work Order #: 31-0160
Account #: 006106
PO #: 59601

Project Name: BIG STONE PLANT CCR

Jeff St. Pierre 13 May 21
Field Service Manager/Date Reviewed
[Signature] 13 May 21
Chemistry Lab Manager/Date Reviewed
[Signature] 13 May 21
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.

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.



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

Report Date: 4 May 2021
Lab Number: 21-A17802
Work Order #: 31-0160
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 20 Apr 2021 12:31
Sampled By: MVTL FIELD PERSONNEL
Date Received: 20 Apr 2021 17:00
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H20X

Temp at Receipt: 0.0C

| | As Received Result | | Method RL | Method Reference | Date Analyzed | Analyst |
|-------------------------|--------------------|-------|-----------|-------------------|-----------------|---------|
| Water Digestions | | | | | | |
| pH, Field | 7.04 | units | 1.00 | SM4500-H+-2011 | 22 Apr 21 | JMS |
| pH | * 6.9 | units | 1.0 | SM 4500 H+ B-2000 | 19 Apr 21 12:31 | BMW |
| Sulfate | 2380 ~ | mg/L | 5.0 | ASTM D516-11 | 21 Apr 21 8:24 | HO |
| Chloride | 4.0 | mg/L | 3.0 | SM 4500 Cl E | 22 Apr 21 9:41 | SS |
| Solids, Total Dissolved | 3860 | mg/L | 10 | SM 2540 C-97 | 22 Apr 21 8:29 | AKF |
| Calcium | 530.0 ~ | mg/L | 0.500 | SW6010D | 21 Apr 21 16:07 | PJH |
| Boron | 0.259 | mg/L | 0.100 | SW6010D | 26 Apr 21 10:31 | KAM |
| Fluoride | 0.318 @ | mg/L | 0.020 | EPA 300.0 | 26 Apr 21 10:31 | KAM |
| | | | | | 26 Apr 21 9:55 | 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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JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 4 May 2021
Lab Number: 21-A17803
Work Order #: 31-0160
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 20 Apr 2021 10:33
Sampled By: MVT L FIELD PERSONNEL
Date Received: 20 Apr 2021 17:00
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H30X

Temp at Receipt: 0.0C

| | As Received Result | | Method RL | Method Reference. | Date Analyzed | Analyst |
|-------------------------|--------------------|-------|-----------|-------------------|-----------------|---------|
| Water Digestions | | | | | | |
| pH, Field | 6.74 | units | 1.00 | SM4500-H+-2011 | 22 Apr 21 | JMS |
| pH | * 6.8 | units | 1.0 | SM 4500 H+ B-2000 | 20 Apr 21 10:33 | BMW |
| Sulfate | 1540 ~ | mg/L | 5.0 | ASTM D516-11 | 21 Apr 21 8:24 | HO |
| Chloride | 73.5 | mg/L | 3.0 | SM 4500 Cl E | 22 Apr 21 9:41 | SS |
| Solids, Total Dissolved | 3190 | mg/L | 10 | SM 2540 C-97 | 22 Apr 21 8:29 | AKF |
| Calcium | 405.0 ~ | mg/L | 0.500 | SW6010D | 21 Apr 21 16:07 | PJH |
| Boron | 6.460 | mg/L | 0.100 | SW6010D | 26 Apr 21 10:31 | KAM |
| Fluoride | 0.396 @ | mg/L | 0.020 | EPA 300.0 | 26 Apr 21 10:31 | KAM |
| | | | | | 26 Apr 21 9:55 | RMV |

* Holding Time Exceeded

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

RL = Reporting Limit

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@ = Due to sample matrix # = Due to concentration of other analytes
! = Due to sample quantity + = Due to internal standard response

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

Report Date: 4 May 2021
Lab Number: 21-A17804
Work Order #: 31-0160
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 20 Apr 2021 11:18
Sampled By: MVTl FIELD PERSONNEL
Date Received: 20 Apr 2021 17:00
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H40X

Temp at Receipt: 0.0C

| | As Received Result | | Method RL | Method Reference | Date Analyzed | Analyst |
|-------------------------|--------------------|-------|-----------|-------------------|-----------------|---------|
| Water Digestions | | | | | | |
| pH, Field | 6.82 | units | 1.00 | SM4500-H+-2011 | 22 Apr 21 | JMS |
| pH | * 6.8 | units | 1.0 | SM 4500 H+ B-2000 | 21 Apr 21 11:18 | BMW |
| Sulfate | 1110 ~ | mg/L | 5.0 | ASTM D516-11 | 21 Apr 21 8:24 | HO |
| Chloride | 44.9 | mg/L | 3.0 | SM 4500 Cl E | 22 Apr 21 9:41 | SS |
| Solids, Total Dissolved | 2250 | mg/L | 10 | SM 2540 C-97 | 22 Apr 21 8:29 | AKF |
| Calcium | 331.0 | mg/L | 0.500 | SW6010D | 21 Apr 21 16:07 | PJH |
| Boron | 0.467 | mg/L | 0.100 | SW6010D | 26 Apr 21 10:31 | KAM |
| Fluoride | 0.514 @ | mg/L | 0.020 | EPA 300.0 | 26 Apr 21 10:31 | KAM |
| | | | | | 26 Apr 21 9:55 | 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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JOSH HOLLEN
OTTER TAIL POWER CO
PO BOX 496
FERGUS FALLS MN 56538-0496

Report Date: 4 May 2021
Lab Number: 21-A17805
Work Order #: 31-0160
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 20 Apr 2021 13:22
Sampled By: MVTL FIELD PERSONNEL
Date Received: 20 Apr 2021 17:00
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H6

Temp at Receipt: 0.0C

| | As Received Result | | Method RL | Method Reference | Date Analyzed | Analyst |
|-------------------------|-----------------------|-------|--------------|---------------------|------------------|---------|
| Water Digestions | | | | | | |
| pH, Field | 7.40 | units | 1.00 | SM4500-H+-2011 | 22 Apr 21 | JMS |
| pH | * 7.2 | units | 1.0 | SM 4500 H+ B-2000 | 20 Apr 21 13:22 | BMW |
| Sulfate | 84.8 | mg/L | 5.0 | ASTM D516-11 | 21 Apr 21 8:24 | HO |
| Chloride | 3.9 | mg/L | 3.0 | SM 4500 Cl E | 22 Apr 21 9:41 | SS |
| Solids, Total Dissolved | 585 | mg/L | 10 | SM 2540 C-97 | 22 Apr 21 8:29 | AKF |
| Calcium | 50.30 | mg/L | 0.500 | SW6010D | 21 Apr 21 16:07 | PJH |
| Boron | 3.320 | mg/L | 0.100 | SW6010D | 26 Apr 21 10:31 | KAM |
| Fluoride | 0.462 @ | mg/L | 0.020 | EPA 300.0 | 26 Apr 21 10:31 | KAM |
| | | | | | 26 Apr 21 9:55 | RMV |

* Holding Time Exceeded

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

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

Report Date: 4 May 2021
 Lab Number: 21-A17806
 Work Order #: 31-0160
 Account #: 006106
 Sample Matrix: GROUNDWATER
 Date Sampled: 20 Apr 2021 14:08
 Sampled By: MVTL FIELD PERSONNEL
 Date Received: 20 Apr 2021 17:00
 PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H8

Temp at Receipt: 0.0C

| | As Received Result | | Method RL | Method Reference | Date Analyzed | Analyst |
|-------------------------|-----------------------|-------|--------------|---------------------|------------------|---------|
| Water Digestions | | | | | | |
| pH, Field | 7.23 | units | 1.00 | SM4500-H+-2011 | 22 Apr 21 | JMS |
| pH | * 7.1 | units | 1.0 | SM 4500 H+ B-2000 | 20 Apr 21 14:08 | BMW |
| Sulfate | 240 @ | mg/L | 5.0 | ASTM D516-11 | 21 Apr 21 8:24 | HO |
| Chloride | 4.1 | mg/L | 3.0 | SM 4500 Cl E | 22 Apr 21 9:41 | SS |
| Solids, Total Dissolved | 900 | mg/L | 10 | SM 2540 C-97 | 22 Apr 21 8:29 | AKF |
| Calcium | 114.0 | mg/L | 0.500 | SW6010D | 21 Apr 21 16:07 | PJH |
| Boron | 3.550 | mg/L | 0.100 | SW6010D | 26 Apr 21 10:31 | KAM |
| Fluoride | 0.530 @ | mg/L | 0.020 | EPA 300.0 | 26 Apr 21 10:31 | KAM |
| | | | | | 26 Apr 21 9:55 | RMV |

* Holding Time Exceeded

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: 4 May 2021
Lab Number: 21-A17807
Work Order #: 31-0160
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 20 Apr 2021 14:16
Sampled By: MVTl FIELD PERSONNEL
Date Received: 20 Apr 2021 17:00
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H9

Temp at Receipt: 0.0C

Table with 6 columns: As Received Result, Method RL, Method Reference, Date Analyzed, and Analyst. Rows include Water Digestions, pH, Field, pH, Sulfate, Chloride, Solids, Total Dissolved, Calcium, Boron, and Fluoride.

* 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

Quality Control Report

Lab IDs: 21-A17802 to 21-A17807

Project: BIG STONE PLANT CCR

Work Order: 202131-0160

| 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 |
|------------------------------|---------------|-----------|------------------|------------------|-----------------|--------------------------|---------------------|--------------------|---------------------------|----------------------|-----------------|-----------|--------------|-------------------------|---------------|--------------------|--------------|
| Boron mg/L | 1.000 | 98 | 85-115 | 1.00 | 21A17502q | < 0.1 | 0.992 | 99 | 75-125 | 0.992 | 0.996 | 100 | 0.4 | 10 | 102 | 90-110 | < 0.1 |
| Calcium mg/L | 50.00 | 98 | 85-115 | 50.0 | 21A17502q | < 0.5 | 49.90 | 100 | 75-125 | 49.90 | 49.50 | 99 | 0.8 | 10 | 105 | 90-110 | < 0.5 |
| Chloride mg/L | - | - | - | 60.0 | 21-A17421 | < 3 | 66.2 | 110 | 86-117 | 66.2 | 63.0 | 105 | 5.0 | 5 | 103 | 90-110 | < 3 |
| Fluoride mg/L | - | - | - | 1.00 | 21-A16958 | 1.01 | 2.00 | 99 | 75-125 | 2.00 | 2.01 | 100 | 0.5 | 10 | 96 | 90-110 | < 0.02 |
| pH units | - | - | - | - | - | - | - | - | - | 7.0 | 7.1 | - | 1.4 | 2.5 | 101 | 90-110 | - |
| Solids, Total Dissolved mg/L | - | - | - | - | - | - | - | - | - | 673 | 680 | - | 1.0 | 7 | 100 | 85-115 | < 10 |
| | - | - | - | - | - | - | - | - | - | 609 | 612 | - | 0.5 | 7 | | | |
| Sulfate mg/L | - | - | - | 500 | 21-A17806 | 240 | 731 | 98 | 68-132 | 731 | 731 | 98 | 0.0 | 5 | 100 | 80-120 | < 5 |

Approved by: 

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

This is an exact copy of the original document

By AK Date 20 April 21
 pages 1-7

| | | |
|---|--|--|
| Project Otter Tail Power Company | Project Type: Big Stone Plant CCR | Name of Samplers: B&M, MS, OFAS |
| Report Otter Tail Power Company | Carbon Copy: Barr Engineering | Quote Number: |
| Attn: Paul Vukonich | Attn: | Work Order Number: 31-0160 |
| 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 Amber none | 1000 Amber H2SO4 | 500 NaOH | Other: 150 H2SO4 | Other 150 None | Analysis Required |
| A17803 | H2OX | | 20 Apr 21 | 1231 | GW | | | | 1 | 1 | N | | | | | | | | CCR 3 |
| 03 | H3OX | | | 1033 | GW | | | | 1 | 1 | N | | | | | | | | CCR 3 |
| 04 | H4OX | | | 1118 | GW | | | | 1 | 1 | N | | | | | | | | CCR 3 |
| 05 | H-6 | | | 1322 | GW | | | | 1 | 1 | N | | | | | | | | CCR 3 |
| 06 | H-8 | | | 1408 | GW | | | | 1 | 1 | N | | | | | | | | CCR 3 |
| 07 | H-9 | | | 1416 | GW | | | | 1 | 1 | N | | | | | | | | CCR 3 |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |

Comments:

| | | | | | |
|---|-------------------|------------------|--------------------------------------|-------------------|-------------------|
| Samples Relinquished By: <u>Paul Vukonich</u> | | | Samples Received By: <u>A. Auedu</u> | | |
| Date: <u>20 Apr 21</u> | Time: <u>1700</u> | Temp: <u>0.0</u> | Date: <u>20 Apr 21</u> | Time: <u>1700</u> | Temp: <u>0.0C</u> |
| Samples Relinquished into: <u>Fridge</u> Log in Cart Other: | | | | | |
| Samples Relinquished By: | | | Samples Received By: | | |
| Date: | Time: | Temp: | Date: | Time: | Temp: |
| Delivery: <u>Samplers</u> Other: | | | Seal Number(s) - If Used | | |
| Transport: <u>Ambient</u> <u>Ice</u> Other: | | | Seals Intact? Yes No | | |

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073

507 354 8517

Groundwater Assessment

Sampling Personnel:

Ben Wolf

Site: Otter Tail Power Co./ Big Stone

Facility ID: _____

Date: 19 Apr 21

Unique Station ID: _____

Sample ID: Well H2OX

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: 32.83

Well Casing Elevation: 1103.91

Constructed Depth: 32.20

Static Water Elevation: 1097.85

Casing Diameter: 2"

Previous Static: 1098.09

Water Level Before Purge: 6.06

Water Level After Sample: Below pump

Well Volume: 4.37 Gallons

Measurement Method: Elec. W/L Steel Tape

Sampling Information

Weather Conditions: Temp: 42 Wind: NE10 Sky: cloudy

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: 1208 am / pm

Time Purged Dry? 1226

Time of Sampling: 1231 am / pm

Duplicate Sample? Yes No ID: _____

Sample EH: -0.4

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

| Time | pH | Specific Cond. | Temp °C | D. O. mg/L | Turbidity NTU | Gallons Removed | SEQ # | Comments: |
|------|------|----------------|---------|------------|---------------|-----------------|-------|-----------|
| 1226 | 7.01 | 3705 | 7.26 | NA | NA | 4.5 | 1 | |
| | | | | | | | 2 | |
| | | | | | | | 3 | |
| 1231 | 7.04 | 3693 | 7.90 | I | I | — | 4 | Recharge |
| | | | | | | | 5 | |

Stabilized? Yes No

Amount Water Removed: 4.5 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:

Facility ID: _____

Ben Wolf

Date: 20 Apr 21

Unique Station ID: _____

Sample ID: Well H3OX

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: 22.68

Well Casing Elevation: 1095.19

Constructed Depth: 22.55

Static Water Elevation: 1088.64

Casing Diameter: 2"

Previous Static: 1088.74

Water Level Before Purge: 6.55

Water Level After Sample: Below 1000

Well Volume: 2.67 Gallons

Measurement Method: Elec. WLI Steel Tape

Sampling Information

Weather Conditions: Temp: 40 Wind: LCV 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: 1017 am pm

Time Purged Dry? 1028

Time of Sampling: 1033 am pm

Duplicate Sample? Yes No ID: _____

Sample EH: 165.9

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: |
|--------|------|----------------|---------|------------|---------------|-----------------|-------|-----------|
| 1028 | 6.83 | 3539 | 9.03 | NA | NA | 2.75 | 1 | |
| | | | | | | | 2 | |
| | | | | | | | 3 | |
| 1033 | 6.74 | 3460 | 9.25 | | | | 4 | Recharge |
| | | | | | | | 5 | |

Stabilized? Yes No

Amount Water Removed: 2.75 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:

Facility ID: _____

Ben Wolf

Date: 20 Apr 21

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: 1092.22

Casing Diameter: 2"

Previous Static: 1092.31

Water Level Before Purge: 116.00

Water Level After Sample: Below pump

Well Volume: 1.87 Gallons

Measurement Method: Elec. WLI Steel Tape

Sampling Information

Weather Conditions: Temp: 41 Wind: LLV Sky: Part

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: 1105 am / pm

Time Purged Dry? 1113

Time of Sampling: 1118 am / pm

Duplicate Sample? Yes No ID: -

Sample EH: -74-5

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: |
|-------------|-------------|----------------|-------------|------------|---------------|-----------------|----------|-----------------|
| <u>1113</u> | <u>6.76</u> | <u>2513</u> | <u>8.33</u> | <u>NA</u> | <u>NA</u> | <u>2</u> | <u>1</u> | |
| | | | | | | | <u>2</u> | |
| | | | | | | | <u>3</u> | |
| <u>1118</u> | <u>6.82</u> | <u>2504</u> | <u>8.35</u> | <u>-</u> | <u>-</u> | <u>-</u> | <u>4</u> | <u>Recharge</u> |
| | | | | | | | <u>5</u> | |

Stabilized? Yes No Amount Water Removed: 2 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: 20 Apr 21

Unique Station ID: _____

Sample ID: Well H6

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: 17.92

Constructed Depth: 17.70

Casing Diameter: 2"

Water Level Before Purge: 10.12

Well Volume: 1.27 Gallons

Well Casing Elevation: NA

Static Water Elevation: I

Previous Static: _____

Water Level After Sample: 10.45

Measurement Method: Elec. WLI Steel Tape

Sampling Information

Weather Conditions: Temp: 35 Wind: N 10 Sky: Sunny

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: 1304 am / pm

Time Purged Dry? _____

Time of Sampling: 1322 am / pm

Duplicate Sample? Yes No ID: _____ Sample EH: 98.2

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: |
|------|------|----------------|---------|------------|---------------|-----------------|-------|-----------|
| 1310 | 7.44 | 1069 | 6.77 | NA | NA | 1.5 | 1 | |
| 1316 | 7.42 | 1078 | 6.86 | | | 3 | 2 | |
| 1322 | 7.40 | 1081 | 6.88 | | | 4.5 | 3 | |
| | | | | | | | 4 | |
| | | | | | | | 5 | |

Stabilized? Yes No

Amount Water Removed: 4.5 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: 20 Apr 21

Unique Station ID: _____

Sample ID: _____

Well H8

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: 22.33
 Constructed Depth: 22.05
 Casing Diameter: 2"
 Water Level Before Purge: 4.06
 Well Volume: 2.98 Gallons

Well Casing Elevation: 1081.23
 Static Water Elevation: 1077.17
 Previous Static: _____
 Water Level After Sample: 4.36
 Measurement Method: Elec. VLI Steel Tape

Sampling Information

Weather Conditions: Temp: 38 Wind: NW 12 Sky: PHy. Cloudy
 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: 1332 am / pm
 Time of Sampling: 1408 am / pm
 Sample EH: 86.6

| Time | pH | Specific Cond. | Temp °C | D. O. mg/L | Turbidity NTU | Gallons Removed | SEQ # | Comments: |
|------|------|----------------|---------|------------|---------------|-----------------|-------|-----------|
| 1344 | 7.22 | 1423 | 7.39 | NA | NA | 3 | 1 | |
| 1356 | 7.23 | 1421 | 7.61 | | | 6 | 2 | |
| 1408 | 7.23 | 1416 | 7.77 | | | 9 | 3 | |
| | | | | | | | 4 | |
| | | | | | | | 5 | |

Stabilized? Yes No

Amount Water Removed: 9 Gallons

Comments:

Exceptions to Protocol:

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: 20 April

Unique Station ID: _____

Sample ID: _____

Well H9

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: 30.71

Well Casing Elevation: 1086.21

Constructed Depth: 30.20

Static Water Elevation: 1078.99

Casing Diameter: 2"

Previous Static: 1079.40

Water Level Before Purge: 7.22

Water Level After Sample: 7.51

Well Volume: 3.83 Gallons

Measurement Method: Elec. W/L Steel Tape

Sampling Information

Weather Conditions: Temp: 76° Wind: N@9 Sky: Partly Cloudy

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: 1328 am pm

Time Purged Dry? —

Time of Sampling: 1416 am pm

Duplicate Sample? Yes No ID: _____

Sample EH: 101.5

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: |
|-------------|-------------|----------------|-------------|------------|---------------|-----------------|----------|-----------|
| <u>1344</u> | <u>6.51</u> | <u>3339</u> | <u>8.60</u> | <u>NA</u> | <u>NA</u> | <u>4</u> | <u>1</u> | |
| <u>1400</u> | <u>6.50</u> | <u>3387</u> | <u>8.65</u> | <u> </u> | <u> </u> | <u>8</u> | <u>2</u> | |
| <u>1416</u> | <u>6.50</u> | <u>3396</u> | <u>8.74</u> | <u> </u> | <u> </u> | <u>12</u> | <u>3</u> | |
| | | | | | | | <u>4</u> | |
| | | | | | | | <u>5</u> | |

Stabilized? Yes No

Amount Water Removed: 12 Gallons

Comments: _____

Exceptions to Protocol: _____



FINAL REPORT COMPLETION DATE: 8 Nov 21 AH

Date Reported: 4 Nov 2021

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

Work Order #: 31-0462
 Account #: 006106
 PO #: 59601

Project Name: BIG STONE PLANT CCR

Jeff Hoffman 04 Nov 21
 Field Service Manager/Date Reviewed

[Signature] 04 Nov 21
 Chemistry Lab Manager/Date Reviewed

[Signature] 4 Nov 21
 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.



MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
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1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.mvtl.com



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

Report Date: 4 Nov 2021
Lab Number: 21-A53230
Work Order #: 31-0462
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 19 Oct 2021 12:09
Sampled By: MVTL FIELD PERSONNEL
Date Received: 19 Oct 2021 17:40
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H20X

Temp at Receipt: 0.0C

| | As Received Result | | Method RL | Method Reference | Date Analyzed | Analyst |
|-------------------------|--------------------|-------|-----------|----------------------|------------------------------------|------------|
| Water Digestions | | | | | | |
| pH, Field | 7.44 | units | 1.00 | | 24 Oct 21 | JMS |
| pH | * 7.2 | units | 1.0 | SM4500-H+-2011 | 19 Oct 21 12:09 | BMW |
| Sulfate | 2420 ~ | mg/L | 5.0 | SM 4500 H+ B-2000 | 20 Oct 21 10:47 | HO |
| Chloride | 4.5 | mg/L | 3.0 | ASTM D516-11 | 21 Oct 21 8:18 | SS |
| Solids, Total Dissolved | 3790 | mg/L | 10 | SM 4500 Cl E | 21 Oct 21 10:39 | AR |
| Calcium | 506.0 ~ | mg/L | 0.500 | SM 2540 C-97 | 20 Oct 21 14:25 | XC |
| Boron | < 0.5 # | mg/L | 0.1 | SW6010D | 25 Oct 21 14:49 | KAM |
| Fluoride | 0.310 @ | mg/L | 0.020 | SW6010D EPA 300.0 | 25 Oct 21 14:49 25 Oct 21 10:01 | KAM 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 sample quantity

= Due to concentration of other analytes

+ = Due to internal standard response

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



MINNESOTA VALLEY TESTING LABORATORIES, INC.

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www.mvtl.com



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

Report Date: 4 Nov 2021
Lab Number: 21-A53231
Work Order #: 31-0462
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 19 Oct 2021 10:18
Sampled By: MVTL FIELD PERSONNEL
Date Received: 19 Oct 2021 17:40
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H30X

Temp at Receipt: 0.0C

| | As Received Result | | Method RL | Method Reference | Date Analyzed | Analyst |
|-------------------------|--------------------|-------|-----------|-------------------|-----------------|---------|
| Water Digestions | | | | | | |
| pH, Field | 7.99 | units | 1.00 | SM4500-H+-2011 | 24 Oct 21 | JMS |
| pH | * 8.2 | units | 1.0 | SM 4500 H+ B-2000 | 19 Oct 21 10:18 | BMW |
| Sulfate | 1420 ~ | mg/L | 5.0 | ASTM D516-11 | 20 Oct 21 10:47 | HO |
| Chloride | 70.3 | mg/L | 3.0 | SM 4500 Cl E | 21 Oct 21 8:18 | SS |
| Solids, Total Dissolved | 2780 | mg/L | 10 | SM 2540 C-97 | 21 Oct 21 10:39 | AR |
| Calcium | 386.0 ~ | mg/L | 0.500 | SW6010D | 20 Oct 21 14:25 | XC |
| Boron | 5.700 # | mg/L | 0.100 | SW6010D | 25 Oct 21 14:49 | KAM |
| Fluoride | 0.400 @ | mg/L | 0.020 | EPA 300.0 | 25 Oct 21 10:01 | 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 sample quantity

= Due to concentration of other analytes

+ = Due to internal standard response

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



MINNESOTA VALLEY TESTING LABORATORIES, INC.

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www.mvtl.com



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

Report Date: 4 Nov 2021
Lab Number: 21-A53232
Work Order #: 31-0462
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 19 Oct 2021 11:03
Sampled By: MVTl FIELD PERSONNEL
Date Received: 19 Oct 2021 17:40
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H40X

Temp at Receipt: 0.0C

Table with 6 columns: Analyte, As Received Result, Method RL, Method Reference, Date Analyzed, Analyst. Rows include Water Digestions, pH, Field, pH, Sulfate, Chloride, Solids, Total Dissolved, Calcium, Boron, Fluoride.

* 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



MINNESOTA VALLEY TESTING LABORATORIES, INC.

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Page: 5 of 8

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

Report Date: 4 Nov 2021
Lab Number: 21-A53233
Work Order #: 31-0462
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 19 Oct 2021 12:39
Sampled By: MVTL FIELD PERSONNEL
Date Received: 19 Oct 2021 17:40
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H6

Temp at Receipt: 0.0C

| | As Received Result | | Method RL | Method Reference | Date Analyzed | Analyst |
|-------------------------|-----------------------|-------|--------------|---------------------|------------------|---------|
| Water Digestions | | | | | | |
| pH, Field | | | | | 21 Oct 21 | JMS |
| pH | 7.43 | units | 1.00 | SM4500-H+-2011 | 19 Oct 21 12:39 | DGF |
| | * 7.6 | units | 1.0 | SM 4500 H+ B-2000 | 20 Oct 21 10:47 | HO |
| Sulfate | 92.2 | mg/L | 5.0 | ASTM D516-11 | 21 Oct 21 8:18 | SS |
| Chloride | 4.2 | mg/L | 3.0 | SM 4500 Cl E | 21 Oct 21 10:39 | AR |
| Solids, Total Dissolved | 697 | mg/L | 10 | SM 2540 C-97 | 20 Oct 21 14:25 | XC |
| Calcium | 49.80 | mg/L | 0.500 | SW6010D | 25 Oct 21 13:08 | KAM |
| Boron | 4.690 | mg/L | 0.100 | SW6010D | 25 Oct 21 13:08 | KAM |
| Fluoride | 0.490 @ | mg/L | 0.020 | EPA 300.0 | 25 Oct 21 10:01 | RMV |

* Holding Time Exceeded

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.

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

Report Date: 4 Nov 2021
Lab Number: 21-A53234
Work Order #: 31-0462
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 19 Oct 2021 13:20
Sampled By: MVTl FIELD PERSONNEL
Date Received: 19 Oct 2021 17:40
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H8

Temp at Receipt: 0.0C

| | As Received Result | | Method RL | Method Reference | Date Analyzed | Analyst |
|-------------------------|--------------------|-------|-----------|-------------------|-----------------|---------|
| Water Digestions | | | | | | |
| pH, Field | 7.24 | units | 1.00 | | 21 Oct 21 | JMS |
| pH | * 7.4 | units | 1.0 | SM4500-H+-2011 | 19 Oct 21 13:20 | DGF |
| Sulfate | 232 @ | mg/L | 5.0 | SM 4500 H+ B-2000 | 20 Oct 21 10:47 | HO |
| Chloride | 3.7 | mg/L | 5.0 | ASTM D516-11 | 21 Oct 21 8:18 | SS |
| Solids, Total Dissolved | 907 | mg/L | 3.0 | SM 4500 Cl E | 21 Oct 21 10:39 | AR |
| Calcium | 122.0 | mg/L | 10 | SM 2540 C-97 | 20 Oct 21 14:25 | XC |
| Boron | 3.620 | mg/L | 0.500 | SW6010D | 25 Oct 21 13:08 | KAM |
| Fluoride | 0.530 @ | mg/L | 0.100 | SW6010D | 25 Oct 21 13:08 | KAM |
| | | | 0.020 | EPA 300.0 | 25 Oct 21 10:01 | RMV |

* Holding Time Exceeded

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



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

Report Date: 4 Nov 2021
Lab Number: 21-A53235
Work Order #: 31-0462
Account #: 006106
Sample Matrix: GROUNDWATER
Date Sampled: 19 Oct 2021 14:28
Sampled By: MVTl FIELD PERSONNEL
Date Received: 19 Oct 2021 17:40
PO #: 59601

Project Name: BIG STONE PLANT CCR

Sample Description: H9

Temp at Receipt: 0.0C

| | As Received Result | | Method RL | Method Reference | Date Analyzed | Analyst |
|-------------------------|--------------------|-------|-----------|-------------------|-----------------|---------|
| Water Digestions | | | | | | |
| pH, Field | 6.63 | units | 1.00 | | 21 Oct 21 | JMS |
| pH | * 6.9 | units | 1.0 | SM4500-H+-2011 | 19 Oct 21 14:28 | DGF |
| Sulfate | 1480 ~ | mg/L | 5.0 | SM 4500 H+ B-2000 | 20 Oct 21 10:47 | HO |
| Chloride | 55.9 | mg/L | 3.0 | ASTM D516-11 | 21 Oct 21 8:18 | SS |
| Solids, Total Dissolved | 2680 | mg/L | 10 | SM 4500 Cl E | 21 Oct 21 10:39 | AR |
| Calcium | 616.0 ~ | mg/L | 0.500 | SM 2540 C-97 | 20 Oct 21 14:25 | XC |
| Boron | 1.170 # | mg/L | 0.100 | SW6010D | 25 Oct 21 13:08 | KAM |
| Fluoride | 0.310 @ | mg/L | 0.020 | SW6010D | 25 Oct 21 13:08 | KAM |
| | | | | EPA 300.0 | 25 Oct 21 10:01 | 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 sample quantity

= Due to concentration of other analytes

+ = 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
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Page: 8 of 8

Date Reported: 4 Nov 2021

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

Work Order #: 202131-0462
Account Number: 006106
PO #: 59601

Project Name: BIG STONE PLANT CCR

LABORATORY NARRATIVE

INORGANIC & METALS ANALYSES:
No problems were encountered.

MINNESOTA VALLEY TESTING LABORATORIES, INC.

MVTL

1126 N. Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
 2616 E. Broadway Ave. ~ Bismarck, ND 58502 ~ 800-279-6885 ~ Fax 701-258-9724
 1201 Lincoln Highway ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
 www.mvtl.com

MEMBER
ACIL

Quality Control Report

Lab IDs: 21-A53230 to 21-A53235

Project: BIG STONE PLANT CCR

Work Order: 202131-0462

| 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 |
|------------------------------|---------------|-----------|------------------|------------------|-----------------|--------------------------|---------------------|--------------------|---------------------------|----------------------|-----------------|-----------|--------------|------------------------|---------------|--------------------|--------------|
| Boron mg/L | 1.000 | 104 | 85-115 | 1.00 | 21A53674q | 0.137 | 1.170 | 103 | 75-125 | 1.170 | 1.150 | 101 | 1.7 | 10 | 102 | 90-110 | < 0.1 |
| | 1.000 | 100 | 85-115 | 1.00 | 21A53031q | < 0.1 | 1.050 | 105 | 75-125 | 1.050 | 1.060 | 106 | 0.9 | 10 | 101 | 90-110 | < 0.1 |
| | | | | 1.00 | 21A53241q | 0.296 | 1.360 | 106 | 75-125 | 1.360 | 1.320 | 102 | 3.0 | 10 | | | |
| Calcium mg/L | 50.00 | 108 | 85-115 | 50.0 | 21A53674q | 76.40 | 133.0 | 113 | 75-125 | 133.0 | 131.0 | 109 | 1.5 | 10 | 106 | 90-110 | < 0.5 |
| | 50.00 | 108 | 85-115 | 50.0 | 21A53031q | 115.0 | 167.0 | 104 | 75-125 | 167.0 | 166.0 | 102 | 0.6 | 10 | 106 | 90-110 | < 0.5 |
| | | | | 50.0 | 21A53241q | 306.0 | 352.0 | 92 | 75-125 | 352.0 | 352.0 | 92 | 0.0 | 10 | | | |
| Chloride mg/L | - | - | - | 60.0 | 21-A53231 | 70.3 | 130 | 99 | 86-117 | 130 | 131 | 101 | 0.8 | 5 | 95 | 90-110 | < 3 |
| Fluoride mg/L | - | - | - | 1.00 | 21-A53235 | 0.310 | 1.30 | 99 | 75-125 | 1.30 | 1.29 | 98 | 0.8 | 10 | 100 | 90-110 | < 0.02 |
| pH units | - | - | - | - | - | - | - | - | - | 7.1 | 7.1 | - | 0.0 | 2.5 | 101 | 90-110 | - |
| Solids, Total Dissolved mg/L | - | - | - | - | - | - | - | - | - | 217 | 223 | - | 2.7 | 10 | 100 | 85-115 | < 10 |
| | - | - | - | - | - | - | - | - | - | 2680 | 2690 | - | 0.4 | 7 | | | |
| Sulfate mg/L | - | - | - | 500 | 21-A53234 | 232 | 727 | 99 | 68-132 | 727 | 731 | 100 | 0.5 | 5 | 94 | 80-120 | < 5 |

Approved by: 

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

This is an exact copy of the original document

By AS Date 19 Oct 21

pages 1-10

| | | |
|---|--|---|
| Project Otter Tail Power Company | Project Type: Big Stone Plant CCR | Name of Samplers: BW, MB, AF, DS |
| Report Otter Tail Power Company | Carbon Copy: Barr Engineering | Quote Number: |
| Attn: Paul Vukonich | Attn: | Work Order Number: 31-463 |
| 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 Amber none | 1000 Amber H2SO4 | 500 NaOH | Other: 150 H2SO4 | Other: 150 None | Analysis Required |
| AS3230 | H2OX | | 19 Oct 21 | 1209 | GW | | | | 1 | 1 | N | | | | | | | | CCR 3 |
| 31 | H3OX | | | 1218 | GW | | | | 1 | 1 | N | | | | | | | | CCR 3 |
| 32 | H4OX | | | 1103 | GW | | | | 1 | 1 | N | | | | | | | | CCR 3 |
| 33 | H-6 | | | 1239 | GW | | | | 1 | 1 | N | | | | | | | | CCR 3 |
| 34 | H-8 | | | 1320 | GW | | | | 1 | 1 | N | | | | | | | | CCR 3 |
| 35 | H-9 | | | 1428 | GW | | | | 1 | 1 | N | | | | | | | | CCR 3 |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |

Comments:

| | | | | | |
|--|-------------------|------------------|--------------------------------------|-------------------|-------------------|
| Samples Relinquished By: <u>Ben Wark</u> | | | Samples Received By: <u>A. Rudin</u> | | |
| Date: <u>19 Oct 21</u> | Time: <u>1740</u> | Temp: <u>0.0</u> | Date: <u>19 Oct 21</u> | Time: <u>1740</u> | Temp: <u>0.00</u> |
| Samples Relinquished into: <u>Fridge</u> | | Log in Cart | Other: | | |
| Samples Relinquished By: | | | Samples Received By: | | |
| Date: | Time: | Temp: | Date: | Time: | Temp: |
| Delivery: <u>Samplers</u> | Other: | | Seal Number(s) - If Used | | |
| Transport: <u>Ambient</u> | <u>Ice</u> | Other: | Seals Intact? | Yes | No |

2021 Big Stone Sampling - CCR

Landfill or ADA wells

| Site | Parameter List | Well Depth | Diameter (Inches) | Well Elevation | Sample Equipment | Dedicated? | Pump Rate (ml/minute) | Goes Dry? | Sampling Seasons** |
|------|----------------|------------|-------------------|----------------|------------------|------------|-----------------------|-----------|--------------------|
| H2OX | CCR 3 | 32.20 | 2 | 1103.91 | Bladder | Yes | 100 | Yes | April & Oct |
| H3OX | CCR 3 | 22.55 | 2 | 1095.19 | Bladder | Yes | 100 | Yes | April & Oct |
| H4OX | CCR 3 | 27.20 | 2 | 1108.22 | 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 |

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

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

1000
work

500
the 3

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: Offer Tail Power Co./ Big Stone

Sampling Personnel:

Ben Wolf

Facility ID: _____

Date: 19 Oct 21

Unique Station ID: _____

Sample ID: Well H2OX

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: 32.83
 Constructed Depth: 32.20
 Casing Diameter: 2"
 Water Level Before Purge: 6.90
 Well Volume: 4.23 Gallons

Well Casing Elevation: 1103.91
 Static Water Elevation: 1097.01
 Previous Static: 1094.72
 Water Level After Sample: Below pump
 Measurement Method: Elec. WL Steel Tape

Sampling Information

Weather Conditions: Temp: 60 Wind: LEV Sky: Fair
 Sampling Method: Grundfos Bladder SS/ Disp. Bailer Whale Grab Other: _____
 Dedicated Equipment: Yes No Pumping Rate: .25 gpm
 Well Purged Dry? Yes No Time Pump Began: 1147 am pm
 Time Purged Dry? 1204 Time of Sampling: 1147 am pm
 Duplicate Sample? Yes No ID: _____ Sample EH: -219.4
 Sample Appearance: General: Clear Color: None Phase: None Odor: Sulfurous

| Time | pH | Specific Cond. | Temp °C | D. O. mg/L | Turbidity NTU | Gallons Removed | SEQ # | Comments: |
|-------------|-------------|----------------|--------------|------------|---------------|-----------------|----------|-----------------|
| <u>1204</u> | <u>7.32</u> | <u>3868</u> | <u>10.02</u> | <u>NA</u> | <u>NA</u> | <u>4.25</u> | <u>1</u> | |
| | | | | | | | <u>2</u> | |
| | | | | | | | <u>3</u> | |
| <u>1209</u> | <u>7.44</u> | <u>3857</u> | <u>10.54</u> | <u>↓</u> | <u>↓</u> | <u>—</u> | <u>4</u> | <u>Recharge</u> |
| | | | | | | | <u>5</u> | |

Stabilized? Yes No Amount Water Removed: 4.26 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:

Ben Wolf

Facility ID: _____

Date: 19 Oct 21

Unique Station ID: _____

Sample ID: Well H3OX

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: 22.68
 Constructed Depth: 22.55
 Casing Diameter: 2"
 Water Level Before Purge: 6.46
 Well Volume: 2.65 Gallons

Well Casing Elevation: 1095.19
 Static Water Elevation: 1088.73
 Previous Static: 1085.47
 Water Level After Sample: Below pump
 Measurement Method: Elec. WLI Steel Tape

Sampling Information

Weather Conditions: Temp: 50 Wind: LEV Sky: Fair
 Sampling Method: Grundfos Bladder S&T Disp. Bailer Whale Grab Other: _____
 Dedicated Equipment: Yes No Pumping Rate: .25 gpm
 Well Purged Dry? Yes No Time Pump Began: 1002 am/pm
 Time Purged Dry? 1013 Time of Sampling: 1018 am/pm
 Duplicate Sample? Yes No ID: _____ Sample EH: 216.6
 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: |
|------|------|----------------|---------|------------|---------------|-----------------|-------|-----------|
| 1013 | 7.80 | 3419 | 13.86 | NA | NA | 2.75 | 1 | |
| | | | | | | | 2 | |
| | | | | | | | 3 | |
| 1018 | 7.99 | 3474 | 13.29 | ↓ | ↓ | ← | 4 | Recharge |
| | | | | | | | 5 | |

Stabilized? Yes No

Amount Water Removed: 2.75 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:

Ben Wolf

Facility ID: _____

Date: 19 Oct 21

Unique Station ID: _____

Sample ID: Well H4OX

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: 27.48
 Constructed Depth: 27.20
 Casing Diameter: 2"
 Water Level Before Purge: 15.90
 Well Volume: 1.89 Gallons

Well Casing Elevation: 1108.22
 Static Water Elevation: 1092.32
 Previous Static: 1088.39
 Water Level After Sample: Below pump
 Measurement Method: Elec. W/L Steel Tape

Sampling Information

Weather Conditions: Temp: 54 Wind: LLV Sky: Fair
 Sampling Method: Grundfos Bladder SBT Disp. Bailer Whale Grab Other: _____
 Dedicated Equipment: Yes No Pumping Rate: .25 gpm
 Well Purged Dry? Yes No Time Pump Began: 1050 am pm
 Time Purged Dry? 1058 Time of Sampling: 1103 am pm
 Duplicate Sample? Yes No ID: — Sample EH: 1.8
 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: |
|-------------|-------------|----------------|-------------|------------|---------------|-----------------|----------|-----------------|
| <u>1058</u> | <u>7.95</u> | <u>2648</u> | <u>9.40</u> | <u>NA</u> | <u>NA</u> | <u>2</u> | <u>1</u> | |
| | | | | | | | <u>2</u> | |
| | | | | | | | <u>3</u> | |
| <u>1103</u> | <u>8.07</u> | <u>2639</u> | <u>9.58</u> | <u>I</u> | <u>I</u> | <u>—</u> | <u>4</u> | <u>Recharge</u> |
| | | | | | | | <u>5</u> | |

Stabilized? Yes No

Amount Water Removed: 2 Gallons

Comments:

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073

507 354 8517

Groundwater Assessment

Sampling Personnel:

DF

Site: Offter Tail Power Co./ Big Stone

Facility ID: —

Date: 19 Oct 21

Unique Station ID: —

Sample ID:

Well H6

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: 17.92
 Constructed Depth: 17.70
 Casing Diameter: 2"
 Water Level Before Purge: 1000
 Well Volume: 1.29 Gallons

Well Casing Elevation: NA
 Static Water Elevation: —
 Previous Static: —
 Water Level After Sample: 10.40
 Measurement Method: Elec. WLI Steel Tape

Sampling Information

Weather Conditions: Temp: 60 Wind: SS Sky: Sunny
 Sampling Method: Grundfos Bladder SS Disp. Bailer Whale Grab Other:
 Dedicated Equipment: Yes No Pumping Rate: 0.25 gpm
 Well Purged Dry? Yes No Time Pump Began: 1211 am / pm
 Time Purged Dry? — Time of Sampling: 1239 am / pm
 Duplicate Sample? Yes No ID: — Sample EH: 76.4
 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: |
|------------------|-------------|----------------|--------------|------------|---------------|-----------------|-------|-----------|
| <u>6</u> 1217 | <u>7.45</u> | <u>1099</u> | <u>12.38</u> | <u>NA</u> | <u>NA</u> | <u>1.5</u> | 1 | |
| 1233 | <u>7.44</u> | <u>1111</u> | <u>12.26</u> | | | <u>3</u> | 2 | |
| 1239 | <u>7.43</u> | <u>1112</u> | <u>12.24</u> | | | <u>4.5</u> | 3 | |
| | | | | | | | 4 | |
| | | | | | | | 5 | |

Stabilized? Yes No

Amount Water Removed: 4.5 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: 19 Oct 21

Unique Station ID:

Sample ID: Well H8

Well Condition

Well Locked? No
 Well Labeled? No
 Casing Straight? No

Protective Posts? No
 State ID Tag? No
 Grout Seal Intact? No

Repairs Necessary:

Well Information

Well Depth: 22.33

Well Casing Elevation: 1081.23

Constructed Depth: 22.05

Static Water Elevation: 1077.08

Casing Diameter: 2"

Previous Static:

Water Level Before Purge: 4.15

Water Level After Sample: 4.65

Well Volume: 2.97 Gallons

Measurement Method: W/L Steel Tape

Sampling Information

Weather Conditions: Temp: 60 Wind: SS Sky: Sunny

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

Dedicated Equipment: No

Pumping Rate: 0.25 gpm

Well Purged Dry? Yes No

Time Pump Began: 1244 am / pm

Time Purged Dry?

Time of Sampling: 1320 am / pm

Duplicate Sample? Yes ID:

Sample EH: 74.0

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: |
|------|------|----------------|---------|------------|---------------|-----------------|-------|-----------|
| 12 | | | | | | | | |
| 1256 | 7.24 | 1473 | 11.26 | NA | NA | 3 | 1 | |
| 1308 | 7.24 | 1474 | 11.36 | | | 6 | 2 | |
| 1320 | 7.24 | 1474 | 11.36 | | | 9 | 3 | |
| | | | | | | | 4 | |
| | | | | | | | 5 | |

Stabilized? No

Amount Water Removed: 9 Gallons

Comments:

Exceptions to Protocol:

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: 19 Oct 21

Unique Station ID: _____

Sample ID: Well H9

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: 30.71
 Constructed Depth: 30.20
 Casing Diameter: 2"
 Water Level Before Purge: 7.69
 Well Volume: 3.76 Gallons

Well Casing Elevation: 1086.21
 Static Water Elevation: 1078.52
 Previous Static: 1074.84
 Water Level After Sample: 9.17
 Measurement Method: Elec. W/L Steel Tape

Sampling Information

Weather Conditions: Temp: 53° Wind: S@4 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: 1340 am / pm
 Time Purged Dry? _____ Time of Sampling: 1428 am / pm
 Duplicate Sample? Yes No ID: _____ Sample EH: 99.2
 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: |
|-------------|-------------|----------------|--------------|------------|---------------|-----------------|----------|-----------|
| <u>1356</u> | <u>6.64</u> | <u>3149</u> | <u>10.35</u> | <u>NA</u> | <u>NA</u> | <u>4</u> | <u>1</u> | |
| <u>1412</u> | <u>6.63</u> | <u>3178</u> | <u>10.33</u> | <u>L</u> | <u>L</u> | <u>8</u> | <u>2</u> | |
| <u>1428</u> | <u>6.63</u> | <u>3205</u> | <u>10.31</u> | <u>L</u> | <u>L</u> | <u>12</u> | <u>3</u> | |
| | | | | | | | <u>4</u> | |
| | | | | | | | <u>5</u> | |

Stabilized? Yes No

Amount Water Removed: 12 Gallons

Comments: _____

Exceptions to Protocol: _____

Appendix B

Groundwater Flow Calculations

Big Stone Ash Disposal Area Groundwater Velocity Calculation

Date 4/20/2021

| | | | |
|----|----------|--------|---|
| 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 |
| H2OX | 1103.86 | 6.06 | 1097.80 |
| H3OX | 1095.26 | 6.55 | 1088.71 |
| H4OX | 1108.25 | 16.00 | 1092.25 |
| H6 | 1097.76 | 10.12 | 1087.64 |
| H8 | 1081.23 | 4.06 | 1077.17 |
| H9 | 1086.21 | 7.22 | 1078.99 |

(1) Groundwater Monitoring System Report (Barr, 2016)

horizontal distance, ft

| | H2OX | H3OX | H4OX |
|----|--------|--------|--------|
| H6 | 2419.8 | 2513.7 | 4568.2 |
| H8 | 2174.7 | 2466.6 | 4455.1 |
| H9 | 1771.9 | 2272.3 | 4156.8 |

difference in WL elevation, ft

| | H2OX | H3OX | H4OX |
|----|-------|-------|-------|
| H6 | 10.16 | 1.07 | 4.61 |
| H8 | 20.63 | 11.54 | 15.08 |
| H9 | 18.81 | 9.72 | 13.26 |

horizontal gradient, ft/ft

| | H2OX | H3OX | H4OX |
|----|---------|---------|---------|
| H6 | 0.00420 | 0.00043 | 0.00101 |
| H8 | 0.00949 | 0.00468 | 0.00338 |
| H9 | 0.01062 | 0.00428 | 0.00319 |

V, ft/d

| | H2OX | H3OX | H4OX |
|----|---------|---------|---------|
| H6 | 0.01000 | 0.00101 | 0.00240 |
| H8 | 0.02259 | 0.01114 | 0.00806 |
| H9 | 0.02528 | 0.01019 | 0.00760 |

V, ft/yr

| | H2OX | H3OX | H4OX |
|----|------|------|------|
| H6 | 3.7 | 0.4 | 0.9 |
| H8 | 8.3 | 4.1 | 2.9 |
| H9 | 9.2 | 3.7 | 2.8 |

V avg, ft/y

4.0

Big Stone Ash Disposal Area Groundwater Velocity Calculation

Date 10/19/2021

| | | | |
|----|----------|--------|---|
| 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 |
| H2OX | 1103.86 | 6.90 | 1096.96 |
| H3OX | 1095.26 | 6.46 | 1088.80 |
| H4OX | 1108.25 | 15.90 | 1092.35 |
| H6 | 1097.76 | 10.00 | 1087.76 |
| H8 | 1081.23 | 4.15 | 1077.08 |
| H9 | 1086.21 | 7.69 | 1078.52 |

(1) Groundwater Monitoring System Report (Barr, 2016)

horizontal distance, ft

| | H2OX | H3OX | H4OX |
|----|--------|--------|--------|
| H6 | 2419.8 | 2513.7 | 4568.2 |
| H8 | 2174.7 | 2466.6 | 4455.1 |
| H9 | 1771.9 | 2272.3 | 4156.8 |

difference in WL elevation, ft

| | H2OX | H3OX | H4OX |
|----|-------|-------|-------|
| H6 | 9.20 | 1.04 | 4.59 |
| H8 | 19.88 | 11.72 | 15.27 |
| H9 | 18.44 | 10.28 | 13.83 |

horizontal gradient, ft/ft

| | H2OX | H3OX | H4OX |
|----|---------|---------|---------|
| H6 | 0.00380 | 0.00041 | 0.00100 |
| H8 | 0.00914 | 0.00475 | 0.00343 |
| H9 | 0.01041 | 0.00452 | 0.00333 |

V, ft/d

| | H2OX | H3OX | H4OX |
|----|---------|---------|---------|
| H6 | 0.00905 | 0.00099 | 0.00239 |
| H8 | 0.02177 | 0.01131 | 0.00816 |
| H9 | 0.02478 | 0.01077 | 0.00792 |

V, ft/yr

| | H2OX | H3OX | H4OX |
|----|------|------|------|
| H6 | 3.3 | 0.4 | 0.9 |
| H8 | 8.0 | 4.1 | 3.0 |
| H9 | 9.1 | 3.9 | 2.9 |

V avg, ft/y

3.9