

2018 Annual Groundwater Monitoring and Corrective Action Report

CCR Annual Monitoring Report

Ash Disposal Area

Big Stone Plant Big Stone City, South Dakota

Prepared for Otter Tail Power Company

January 2019

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2018 CCR Annual Groundwater Monitoring and Corrective Action Report

Ash Disposal Area

Big Stone Plant Big Stone City, South Dakota

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Acronyms

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

1.0 Introduction

Otter Tail Power Company (OTP) operates Big Stone Plant, a coal-fired generation unit near Big Stone City, South Dakota (Figure 1). Coal combustion residuals (CCR) from plant operations are placed in an on-site landfill, referred to as the Ash Disposal Area. The Ash Disposal Area 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 CCR unit (Ash Disposal Area) is shown on Figure 1.

This 2018 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) describes the monitoring program and results for the Ash Disposal Area at Big Stone Plant (Site).

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

The 2017 Annual Groundwater Monitoring and Corrective Action Report, Ash Disposal Area (Barr, 2018) documented the results of the baseline groundwater monitoring. The evaluation of groundwater monitoring data for statistically significant increases over background levels for the constituents listed in Appendix III from the CCR Rule began on October 17, 2017 and continued in 2018.

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 1CCR 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
§257.90(e)(3)	Provide the number and date groundwater samples were collected, and the monitoring (i.e., detection or assessment)	Section 2.2 Monitoring and Analytical Results
§257.90(e)(4)	Discuss any transition between monitoring programs	Section 2.4 Key Activities for Upcoming Year
§257.90(e)(5)	Other information specified in §257.90 through §257.98	Other information not required in this report.

2.0 Groundwater Monitoring and Corrective Action Program

This section documents the status of the groundwater monitoring and corrective action program for the CCR unit for 2018. 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 2019 are described in Section 2.4.

2.1 Groundwater Monitoring System

2.1.1 Documentation

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

2.1.2 Changes to Monitoring System

The groundwater monitoring system was unchanged in 2018.

2.2 Monitoring and Analytical Results

A total of 12 groundwater samples were collected and analyzed for the constituents listed in Appendix III (Part 257) in 2018 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 in Appendix A.

Two semiannual samples were collected from monitoring wells H2OX, H3OX, H4OX, H6, H8, and H9. In addition to the semiannual samples, one resample was collected from monitoring well H6 for field pH on June 20, 2018.

2.3 Key Actions Completed/Problems Encountered

The following key actions were completed for the groundwater monitoring program during 2018:

- Completed semiannual detection monitoring sampling for each background and downgradient well.
- 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.

No problems were encountered during the reporting period.

2.4 Key Activities for Upcoming Year

The following key groundwater monitoring program activities are planned for 2019:

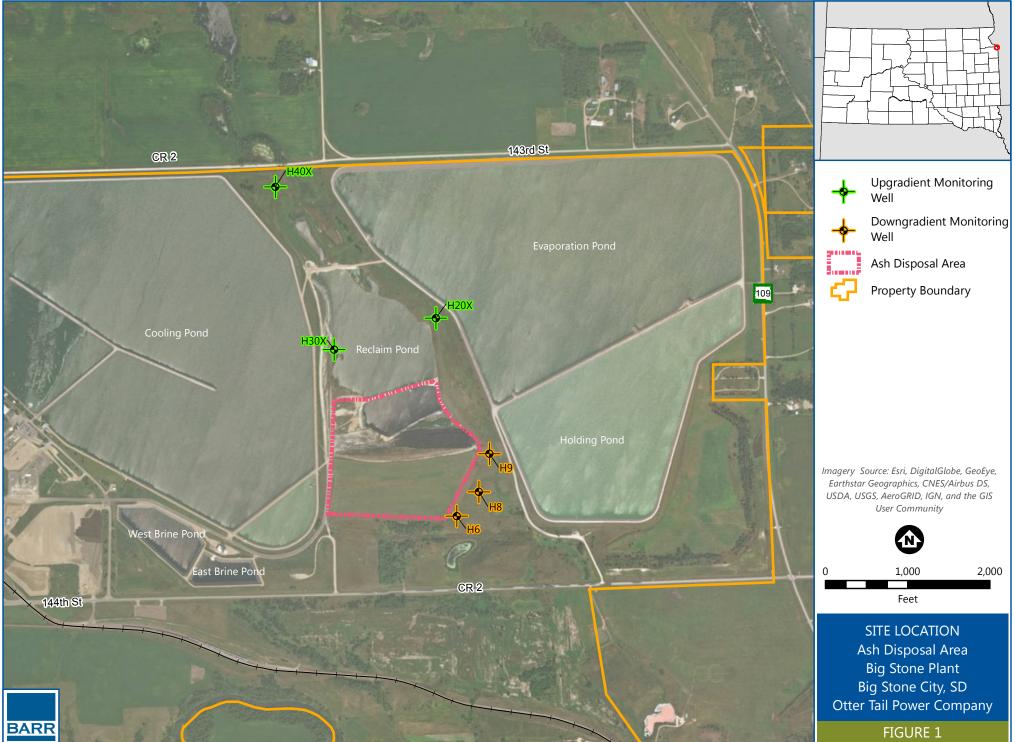
- Continue the groundwater monitoring program in accordance with the CCR rule.
- Evaluate analytical results from the 2019 semiannual detection monitoring events for statistically significant increases (SSIs) according to the CCR Groundwater Sampling and Analysis Plan (Carlson McCain, 2017).

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

Barr Footer: ArcGIS 10.4.1, 2018-01-22 12:37 File: I:\Projects\41\25\1005\Maps\2017_Groundwater_Report_CCR\Ash_Disposal_Area\Fig01 Site Location.mxd User: MRQ



Appendices

Appendix A

Laboratory Reports and Field Sheets



Page:



FINAL REPORT COMPLETION DATE: 18 May 18

Date Reported: 15 May 2018

1 of 15

Work Order #: 31-0151_ASH Account #: 006106 PO #: 48680

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

Project Name: BIG STONE PLANT

Sing Field Service Manager/Date Reviewed, 15 May 18 Chemistry Lab Manager/Date Reviewed 18 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.





CERTIFICATE of ANALYSIS - CCR

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

Project Name: BIG STONE PLANT

Sample Description: WELL H6

Page: 2 of 15

Report Date: 15 May 2018 Lab Number: 18-A17810 Work Order #: 31-0151 Account #: 006106 Sample Matrix: GROUNDWATER Date Sampled: 16 Apr 2018 13:08 Sampled By: MVTL FIELD PERSONNEL Date Received: 16 Apr 2018 19:10 PO #: 48680

Temp at Receipt: 0.9C

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions					18 Apr 18	JMS
pH, Field	7,82	units	1.00	I-1586-85	16 Apr 18 13:08	BS
pH	* 7.3	units	1.0	SM 4500 H+ B-2000	17 Apr 18 11:40	MCS
Sulfate	50.6 @	mg/L	5.0	ASTM D516-07	19 Apr 18 9:01	AKF
Chloride	3.5	mg/L	3.0	SM 4500 Cl E	20 Apr 18 9:48	KCJ
Solids, Total Dissolved	583	mg/L	10	SM 2540 C-97	17 Apr 18 14:25	MCS
Calcium	50,90	mg/L	0.500	SW6010C	19 Apr 18 16:35	RMV
Boron	3.800	mg/L	0.100	SW6010C	19 Apr 18 16:35	RMV
Fluoride	0.370	mg/L	0.020	EPA 300.0	26 Apr 18 10:45	

* 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
 WI LAB # 999447680
 ND MICRO # 1013-M
 ND WW/DN # R-040



MEMBER

CERTIFICATE of ANALYSIS - CCR

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

Project Name: BIG STONE PLANT

Sample Description: WELL H8

3 of 15 Page:

Report Date: 15 May 2018 Lab Number: 18-A17811 Work Order #: 31-0151 Account #: 006106 Sample Matrix: GROUNDWATER Date Sampled: 16 Apr 2018 14:16 Sampled By: MVTL FIELD PERSONNEL Date Received: 16 Apr 2018 19:10 PO #: 48680

Temp at Receipt: 0.9C

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst	
Water Digestions					18 Apr 18	JMS	
pH, Field	7.83	units	1.00	I-1586-85	16 Apr 18 14:16	BS	
pH	* 7.2	units	1.0	SM 4500 H+ B-2000	17 Apr 18 11:40	MCS	
Sulfate	239 @	mg/L	5.0	ASTM D516-07	19 Apr 18 9:01	AKF	
Chloride	4.6	mg/L	3.0	SM 4500 C1 E	20 Apr 18 9:48	KCJ	
Solids, Total Dissolved	877	mg/L	10	SM 2540 C-97	17 Apr 18 14:25	MCS	
Calcium	107.0	mg/L	0.500	SW6010C	19 Apr 18 16:35	RMV	
Boron	3,940	mg/L	0.100	SW6010C	19 Apr 18 16:35	RMV	
Fluoride	0,540	mg/L	0.020	EPA 300.0	26 Apr 18 10:45	RMV	

* Holding Time Exceeded

RL = Reporting Limit

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 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: NN LAB # 027-015-125
 WI LAB # 999447680
 ND MNCRO # 1013-M
 ND WW/DW # R-040



ACIL

CERTIFICATE of ANALYSIS - CCR

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

Project Name: BIG STONE PLANT

Sample Description: WELL H9

Page: 4 of 15

Report Date: 15 May 2018 Lab Number: 18-A17812 Work Order #: 31-0151 Account #: 006106 Sample Matrix: GROUNDWATER Date Sampled: 16 Apr 2018 15:27 Sampled By: MVTL FIELD PERSONNEL Date Received: 16 Apr 2018 19:10 PO #: 48680

Temp at Receipt: 0.9C

	As Receiv Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions pH, Field pH Sulfate Chloride Solids, Total Dissolved Calcium Boron	7.25 * 6,8 1520 ~ 25.6 2840 604.0 ~ 1.170	units units mg/L mg/L mg/L mg/L mg/L	1.00 1.0 5.0 3.0 10 0.500 0.100	I-1586-85 SM 4500 H+ B-2000 ASTM D516-07 SM 4500 Cl E SM 2540 C-97 SW6010C SW6010C	18 Apr 18 16 Apr 18 15:27 17 Apr 18 11:40 19 Apr 18 9:01 20 Apr 18 9:48 17 Apr 18 14:25 19 Apr 18 17:08 19 Apr 18 17:08 30 Apr 18 12:45	MCS AKF KCJ MCS RMV RMV RMV

* Holding Time Exceeded

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

= <u>b</u>	Due to sample matrix	# - Due co concentration of finite
! =	Due to sample quantity	
CERTIFICATION: MN LAB # 027-015-125	WI LAB # 999447680	ND MICRO # 1013-M ND WW/DW # R-040



MEMBER

CERTIFICATE of ANALYSIS - CCR

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

Project Name: BIG STONE PLANT

Sample Description: WELL H2OX

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Report Date: 15 May 2018 Lab Number: 18-A17813 Work Order #: 31-0151 Account #: 006106 Sample Matrix: GROUNDWATER Date Sampled: 16 Apr 2018 15:47 Sampled By: MVTL FIELD PERSONNEL Date Received: 16 Apr 2018 19:10 PO #: 48680

Temp at Receipt: 0.9C

	As Receiv Result	ed	Method RL	Method Reference	Date Analyzed	Analyst	
Water Digestions pH, Field pH Sulfate Chloride	7.09 * 7.1 2390 ~ 3.7	units units mg/L mg/L	1.00 1.0 5.0 3.0	I-1586-85 SM 4500 H+ B-2000 ASTM D516-07 SM 4500 Cl E	18 Apr 18 16 Apr 18 15:47 17 Apr 18 11:40 19 Apr 18 9:01 20 Apr 18 9:48	AKF KCJ	
Solids, Total Dissolved Calcium Boron Fluoride	3870 481.0 ~ 0.240 0.310 @	mg/L mg/L mg/L mg/L	10 0.500 0.100 0.020	SM 2540 C-97 SW6010C SW6010C EPA 300.0	17 Apr 18 14:25 24 Apr 18 10:56 19 Apr 18 17:08 30 Apr 18 12:45	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
 NI LAB # 999447680
 ND MICRO # 1013-M
 ND WW/DW # R-040

 RL = Reporting Limit



ACIL

CERTIFICATE of ANALYSIS - CCR

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

Project Name: BIG STONE PLANT

Sample Description: WELL H30X

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Report Date: 15 May 2018 Lab Number: 18-A17814 Work Order #: 31-0151 Account #: 006106 Sample Matrix: GROUNDWATER Date Sampled: 16 Apr 2018 13:03 Sampled By: MVTL FIELD PERSONNEL Date Received: 16 Apr 2018 19:10 PO #: 48680

Temp at Receipt: 0.9C

	As Receiv Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions pH, Field pH Sulfate Chloride	7.14 * 7.0 1910 ~ 79.7	units units mg/L mg/L	1.00 1.0 5.0 3.0	I-1586-85 SM 4500 H+ B-2000 ASTM D516-07 SM 4500 Cl E	18 Apr 18 16 Apr 18 13:03 17 Apr 18 11:40 19 Apr 18 9:01 20 Apr 18 9:48	JMS BS MCS AKF KCJ
Solids, Total Dissolved Calcium Boron Fluoride	3740 414.0 ~ 6.920 ~ 0.290 @	mg/L mg/L mg/L mg/L	10 0.500 0.100 0.020	SM 2540 C-97 SW6010C SW6010C EPA 300.0	17 Apr 18 14:25 24 Apr 18 10:56 24 Apr 18 10:56 26 Apr 18 10:45	

* 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
 WI LAB # 999447680
 ND MICRO # 1013-M
 ND WW/DW # R-040



MEMBER

CERTIFICATE of ANALYSIS - CCR

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

Project Name: BIG STONE PLANT

Sample Description: WELL H40X

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Report Date: 15 May 2018 Lab Number: 18-A17815 Work Order #: 31-0151 Account #: 006106 Sample Matrix: GROUNDWATER Date Sampled: 16 Apr 2018 14:38 Sampled By: MVTL FIELD PERSONNEL Date Received: 16 Apr 2018 19:10 PO #: 48680

Temp at Receipt: 0.9C

	As Receiv Result	ed	Method RL	Method Reference	Date Analyzed	Analyst	
Water Digestions pH, Field pH Sulfate Chloride Solids, Total Dissolved Calcium Boron	6.82 * 6.9 1190 ~ 50.1 2300 315.0 0.408 0.340 @	units units mg/L mg/L mg/L mg/L mg/L	1.00 1.0 5.0 3.0 10 0.500 0.100 0.020	I-1586-85 SM 4500 H+ B-2000 ASTM D516-07 SM 4500 Cl E SM 2540 C-97 SW6010C SW6010C EPA 300.0	18 Apr 18 16 Apr 18 14:38 17 Apr 18 11:40 19 Apr 18 9:01 20 Apr 18 9:48 17 Apr 18 14:25 19 Apr 18 17:08 19 Apr 18 17:08 26 Apr 18 10:45	MCS AKF KCJ MCS RMV RMV	

* Holding Time Exceeded

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

RL = Reporting Limit

 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
 WI LAB # 999447680
 ND MICRO # 1013-M
 ND WW/DW # R-040

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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INORGANIC AND METALS ANALYSES: No problems were encountered with these analyses.

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. **MVTL**

MINNESOTA VALLEY TESTING LABORATORIES, INC.

Page: 1 of 1

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: 18-A17810 to 18-A	17822	Pro	ject: BIG	G STON	E PLANT		Work (Order: 2	01831-01	151							
a Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits			Matnix Spike Orig Result	Matrix Spike Result	Matrix	Matrix Spike % Rec Limits	MSD/T Dup?	MSD/ Dup Result	MSD Rec. %	MSD/ Dup RPD	MSD/ * Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Boron mg/L	1.000 1.000 1.000 1.000	97 100 99 99	85-115 85-115 85-115 85-115	1.00 1.00 1.00 1.00	18-A17811 18-A17819 18-A17793 18-A17819	3.940 1.260 1.120 1.340	5.140 2.430 2.080 2.370	120 117 96 103	75-125 75-125 75-125 75-125	5.140 2.430 2.080 2.370	4.890 2.480 2.010 2.350	95 122 89 101	5.0 2.0 3.4 0.8	10 10 10 10	92 95 95 94 96	90-110 90-110 90-110 90-110 90-110	< 0.1 < 0.1 < 0.1
Calcium mg/L	50.00 50.00 50.00 50.00	99 101 100 100	85-115 85-115 85-115 85-115	50.0 50.0 50.0 50.0	18-A17811 18-A17819 18-A17819 18-A17793	107.0 231.0 241.0 233.0	161.0 289.0 295.0 282.0	108 116 108 98	75-125 75-125 75-125 75-125	161.0 289.0 295.0 282.0	157.0 292.0 292.0 290.0	100 122 102 114	2.5 1.0 1.0 2.8	10 10 10 10	93 95 96 97 99	90-110 90-110 90-110 90-110 90-110	< 0.5 < 0.5 < 0.5
Chloride mg/L	-	-	-	60.0 60.0	18-A17816 18-A17440	50.9 7.7	113 67.3	104 99	86-117 85-115	113 67.3	116 69.2	108 102	2.6 2.8	5 5	99 99	90-110 90-110	<3 <3
Fluoride mg/L	-	-	-	0.20 1.00 1.00	18-A17810 18-D1309 18-A18659	0.370 1.03 0.590	0.580 1.92 1.59	105 89 100	75-125 75-125 75-125	0.580 1.92 1.59	0.590 2.13 1.46	110 110 87	1.7 10 8.5	10 10 10	103 93 103	90-110 90-110 90-110	< 0.02 < 0.02
pH units	-	-	-	-	-	-	-	-	-	7.2 7.0	7.2 7.0	-	0.0 0.0	2.5 2.5	101 101	90-110 90-110	-
Solids, Total Dissolved mg/L		- - -	- - -		- - -	-	-		-	372 1030 2750 7660	368 1050 2800 7330		1.1 1.9 1.8 4.4	10 7 7 7	104 100	85-115 85-115	< 10 < 10
Sulfate mg/L	-	-	- - -	500 500 500	18-A17818 18-A17822 18-A17793	295 904 1570	834 1330 1920	108 85 70	68-132 68-132 68-132	834 1330 1920	846 1310 1970	110 81 80	1.4 1.5 2.6	5 5 5	99 98	80-120 80-120	< 5 < 5

Approved by:

Minnesota Valley Testing Laboratories 1126 North Front Street New Ulm, MN 56003

 1126 North Front Street
 New Ulm, MN 56003

 Phone: 800 782 3557
 Fax: 507 359 2890

 Field Security Option Option
 Fax: 507 359 2890

Field Service Chain of Custody Record

															- 61	<u></u>	<u></u>			-
		Power Com		Project Ty		Big Stor			<u> </u>	Nam	<u>ie of</u>	Sam	pler	<u>s:</u>	エッシュ	4' He	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim c_{i}$		
Report	Otter Tail I	Power Com	pany	Carbon Copy: Barr Engineering				Name of Samplers: José Hustiman AF, BS met Sfern, Ben Wolf												
Attn:	Paul Vuko	nich		Attn:						Quo	te Ni	impe	<u>r.</u>							
Address	P.O. Box 4	96		Address:						Wori	k Or	der N	umb	er:						
	Fergus Fa	lls, MN 565	38-0496							Lab	Num	bers	<u>.</u>							
Phone:	218-739-8																			
		Sample In	formation								E	Bottl	e Ty	ре					Analys	sis
Lab Number	Sample ID	Unique Station ID	Date	Time	Sample Type	Sample Location	1000 HNO3	Fillered Yor N 1000 2	ellou	600 HNO3	Filler? Y or N	500 H2SO4	Filter? Y or M	1000 Amber not	1000 Amber	500 NaOH	Other: 150 Hand	Other 150 AL	Analysis Required	
ATRB	H2OX	1	11-Apr 18	1547	GW				1	1	N								Boron,Calcium	n]
	НЗОХ	1	1 7	1303	GW				1	1	N								Chloride, pH	٦
	H4OX		1 7	1438	GW	1			1	1	N								Fluoride, TDS	
AITRIO		+	$\frac{1}{i}$	1308	GW				1	1	Ν								Sulfate on all	
	H-8		+	1416	GW	1			1	1	N							1	· · · · · · · · · · · · · · · · · · ·	-
	H-9			1527	GW	1			1	1	N									ゴ
	 · · · · · · · ·	1				1														7
A17816	Slag 4		1 1	12360	GW				1	1	N									
	Slag 5			1430	GW				1	1	N							L		
	Slag 6			1510	GW				1	1	N								L]

Comments:

WORK ORDER #2

			RZZ	\$		+	
Samples Relinc	uished By:	all still	``\``\``\``\``\``\``\``\``\``\``\``\``\``\``\	Samples Received E	V. A. Klon	(**)	
Date:		Time: 19 10	Tempo	Date: 17 April	Time	800	Temp: 2 - 40
Samples Relind	uished into:	Fridge) Log	in Cart Othe	er: 🔰			•
Samples Relind	uished By:			Samples Received E	y:		
Date:		Time:	Temp:	Date:	Time	:	Temp:
Delivery:	Samplers	Other:		Seal Number(s) - If l	Jsed		
Transport:	Ambient	Ice	Other:	Seals Intact?	Yes	No	

1

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Groundwater Assessment			Site:	Otter 1	Tail Power	Co./ Big Ston
Sampling Personnel:			Facility ID:			
Bon Stubbs	_		Date: 1C	Apr 18		
			Unique Stati	ion ID:		
······			Sample ID:		We	H6
Well Condition				1.0.0		
Well Locked? Yes No	_		Protective P		N	
Well Labeled? Cles No	_		State ID Tag		Ø	
Casing Straight? Ces No			Grout Seal I	ntact? Yes	N	9
Repairs Necessary:						· · · · · · · · · · · · · · · · · · ·
Well Information					(,	
Well Depth: 17.92			Well Casing		<u></u>	<u>~</u>
Constructed Depth: 17.70	_		Static Water			
Casing Diameter: 2"	<u> </u>		Previous Sta			
Water Level Before Purge: 14.3	5			After Sample		
Well Volume: 0.57	Gallons		Measureme	nt Method:	Elec. W	LI Steel Ta
			1			
Sampling Information						
Weather Conditions: Temp: 30		Wind: 시	-17	Sky:	FAIT	
				Grab Other:		
Sampling Method: Grundfos	Bladder SS/T	Disp. Bailer	Whale			
Dedicated Equipment: Yes No	Bladder SS/T	Disp. Baller	Pumping Ra	ite: 0.25		om
Dedicated Equipment: Yes No Well Purged Dry? Yes No	Bladder SS/T	Disp. Baller	Pumping Ra Time Pump	ite: <u>a.z.5</u> Began i i	300	am / 👩
Dedicated Equipment: YesNoWell Purged Dry?YesNoTime Purged Dry?13\$3		Disp. Baller	Pumping Ra Time Pump Time of San	ite: <u>a 25</u> Began <u>i</u> npling: 13		am / 👩
Dedicated Equipment: Yes No Well Purged Dry? Yes No	Bladder \$6/T	Disp. Baller	Pumping Ra Time Pump Time of San Sample EH:	nte: <u>8.25</u> Began 1 npling: 13 79-5	300 67	am / oð am / p
Dedicated Equipment: YesNoWell Purged Dry?YesNoTime Purged Dry?13:3Duplicate Sample?Yes		Color: W	Pumping Ra Time Pump Time of San Sample EH:	ite: <u>a 25</u> Began <u>i</u> npling: 13	300 67	am / 👩
Dedicated Equipment: (Yes) No Well Purged Dry? (Yes) No Time Purged Dry? (3 × 3) Duplicate Sample? Yes No Sample Appearance: General:		Color: No	Pumping Ra Time Pump Time of San Sample EH:	ate: 0.25 Began 13 npling: 13 79-5 e: none	కింద .6 శ్రె .0	am / oð am / p
Dedicated Equipment: (***) No Well Purged Dry? (***) Time Purged Dry? 13 * 3 Duplicate Sample? Yes < No		Color: No	Pumping Ra Time Pump Time of San Sample EH: As Phase Turbidity	$\begin{array}{c c} \text{ate:} & 0 & 2 \leq \\ \text{Began} & 1 \\ \text{opling:} & 13 \\ \hline & 77 - 5 \\ \text{e:} & 10 & 12 \\ \hline & & & \\ \text{Gallons} \end{array}$	కె బడు స్త్రి (SEQ)	am / o am / p dor:
Dedicated Equipment: (Yes) No Well Purged Dry? (Yes) No Time Purged Dry? (Yes) No Duplicate Sample? Yes (No) Sample Appearance: General: Sample Appearance: Specific Cond. Cond.		Color: ve	Pumping Ra Time Pump Time of San Sample EH: Turbidity NTU	ate: <u>0.25</u> Began 13 npling: 13 79-5 e: <u>13</u> Removed	3 ΔΦ Δ 2 Ο SEQ # C	am / oð am / p
Dedicated Equipment: (1985) No Well Purged Dry? (1985) No Time Purged Dry? (1383) Time Duplicate Sample? Yes (No) Sample Appearance: General: Sample Appearance: General: Specific Time pH Cond. 1363 12005		Color: No (Pumping Ra Time Pump Time of San Sample EH: As Phase Turbidity	$\begin{array}{c c} \text{ate:} & 0 & 2 \leq \\ \text{Began} & 1 \\ \text{opling:} & 13 \\ \hline & 77 - 5 \\ \text{e:} & 10 & 12 \\ \hline & & & \\ \text{Gallons} \end{array}$	3 ο ω 6 2 0 SEQ # C 1	am / o am / p dor: المعالية omments:
Dedicated Equipment: (Yes) No Well Purged Dry? (Yes) No Time Purged Dry? (Yes) No Duplicate Sample? Yes (No) Sample Appearance: General: Sample Appearance: Specific Cond. Cond.	 ID: درود ۲ Iemp o _C	Color: ve	Pumping Ra Time Pump Time of San Sample EH: Turbidity NTU	ate: <u>0.25</u> Began 13 npling: 13 79-5 e: <u>13</u> Removed	3 ο ω 6 2 0 SEQ # C 1 2	am / o am / p dor: 🛌 👡 c
Dedicated Equipment: (1985) No Well Purged Dry? (1985) No Time Purged Dry? (1383) Time Duplicate Sample? Yes (No) Sample Appearance: General: Sample Appearance: General: Specific Time pH Cond. 1363 12005	 ID: درود ۲ Iemp ^o C ی. ن ب 2	Color: ve	Pumping Ra Time Pump Time of San Sample EH: Turbidity NTU	Inte: 0.25 Began 1 Impling: 13 79-5 e: Norek Gallons Removed 0-75	3 α ω 6 2 7 8 EQ # C 1 2 3	am / @ am / p dor: المعالية omments:
Dedicated Equipment: (1985) No Well Purged Dry? (1985) No Time Purged Dry? (1383) Time Duplicate Sample? Yes (No) Sample Appearance: General: Sample Appearance: General: Specific Time pH Cond. 1363 12005	 ID: درود ۲ Iemp ^o C ی. ن ب 2	Color: ve	Pumping Ra Time Pump Time of San Sample EH: Turbidity NTU	Inte: 0.25 Began 1 Impling: 13 79-5 e: Norek Gallons Removed 0-75	3 α ω 6 2 0 SEQ # C 1 2 3 4	am / o am / p dor: مع سر م omments: ۲۹ دلمو ۲۹ د
Dedicated Equipment: (1985) No Well Purged Dry? (1985) No Time Purged Dry? (1383) Time Duplicate Sample? Yes (No) Sample Appearance: General: Sample Appearance: General: Specific Time pH Cond. 1363 12005	 ID: درود ۲ Iemp ^o C ی. ن ب 2	Color: No D. O. mg/L. JA	Pumping Ra Time Pump Time of San Sample EH: Turbidity NTU	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	3 ο ω ο 2 SEQ # C 1 2 3 4 5	am / @ am / p dor: المعالية omments:

Exceptions to Protocol:

- List C - Exton

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Groundwater Assessment			Site:	Otte	r Tail Pow	er Co./ Big Stor
Sampling Personnel:			Facility ID:			
Bon Stubbs	_		Date: 16	AVPT N2		
			Unique Stat			
			Sample ID:		M	Vell H8
Well Condition				Posts? Wes		No
Well Locked? Ces No			Protective F			No
Well Labeled? (Yes No	_		State ID Ta Grout Seal	V		No
Casing Straight? Wes No			Grout Seal	maci? cres		
Repairs Necessary:						
Well Information				F		4004 00
Well Depth: 22.33	_		Well Casing			1081.23
Constructed Depth: 22.05	_		Static Wate		1074.	
Casing Diameter: 2"	<u> </u>		Previous St		75.2	
Water Level Before Purge: 6.2	<u>,4</u>			After Sample		
Well Volume: 2.62 Sampling Information	Gallons	Mindt	Measureme	······································	Elec. V	
Sampling Information Weather Conditions: Temp: 36 Sampling Method: Grundfos	· · · · · · · · · · · · · · · · · · ·		N-L7 r Whale	Sky: Grab Other	Fair	-
Sampling Information Weather Conditions: Temp: ろん Sampling Method: Grundfos Dedicated Equipment: どき No	·····		N-L7 r Whale Pumping R	Sky: Grab Other ate: 6.2.4	Fair	gpm
Sampling Information Weather Conditions: Temp: 36 Sampling Method: Grundfos Dedicated Equipment: 8 Well Purged Dry? Yes	·····		N - L 7 r Whale Pumping Ra Time Pump	Sky: Grab Other ate: 6.2.4 Began: 1	Fair 5 343	gpm am_ <i>l@</i> f
Sampling Information Weather Conditions: Temp: 36 Sampling Method: Grundfos Dedicated Equipment: 76 No Well Purged Dry? Yes (No Time Purged Dry?	@ladder §S/T		N - 17 r Whale Pumping Ra Time Pump Time of Sar	Sky: Grab Other ate: <u>6,2</u> Began: 1 mpling: 1	म्प्रो इ 343 पार्छ	gpm
Sampling Information Weather Conditions: Temp: 3 & Sampling Method: Grundfos Dedicated Equipment: (1) No Well Purged Dry? Yes (No Time Purged Dry? Duplicate Sample? Yes (No	Gladder SS/T	Disp. Baile	N-L7 r Whale Pumping R Time Pump Time of Sar Sample EH	Sky: Grab Other ate: <u>6.2.4</u> Began: 1 mpling: 1 : <u>8</u> 2	E.ir 343 416 7	gpm am /ơỹn am / pr
Sampling Information Weather Conditions: Temp: 3 & Sampling Method: Grundfos Dedicated Equipment: (1) No Well Purged Dry? Yes (No Time Purged Dry? Duplicate Sample? Yes (No	@ladder §S/T	Disp. Baile	N - 17 r Whale Pumping Ra Time Pump Time of Sar	Sky: Grab Other ate: <u>6.2.4</u> Began: 1 mpling: 1 : <u>8</u> 2	E.ir 343 416 7	gpm am_ <i>l@</i> f
Sampling Information Weather Conditions: Temp: 36 Sampling Method: Grundfos Dedicated Equipment: 76 No Well Purged Dry? Yes No Time Purged Dry? Duplicate Sample? Yes No Sample Appearance: General: d	Gladder SS/T	Disp. Bailer	N-17 r Whale Pumping Ra Time Pump Time of San Sample EH Sample EH	Sky: Grab Other ate: <u>6,2,4</u> Began: 1 mpling: 1 : <u>8</u> 2	E.ir 343 416 7	gpm am <i>lợ</i> ộr am <i>l</i> ợpr
Sampling Information Weather Conditions: Temp: 36 Sampling Method: Grundfos Dedicated Equipment: 68 Weal Purged Dry? Yes Time Purged Dry? Yes Duplicate Sample? Yes Sample Appearance: General: Specific Specific	Bladder 3S/T	Disp. Bailer	N-L7 r Whale Pumping Ra Time Pump Time of Sar Sample EH Sample EH	Sky: Grab Other ate: 6.2.4 Began: 1 mpling: 1 : 82 se: 1016	五元 5 343 416 -7 [SEQ]	gpm am <i>lợ</i> ộr am <i>l</i> ợpr
Sampling Information Weather Conditions: Temp: 36 Sampling Method: Grundfos Dedicated Equipment: 68 No Well Purged Dry? Time Purged Dry? Yes Duplicate Sample? Yes Sample Appearance: General: Time pH	Eladder SS/T	Disp. Bailer Color: ^ D. O. mg/L	N - 17 r Whale Pumping Ra Time Pump Time of San Sample EH Sample EH Sample EH	Sky: Grab Other ate: 6.24 Began: 1 mpling: 1 : 82 Se: And Gallons Removed	五元 5 343 416 -7 [SEQ]	gpm am /ơð am /ơð Odor: ⴰⴰⴰⴰག
Sampling Information Weather Conditions: Temp: Sampling Method: Grundfos Dedicated Equipment: Mo Well Purged Dry? Time Purged Dry? Duplicate Sample? Yes Sample Appearance: General: Image: PH Cond. 1354 7.2(Bladder SS/T ID: Lear Iemp ^o C G: 91	Disp. Bailer	N-L7 r Whale Pumping Ra Time Pump Time of Sar Sample EH Sample EH	Sky: Grab Other ate: 6.24 Began: 1 mpling: 1 : 82 Se: Mone Gallons Removed 2.75	玉記 5 343 416 -7 SEQ #	gpm am /ơð am /ơð Odor: ⴰⴰⴰⴰག
Sampling Information Weather Conditions: Temp: Sampling Method: Grundfos Dedicated Equipment: Mo Well Purged Dry? Time Purged Dry? Duplicate Sample? Yes Sample Appearance: General: 11 Time PH Cond. 1354 7.26 1281 1405	Eladder SS/T	Disp. Bailer Color: ^ D. O. mg/L	N - 17 r Whale Pumping Ra Time Pump Time of San Sample EH Sample EH Sample EH	Sky: Grab Other ate: 6.24 Began: 1 mpling: 1 : 82 Se: 6.0 Se: 6.0 Gallons Removed 2.75 5.5	5 343 416 -7 SEQ # 1	gpm am /ơð am /ơð Odor: ⴰⴰⴰⴰག
Sampling Information Weather Conditions: Temp: Sampling Method: Grundfos Dedicated Equipment: Mo Well Purged Dry? Time Purged Dry? Duplicate Sample? Yes Sample Appearance: General: Image: Image: <t< td=""><td>Bladder SS/T iD: C = C C = C G = P = C G = P = C</td><td>Disp. Bailer Color: ^ D. O. mg/L</td><td>N - 17 r Whale Pumping Ra Time Pump Time of San Sample EH Sample EH Sample EH</td><td>Sky: Grab Other ate: 6.24 Began: 1 mpling: 1 : 82 Se: Mone Gallons Removed 2.75</td><td>EQ 343 416 -7 SEQ # 1 2</td><td>gpm am /ơð am /ơð Odor: ⴰⴰⴰⴰག</td></t<>	Bladder SS/T iD: C = C C = C G = P = C G = P = C	Disp. Bailer Color: ^ D. O. mg/L	N - 17 r Whale Pumping Ra Time Pump Time of San Sample EH Sample EH Sample EH	Sky: Grab Other ate: 6.24 Began: 1 mpling: 1 : 82 Se: Mone Gallons Removed 2.75	EQ 343 416 -7 SEQ # 1 2	gpm am /ơð am /ơð Odor: ⴰⴰⴰⴰག
Sampling Information Weather Conditions: Sampling Method: Grundfos Dedicated Equipment: Dedicated Equipment: Mo Well Purged Dry? Time Purged Dry? Duplicate Sample? Yes Sample Appearance: General: 11 Time pH Cond. 1354 7.26 1281 1405	Bladder SS/T iD: C = C C = C G = P = C G = P = C	Disp. Bailer Color: ^ D. O. mg/L	N - 17 r Whale Pumping Ra Time Pump Time of San Sample EH Sample EH Sample EH	Sky: Grab Other ate: 6.24 Began: 1 mpling: 1 : 82 Se: 6.0 Se: 6.0 Gallons Removed 2.75 5.5	Fair 3-43 -7 -7 SEQ # 1 2 3	gpm am /ơð am /ơð Odor: ⴰⴰⴰⴰག

Exceptions to Protocol:

List C, Extra

Groundwater Assessment				Site:		Otter	Tail Pov	ver Co./ E	Big Stone
Sampling Personne				Facilit	y ID:				
Ben Stubbs				Date:	16	Avr 18			
<u>, (2.3</u>				Uniqu	e Stat	ion'I			
				Samp			We	ell H9	
Well Condition									
				Drotor	ofivo D	ostsæs		No	
Well Locked? Yes No Well Labeled? (Yes No				-	ID Tag				
Casing Straight? (Yes No						ntac-Yes	• •	No	
Repairs Necessary:				Grout	Jean	11100-100		110	
									
Well Information					~	E9		4000.04	
Well Depth: 30-7						Elevation:		1086.21	. <u></u>
Constructed Depth: 30.20						r Elevation		6.10	
Casing Diameter: 2"					ous Sta				
Water Level Before Purge: 10-11	<u> </u>					After San		84	Ote of Tem
Well Volume: 3,36	Gallons	-		Neas	ureme	nt Method:	Elec. V	ğLI i	Steel Tap
O augusting Information		<u></u>		<u>`</u>	·				
Sampling Information		Mind	: N-	.1~7		Sky:	Fri(~	
Weather Conditions Temp: 36 Sampling Method: Grundfos	Bladder SS/T			Whate		Grab Other:	140		<u> </u>
Dedicated Equipme Yes No	Blauder 36/1	Disp. r	581184			ate: 0.7	<u></u>	gpm	
Well Purged Dry? Yes No							45		am / ന്റ
Time Purged Dry?					of Sar		527		am / pm
	D:				le EH:				
	AC	Color	Non			<u>ده ۲۰</u> se: ۲۰۰۸		Odor:	No vis
Sample Appearance General. 200	<u>, A.1</u>	00101	$\cdot 10n$	<u> </u>	1 110	<u> </u>	<u>.</u>		WVG.
	Temp	D. O.		Turbic	dity	Gallons			
Time pH Specific Cond.	°C	mg/L		NTU	-	Removed	SEQ #	Comme	nts:
1459 7-30 2470	8.30	N,	R	N	A	3.5	1		
	8.43					7	2		
1513 7.27 2497						10.5	3		
	8-51	1 1							
	8.51						4		
	8.51)				4 5		
	8.51	Amo) unt Wa	ter Ren	noved	10,2	5	Gallons	

Exceptions to Protocol:

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List C Extra

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Groundwater Assessment		Site: O	tter Tail Power Co./ Big Stone
Sampling Personnel:		Facility ID:	· · · · · · · · · · · · · · · · · · ·
Marth Stru		Date: 16April	<u>ŝ</u>
•		Unique Station ID:	· · · · · · · · · · · · · · · · · · ·
		Sample ID:	Well H2OX
Well Condition Well Locked? Ves Well Labeled? Ves Casing Straight? Ves Repairs Necessary: No		Protective Posts? Ye State ID Tag? Ye Grout Seal Intact?	es <u>No</u>
Well Information			
Well Depth: 3-2,83		Well Casing Elevation:	1103.91
Constructed Depth: 32.20		Static Water Elevation	: 1096-34
Casing Diameter: 2"		Previous Static: 10	97.8
Water Level Before Purge: 7. 5	57	Water Level After Sam	ple: Below Purp
Well Volume: 4.12	Gallons	Measurement Method:	Elec. WLI Steel Tape
Sampling Information			
Weather Conditions: Temp: 4	Wind: N	NE@16 SI	(V: Sung
Sampling Method: Grundfos I	Bladder SS/JT Disp. Bailer	Whale Grab Ot	her:
Dedicated Equipment: (Yes) No		Pumping Rate: C	se}5 gpm
Well Purged Dry? (Yes No		Time Pump Began:	1534 am /(pm)
Time Purged Dry? 154.2		Time of Sampling:	1547 am 1 pm
Duplicate Sample? Yes (No)	ID:	Sample EH: 169	3 466.7
Sample Appearance: General:	Color:	Phase:	Odor:
	$\begin{array}{c c} Temp & D. O. \\ {}^{\circ}C & mg/L \\ \hline 7.10 & UU \\ \hline 7.77 & 1 \\ \hline \end{array}$	Turbidity Gallons NTU Removed AUA 4, 5	
			4.5 Gallons

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Exceptions to Protocol:

- List C - Extra

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New Ulm, MN 56073

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Sampling I		3essment			Site: Facility ID: Date: <u>I & Apr</u> Unique Static Sample ID:	18		Power Co./ Big Stone
Well Con Well Locke Well Label Casing Str Repairs Ne	ed? ed? aight?	(Yes) No (Yes No (Yes No	· · · · · · · · · · · · · · · · · · ·		Protective Po State ID Tag Grout Seal In	? Ye	s (
Well Info Well Depth Constructe Casing Dia Water Leve Well Volun	i: Id Depth: Imeter: I Before Pt	.)).62_ 22.55 2" urge: <u>\$</u> ; 2.\$)5 Gallons	-	Well Casing Static Water Previous Sta Water Level Measuremen	Elevation: tic: After Samp	10 89 10 90. (Elec. V	Selad Pump
Weather C		Temp: 3	5	Wind: ~v			y: Sn	
Sampling I Dedicated Well Purge Time Purg Duplicate S	Equipment: ed Dry? ed Dry?	Grundfos (Yes No (Yes No 1,158 Yés (No /	Bladder S9/T	Disp. Bailer	Pumping Rat Time Pump I Time of Sam Sample EH:	Began:		gpm , am / pm , am / pm
Sample Ap		General: Cla		Color: No	m Phase:	Acru		Odor: Marq
া) Time 258	рН 7.02	Specific Cond. 3477	1emp °С 6.84	D. O. mg/L 心人	Turbidity NTU	Gallons Removed	SEQ # 1	Comments:
1303	7.14	35.30	7.160				2 3 4	techwer
Stabilized?	Yes	No \		Amount W	ater Remove	, <u>3</u>	5	Gallons

Comments:

Exceptions to Protocol:

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Sec. -

- List C - Extra

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Groundwater Assessm	ent			Site:		er Tail	Power Co./ Big Ston
Sampling Personnel:				Facility IL			
Matt	stein.	_		Date: 16	Apr18		
		-		Unique S			
		_		Sample I	D:		Well H4OX
Well Condition							\sim
Well Locked?	(Yes No			Protective		-	(No)
Well Labeled?	Yes No			State ID		s (NO)
Casing Straight?	Nes)No	_		Grout Se	al Intact? (Ye	डे	No
Repairs Necessary:							
Well Information		• •					
Well Depth: Depth:	7.48			Well Cas	ing Elevation:		1108.22
Constructed Depth:	<u>7.4/8</u> 27.20				ater Elevation:	10	90,84
Casing Diameter:	2"	_		Previous	Static: 1091.	01	
Water Level Before Purge:	17.	38		Water Le	vel After Samp	e: ß	Iow Rung
Well Volume:	Ilo-1	Gallons		Measure	nent Method:	Elec	. WLI Steel Tape
(Oing 164pril)			-	١			
Sampling Information							
Weather Conditions:	Temp:	38	Winc	t: Nut	\mathfrak{D}/\mathcal{I} Sk	y: 5	unny
Sampling Method:	Grundfos	Bladder SS))Disp. I		Grab Oth	er:	1
Dedicated Equipment:	Yes No	_		Pumping		15	gpm
Well Purged Dry?	Yes (No)					417	
Time Purged Dry?				Time of S	Sampling:	1435	- am / ͡p͡mີ⇒
Duplicate Sample?	Yes ଐ∂⇒	≤ID: <u> </u>	~	Sample E	143.8	-	
Sample Appearance:	General:	(lew)	Colo	r:new_Pha	seinene_		Odor:world
							····
	Specific	lemp	D.	Turbidity		SE	
Time pH	Cond.	°C	0.	NTU	Removed		Comments:
1424 6.79	2327	8.5	人了人	NA	[175	1	
14 31 6.82	2325	8.14			3.5	2	
14 38 682	2323	8.16			5.25	3	
			11	<u> </u>		4	
			<u> </u>			5	
Stabilized? (Yes)	No		Amo	unt Water	5.25		Gallons

Comments:

Exceptions to Protocol:

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- List C - Exton





Page: 1 of 6

FINAL REPORT COMPLETION DATE: 26 Jun 1808

Date Reported: 22 Jun 2018

Work Order #: 31-0285 Account #: 006106 PO #: 48680

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

Project Name: BIG STONE

25June 8 ield Service Manager/Date Reviewed 22 June 18 Manager/Date Reviewed iemistry Assurance Director/Date Reviewed uality

- 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.





CERTIFICATE of ANALYSIS - CCR

JOSH HOLLEN OTTER TAIL POWER CO PO BOX 496 FERGUS FALLS MN 56538-0496 Page: 2 of 6

Report Date: 22 Jun 2018 Lab Number: 18-A31219 Work Order #: 31-0285 Account #: 006106 Sample Matrix: GROUNDWATER Date Sampled: 20 Jun 2018 10:35 Sampled By: MVTL FIELD PERSONNEL Date Received: 20 Jun 2018 15:00 PO #: 48680

Project Name: BIG STONE

Sample Description: WELL H6

	As Receive Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
pH, Field	6.83	units	1.00	I-1586-85	20 Jun 18 10:35	MS

 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
 WI LAB # 999447680
 ND MICRO # 1013-M
 ND WW/DW # R-040

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.





Page: 3 of 6

CERTIFICATE of ANALYSIS - CCR

JOSH HOLLEN OTTER TAIL POWER CO PO BOX 496 FERGUS FALLS MN 56538-0496 Report Date: 22 Jun 2018 Lab Number: 18-A31220 Work Order #: 31-0285 Account #: 006106 Sample Matrix: GROUNDWATER Date Sampled: 20 Jun 2018 11:13 Sampled By: MVTL FIELD PERSONNEL Date Received: 20 Jun 2018 15:00 PO #: 48680

Project Name: BIG STONE

Sample Description: WELL H8

	As Receiv Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
pH, Field	6.80	units	1.00	I-1586-85	20 Jun 18 11:13	MS

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 WI LAB # 999447680 ND MICRO # 1013-M ND WW/DW # R-040

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.

Minnesota Valley Testing La New Ulm, MN 56073 Groundwater Assessment Sampling Personnel: Math Ster	1 borator 507 354 85	2.42	the or By Otte	iginal o Da P a se er Tail Po	31-0385 A 31219 act copy of document ate $203un 18$ es $1-5$ ower Co./ Big Stone Nell H6
Well Condition Well Locked? No Well Labeled? Yes Casing Straight? Yes Repairs Necessary:	-	Protective P State ID Tag Grout Seal I	? Yes	(No No No
Well InformationWell Depth:11.42Constructed Depth:15.00Casing Diameter:2"Water Level Before Purge:13.22Well Volume:0.76Gallons	_	Well Casing Static Water Previous Sta Water Level Measurement	Elevation: atic: After Sample	1.A	1097.76 1-521 Re(0-1 D, mp WD Steel Tape
Sampling Information Weather Conditions: Temp: Sampling Method: Grundfos Dedicated Equipment: Yes Well Purged Dry? Yes Time Purged Dry? 10.30 Duplicate Sample? Yes Sample Appearance: General: Clear General:	Disp. Bailer	Whale Pumping Ra Time Pump Time of Sam Sample EH:	Began npling: ಎಂ), (10,26	gpm (am) / pm (am) / pm Odor: Nerve
(H) SpecificTemp \circ_{C} TimepHCond. \circ_{C} 1030 $(n,716)$ 83.9 $8,11$ 1035 $6,83$ 8.44 $8,17$ 1035 $6,83$ 8.44 $8,17$ 1035 $6,83$ 8.44 $8,17$ 1035 $6,83$ 8.44 $8,17$ 1035 $6,83$ 8.44 $8,17$ 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.44 8.17 1035 $6,83$ 8.14 8.17 1035 $6,83$ 8.14 8.17 1035 $6,83$ 8.14 8.14 1035 $6,83$ 8.14 1035 8.14 8.14 1035 8.14 8.14 1035 8.14 8.14 1035 8.14	D. O. mg/L w/h Amount Wa	Turbidity NTU AJA ater Removed	Gallons Removed	SEQ # 2 3 4 5	Comments:

Exceptions to Protocol:

Minnesota Valley Testing Laboratories, Inc.

New Ulm, MN 56073	507 354 8517
Groundwater Assessment Sampling Personnel: Matt Stein	Site: Otter Tail Power Co./ Big Stone Facility ID: Date: 20 June /8 Unique Station ID:
	Sample ID: Well H8
Well Condition Well Locked? Yes No Well Labeled? Yes No Casing Straight? Yes No Repairs Necessary: Kes No	Protective Posts? (Yes No State ID Tag? Yes No Grout Seal Intact? (Yes) No
Well InformationWell Depth:22.05Constructed Depth:22.05Casing Diameter:2"Water Level Before Purge:7.33Well Volume:3.44Gallons	Well Casing Elevation: 1081.23 Static Water Elevation: 1073.9 Previous Static: 1074.99 Water Level After Sample: 7.7] Measurement Method: Kleč. WLP
Sampling Information Weather Conditions: Temp: Sampling Method: Grundfos Bladder SS/r Dedicated Equipment: Ves Well Purged Dry? Yes Time Purged Dry? ID: Duplicate Sample? Yes Sample Appearance: General: Cleaver	Wind: NEEG9 Sky: P. Cloudy Disp. Bailer Whale Grab Other: Pumping Rate: O.D.S gpm Time Pump Began: 1043 am)/ pm Time of Sampling: 4113 am)/ pm Sample EH: 1966.1 Color: none Odor:
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	D. O. Turbidity Mg/L Gallons Removed SEQ # MA 2.50 1 MA 2.50 3 7.50 3 4 5
Stabilized? Yes) No	Amount Water Remove 7.50 Gallons

Comments:

Exceptions to Protocol:



Page:



FINAL REPORT COMPLETION DATE: 16 Jan 9 a A

Date Reported: 19 Dec 2018

Work Order #: 31-0547 Account #: 006106 PO #: 48080

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

Project Name: BIG STONE PLANT

1050m Service Manager/Date Reviewed Field 15 Jun 19 Manager/Date Reviewed try Lab hemis 150an 2019 tu Assurance Director/Date Reviewed uality

- 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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2 North Gen 2616 East B 1201 Lincole

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CERTIFICATE of ANALYSIS - CCR

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

Project Name: BIG STONE PLANT

Sample Description: H2OX

Page: 2 of 15

Report Date: 19 Dec 2018 Lab Number: 18-A61777 Work Order #: 31-0547 Account #: 006106 Sample Matrix: GROUNDWATER Date Sampled: 6 Nov 2018 13:37 Sampled By: MVTL FIELD PERSONNEL Date Received: 7 Nov 2018 12:45 PO #: 48080

Temp at Receipt: 0.0C

	As Receiv Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions PH, Field Sulfate Chloride Solids, Total Dissolved Calcium Boron Fluoride	6.90 2240 ~ 4.1 3870 540.0 ~ 0.256 0.500 @	units mg/L mg/L mg/L mg/L mg/L mg/L	1.00 5.0 3.0 10 0.500 0.100 0.020	SM4500-H+-2011 ASTM D516-07 SM 4500 Cl E SM 2540 C-97 SW6010C SW6010C EPA 300.0	13 Nov 18 6 Nov 18 13:37 15 Nov 18 11:28 15 Nov 18 8:52 8 Nov 18 11:54 15 Nov 18 15:15 15 Nov 18 15:15 12 Nov 18 14:36	JMS BMW KCJ AKF AL KAM 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 concentration of other analytes

 ! = Due to sample quantity
 + = Due to internal standard response

 CERTIFICATION: MN LAB # 027-015-125
 WI LAB # 999447680
 ND MICRO # 1013-M
 ND WW/DW # R-040

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1126 2 No 2616 1201

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Page: 3 of 15

CERTIFICATE of ANALYSIS - CCR

MEGAN LISBURG OTTER TAIL POWER CO PO BOX 496 FERGUS FALLS MN 56538-0496 Lab Number: 18-A61778 Work Order #: 31-0547 Account #: 006106 Sample Matrix: GROUNDWATER Date Sampled: 6 Nov 2018 14:05 Sampled By: MVTL FIELD PERSONNEL Date Received: 7 Nov 2018 12:45 PO #: 48080

Project Name: BIG STONE PLANT Sample Description: H30X

Temp at Receipt: 0.0C

Report Date: 19 Dec 2018

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions pH, Field Sulfate Chloride Solids, Total Dissolved Calcium Boron Fluoride	6.82 uni 1810 ~ mg/ 76.3 mg/ 3610 mg/ 467.0 ~ mg/ 6.860 mg/ 0.450 @ mg/	L 5.0 L 3.0 L 10 L 0.500 L 0.100	SM4500-H+-2011 ASTM D516-07 SM 4500 Cl E SM 2540 C-97 SW6010C SW6010C EPA 300.0	13 Nov 18 6 Nov 18 14:05 15 Nov 18 11:28 15 Nov 18 8:52 8 Nov 18 11:54 15 Nov 18 15:15 15 Nov 18 15:15 12 Nov 18 14:36	JMS BMW KCJ AKF AL KAM KAM RMV

* Holding Time Exceeded

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

 RL = Reporting Limit

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 # = Due to concentration of other analytes

 ! = Due to sample quantity
 + = Due to internal standard response

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 WI LAB # 999447680
 ND MICRO # 1013-M
 ND WW/DW # R-040



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CERTIFICATE of ANALYSIS - CCR

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

Project Name: BIG STONE PLANT

Sample Description: H40X

4 of 15 Page:

Report Date: 19 Dec 2018 Lab Number: 18-A61779 Work Order #: 31-0547 Account #: 006106 Sample Matrix: GROUNDWATER Date Sampled: 6 Nov 2018 15:22 Sampled By: MVTL FIELD PERSONNEL Date Received: 7 Nov 2018 12:45 PO #: 48080

Temp at Receipt: 0.0C

	As Receiv Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions pH, Field Sulfate Chloride Solids, Total Dissolved Calcium Boron Fluoride	6.99 1220 ~ 48.1 2280 335.0 0.435 0.580 @	units mg/L mg/L mg/L mg/L mg/L mg/L	1.00 5.0 3.0 10 0.500 0.100 0.020	SM4500-H+-2011 ASTM D516-07 SM 4500 Cl E SM 2540 C-97 SW6010C SW6010C EPA 300.0	13 Nov 18 6 Nov 18 15:22 15 Nov 18 11:28 15 Nov 18 8:52 8 Nov 18 11:54 15 Nov 18 15:15 15 Nov 18 15:15 12 Nov 18 14:36	JMS BMW KCJ AKF AL KAM 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 concentration of other analytes

 ! = Due to sample quantity
 + = Due to internal standard response

 CERTIFICATION: MN LAB # 027-015-125
 WI LAB # 999447680
 ND MICRO # 1013-M
 ND WW/DW # R-040

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CERTIFICATE of ANALYSIS - CCR

Project Name: BIG STONE PLANT

Sample Description: H6

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

Report Date: 19 Dec 2018 Lab Number: 18-A61780 Work Order #: 31-0547 Account #: 006106 Sample Matrix: GROUNDWATER Date Sampled: 6 Nov 2018 14:27 Sampled By: MVTL FIELD PERSONNEL Date Received: 7 Nov 2018 12:45 PO #: 48080

Temp at Receipt: 0.0C

5 of 15

Date Method Method As Received Analyst RL Reference Analyzed Result 13 Nov 18 JMS Water Digestions 6 Nov 18 14:27 DGF 1.00 SM4500-H+-2011 pH, Field 7.57 units 15 Nov 18 11:28 KCJ Sulfate 63.3 @ mg/L 5.0 ASTM D516-07 15 Nov 18 8:52 AKF 3.3 mg/L 3.0 SM 4500 Cl E Chloride 8 Nov 18 11:54 Solids, Total Dissolved 585 10 SM 2540 C-97 AL mg/L SW6010C 15 Nov 18 15:15 KAM 0.500 55.00 mg/L Calcium 0.100 SW6010C 15 Nov 18 15:15 KAM 4.040 mg/L Boron 12 Nov 18 14:36 RMV mg/L 0.560 @ 0.020 EPA 300.0 Fluoride

* Holding Time Exceeded

RL = Reporting Limit

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CERTIFICATE of ANALYSIS - CCR

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

Project Name: BIG STONE PLANT

Sample Description: H8

Page: 6 of 15

Report Date: 19 Dec 2018 Lab Number: 18-A61781 Work Order #: 31-0547 Account #: 006106 Sample Matrix: GROUNDWATER Date Sampled: 6 Nov 2018 15:07 Sampled By: MVTL FIELD PERSONNEL Date Received: 7 Nov 2018 12:45 PO #: 48080

Temp at Receipt: 0.0C

	As Receiv Result	red	Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions		÷.	i je		13 Nov 18	JMS
pH, Field	7.26	units	1.00	SM4500-H+-2011	6 Nov 18 15:07	DGF
Sulfate	224 @	mg/L	5.0	ASTM D516-07	15 Nov 18 11:28	KCJ
Chloride	4.5	mg/L	3.0	SM 4500 Cl E	15 Nov 18 8:52	AKF
Solids, Total Dissolved	902	mg/L	10	SM 2540 C-97	8 Nov 18 11:54	AL
Calcium	122.0	mg/L	0.500	SW6010C	15 Nov 18 15:15	KAM
Boron	4.460	mg/L	0.100	SW6010C	15 Nov 18 15:15	KAM
Fluoride	0.690 @	mg/L	0.020	EPA 300.0	12 Nov 18 14:36	RMV

* Holding Time Exceeded

 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

 CERTIFICATION: MN LAB # 027-015-125
 WI LAB # 999447680
 ND MICRO # 1013-M
 ND WW/DW # R-040

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CERTIFICATE of ANALYSIS - CCR

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

Project Name: BIG STONE PLANT

Sample Description: H9

Page: 7 of 15

Report Date: 19 Dec 2018 Lab Number: 18-A61782 Work Order #: 31-0547 Account #: 006106 Sample Matrix: GROUNDWATER Date Sampled: 6 Nov 2018 15:59 Sampled By: MVTL FIELD PERSONNEL Date Received: 7 Nov 2018 12:45 PO #: 48080

Temp at Receipt: 0.0C

	As Receiv Result	ed	Method RL	Method Reference	Date Analyzed	Analyst
Water Digestions					13 Nov 18	JMS
pH, Field	6.71	units	1.00	SM4500-H+-2011	6 Nov 18 15:59	DGF
Sulfate	1590 ~	mg/L	5.0	ASTM D516-07	15 Nov 18 11:28	KCJ
Chloride	35.2	mg/L	3.0	SM 4500 C1 E	15 Nov 18 8:52	AKF
Solids, Total Dissolved	2910	mg/L	10	SM 2540 C-97	8 Nov 18 11:54	AL
Calcium	638.0 ~	mg/L	0.500	SW6010C	15 Nov 18 15:15	KAM
Boron	1.280	mg/L	0.100	SW6010C	15 Nov 18 15:15	KAM
Fluoride	0.400 @	mg/L	0.020	EPA 300.0	12 Nov 18 14:36	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
 WI LAB # 999447680
 ND MICRO # 1013-M
 ND WW/DW # R-040

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Page: 15 of 15

Date Reported: 19 Dec 2018

Work Order #: 201831-0547 Account Number: 006106 PO #: 48080

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

Project Name: BIG STONE PLANT

LABORATORY NARRATIVE

INORGANIC & METALS ANALYSES:

The percent recovery of the mercury matrix spike duplicate for samples 18-A61783 through 18-A61789 was outside of acceptable range. Data was reported based on the acceptable recovery of the matrix spike and acceptable relative percent difference between the matrix spikes.

Due to high concentration, percent recovery of boron was outside acceptable range in the matrix spike and duplicate for samples 18-A61787 through 18-A61789. Data was reported based on acceptable laboratory control spike recovery and relative percent difference between matrix spike and duplicate.

The internal standard associated with selenium was suppressed in the laboratory reagent blank for samples 18-A61783 through 18-A61789. This could cause elevation of the blank concentrations. Data was reported based on all blank values being below the reporting limit.

No other problems were encountered with these analyses.

Amended report 15 January 2019: The magnesium results were deleted from samples 18-A61777 through 18-A61789.

1126 North Front StreetNew Ulm, MN 56003Phone: 800 782 3557Fax: 507 359 2890Field Service Chain of Custody Record

		Power Com		Project Ty	/pe:	Big Stor			Nan	ne of	Sam	pler	s: 0	- 1	2.5			
Report '	Otter Tail I	Power Com	pany	Carbon Co	py:	Barr En	gineerir	g					ν	FE	5W,	M	>	
Attn:	Paul Vuko	nich		Attn:					Quo	te N	umbe	9 11						
Address	P.O. Box 4	196		Address:					Wor	'k Or	der N	lumb	er:					
	Fergus Fa	lls, MN 565	38-0496						Lab	Num	bers							
Phone:	218-739-8	349																
		Sample In	formation								Bottl	e Ty	ре				Ana	lysis
Lab Number	Qi ej	05	/	/	Sample Type	e le	1000 HNO3 Inner 50n M	en en	03		204	Filters Y or N	1000 Amber none	mber	E	Other 150 H2804	Analysis Required	/
Lab N	Sample ID	Unique Station ID	Date	Time	Samp	Sample Location	1000 H	1000 none		Filter? Y ou	500 H2804	Filters	1000 4	1000 Amber	BN 000	Official Contract	Analysis Required	
ALOTA	H2OX		GNOU18	1337	GW			1	1	N							CCR 3	
18	H3OX			1405	GW			1	1	N							CCR 3	
	H4OX			1522	GW			1	1	N							CCR 3	
68	H-6			1427	GW			1	1	N							CCR 3	
81	H-8			1507	GW			1	1	N							CCR 3	
	H-9		1	1559	GW			1	1	N							CCR 3	
	Slag 4		7Nov18	907	GW		2 1	1	1	N							CCR 3, 4	
	Slag 5		1'L	958	GW		2 1	1	1	N							CCR 3, 4	
85	Slag 6		6NOUI8	1359	GW		2 1	1	1	N							CCR 3, 4	
86	Slag 7		7Nouts	821	GW		2 1	1	1	N							CCR 3, 4	

Comments:

10.00

(1,1,2)

Samples Relin	quished By:	11-	In		Samples Received By	/:			· · · · · · · · · · · · · · · · · · ·
Date: 7A	0018	Time:	1245	Temp: 0, 07M7	Pojate:		Time:		Temp:
Samples Relin	quished into:	Fridge	Log in Cart	Other:					
Samples Relin	quished By:				Samples Received By	<i>ſ</i> :			
Date:		Time:		Temp:	Date:		Time:		Temp:
Delivery:	Samplers	Other:			Seal Number(s) - If U	sed			
Transport:	Ambient	TCB		Other:	Seals Intact?	Yes		No	

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CCR - Appendix III Detection Monitoring Field Parameters pH*

* Field and Laboratory Measurements

Total Concentration ParametersBoron6010Calcium6010ChlorideSM4FluorideEPApHSMSulfateASTDissolved Solids, TotalSM

Method 6010 6010 SM4500 CL E EPA 300 SM 4500 H+B-96 ASTM D516 SM 2540 C-97

Note: These are non-filtered samples.



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CCR - Appendix IV - Assessment Monitoring

1. 61. 9

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.

L'IEGO H'NON C

FAU 2018



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
Slag Pond wells	*								
SLAG4	CCR 3 and CCR 4	39.00	2	1110.20	LOW FLOW	No	100	No	April & Oct
SLAG5	CCR 3 and CCR 4	38.80	2	1107.30	LOW FLOW	No	100	Yes	April & Oct
SLAG6	CCR 3 and CCR 4	37.30	2	1111.51	LOW FLOW	No	100	Yes	April & Oct
SLAG7	CCR 3 and CCR 4	48.70	2	1114.39	LOW FLOW	No	100	Yes	April & Oct
SLAG8	CCR 3 and CCR 4	52.09	2	1127.26	LOW FLOW	No	100	No	April & Oct
SLAG9	CCR 3 and CCR 4	49.80	2	1122.35	LOW FLOW	No	100	No	April & Oct
SLAG2B	CCR 3 and CCR 4	40.80	2	1111.26	LOW FLOW	No	100	Yes	April & Oct
	Sample CCR3	s first	and the	n ccru	A Contraction of the second se		201		

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

List CCR3 1000 None 500 HNO3

List CCR 3+4 2-1000 \$1003 500 NOME 2600 NOME 500 HND3

Big Stone Plant Notes

- Advance notice must be given to Josh Hollen, Otter Tail Power Company Environmental Services prior to sampling at (218) 739-8314 or jhollen@otpco.com
- 2 There is no routine summer round of sampling at Big Stone after CCR background is complete
- 3 Three additional monitoring wells will be installed in the summer of 2016 that are not indicated on this sampling plan. The three new wells will be analyzed for the Big Stone Plant "C" Parameter List
- 4 A new site will be sampled for CCR parameters. The Plant's Slag Pond and associated temporary slag stockpile area are covered under the EPA's CCR rule. There will be 8 new wells at this site that will require CCR sampling
- 5 Please separate the Chain of Custody and associated field and lab reports for the Ash Disposal Area ("H" series wells) from the other sites. DENR is requiring us to file separate reports.
- 6 The CCR-related sampling and reporting should be in its own report aside from the State sampling
- 7 We will need 8 CCR sampling events conducted and reported by September 2017 for Appendix III and Appendix IV CCR parameters A few of those can be tied with State-Required sampling events; otherwise they'll need to be separate runs.
- 8 The Spring Water Monitoring Report must be submitted by June 30 each year
- 9 The Fall Water Monitoring Report must be submitted by January 31 of the following year
- 10 The surface water samples are UNFILTERED
- 11 Wells 11 & 12 have dedicated pumps that require a portable generator be used in order to operate the pumps
- 12 Access is generally good to most wells. Samplers in the past have used an ATV or have walked into 2 or 3 sites
- 13 Please remove all reference of "ASH RUNOFF POND" and replace with "RECLAIM POND"; Please review site names. Please use site names as indicated - including ALL CAPS and elimination of hyphens and spaces in order to facilitate efficient database management.
- 14 One MS/MSD per event
- 15 Please send a copy of all reports to Barr Engineering (including CoCRs, Field, QA/QC and Lab)

New Ulm, MN 56073

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507 354 8517

Groundwater Assessment		Site:	Otter	Fail Pow	er Co./ Big Stone
Sampling Personnel:		Facility ID:			
Ben Walf		Date: 6	NONR		
		Unique Statio	on ID:		
		Sample ID:		We	II H2OX
Well Condition Well Locked? Yes No Well Labeled? Yes No Casing Straight? Yes No Repairs Necessary: Kes No		Protective Po State ID Tag Grout Seal Ir	? Yes	(No No
Well Information					
Well Depth: 32.83		Well Casing	Elevation:		1103.91
Constructed Depth: 32.20		Static Water	Elevation: /	095.	2/
Casing Diameter: 2"		Previous Sta	tic: 1096.	36	
Water Level Before Purge: 8-70		Water Level	After Sample:	Bek	ill pamp
Well Volume: 3.73 Gallons		Measuremen	t Method:	Elec. V	VU Steel Tape
Sampling Information		Que			
Weather Conditions: Temp: 34	Wind:	1@15	Sky:	aou	dy
Sampling Method: Grundfos Bladder SSA	Disp. Bailer	Whate	Grab Other:		•
Dedicated Equipment: (es No		Pumping Rat		/	gpm
Well Purged Dry? (es No		Time Pump I			am / pm
Time Purged Dry? 13.34		Time of Sam		.2	' am / pm/
Duplicate Sample? Yes No ID:		Sample EH:			
Sample Appearance: General: Sl- cloudy	Color: TO	ר Phase	Light.	sed.	Odor: chemica
Time C pH Specific Temp Cond. OC	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1332 6.82 4597 9.49	-111	.18	4		
	NH	NA	1	1	
		NA-	/	2	
	NAT				Richarge
				2	Richarge
			· · · · · ·	2 3	Richarge

Comments:

New Ulm, MN 56073

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507 354 8517

Groundwater Ass	essment			Site:	Otter	Tail Po	wer Co./ Big Stone
Sampling Personnel:				Facility ID:			
Ben	WOLF		3	Date: (o	NUV 18		
				Unique Stat	ion ID:		
		_		Sample ID:		W	ell H3OX
Well Condition	6						~
Well Locked?	Yes No			Protective P			(No)
Well Labeled?	Yes No			State ID Tag			NO
Casing Straight?	Yes No	-		Grout Seal I	ntact? Yes		
Repairs Necessary: Well Information					na si		
Well Depth:	22.68	>		Well Casing	Elevation:		1095.19
Constructed Depth:	22.55	-		Static Wate		1089	
Casing Diameter:	2"				atic: 1090		10
Water Level Before Put	1 0	3			After Sample	-c	Ion rump
Well Volume:	2.71	Gallons	_	Measureme		Flec.	
Sampling Information	on			0			
Weather Conditions:	Temp:	32	Wind: 🕢	070	Sky:	cle	itedy
Sampling Method:	Grundfos	ladder SS/	Disp. Bailer	Whale	Grab Other:		
Dedicated Equipment:	Yes/ No			Pumping Ra			gpm
Well Purged Dry?	(Tes) No	_	27	Time Pump	Began: 34	19	am / @m
Time Purged Dry?	7406	1 		Time of Sar		75	am / pm
Duplicate Sample?	Yes No	_ID:		Sample EH:	61.4		u+
Sample Appearance:	General:	Clear	Color: 1/0	シーピ Phas	e: None	-	Odor: NOn
11	Specific	Temp	D. O.	Turbidity	Gallons	SEQ	
Time pH	Cond.	°C	mg/L	NTU	Removed	#	Comments:
1400 6.89	4582	11.62	NA	NA	2.75	1	
						2	
1405 6.82	4638	11.38	-		-	3	Recharge
						4	
						5	
			1		-		
Stabilized? Yes	A		Amount Wa	ater Removed	2.75		Gallons

Exceptions to Protocol:

New Ulm, MN 56073

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507 354 8517

Groundwater Assessment		Site:	Otter	Tail Pov	ver Co./ Big Stone
Sampling Personnel:		Facility ID:			
Ben WOIF		Date: (o	NOV 18		
		Unique Statio	on ID:		
		Sample ID:		We	ell H4OX
Well Condition Well Locked? Yes No Well Labeled? Yes No Casing Straight? Yes No Repairs Necessary: Kes Kes		Protective Po State ID Tag Grout Seal Ir	? Yes		No No
Well Information					
Well Depth: 27.48		Well Casing	Elevation:		1108.22
Constructed Depth: 27.20		Static Water	Elevation:	396.	22
Casing Diameter: 2"		Previous Sta	tic: 1090	80	
Water Level Before Purge: 18-00		Water Level	After Sample:	23.	29
Well Volume: /.54 Gallons		Measuremer	nt Method:	Elec. V	WLI) Steel Tape
Sampling Information		0		_ /	0
Weather Conditions: Temp: 33	Wind:	1070	Sky:	Clo	ed Y
Sampling Method: Grundfos Bladder SS/	Disp. Bailer	Whale	Grab Other:		
Dedicated Equipment: Ves No		Pumping Ra		1.	gpm
Well Purged Dry? (es) No		Time Pump			am / (m/
Time Purged Dry? 15/7		Time of Sam		12	am / ph/
Duplicate Sample? Yes No ID:		Sample EH:	-19.9		
Sample Appearance: General: Clear	Color: 10	1 Phase	NONU		Odor: None
Time pH Specific Temp Cond. °C	D. O. mg/L	Turbidity NTU	Gallons Removed	SEQ #	Comments:
1517 7.40 3157 8.21	NK	NA	1.75	1	
				2	
1522 6.99 3153 8.38	L	1	-	3	Recharge
				4	Ů
				5	
Stabilized? Yes	Amount Wa	ter Removed:	1-75		Gallons

Comments:

Exceptions to Protocol:

New Ulm, MN 56073

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507 354 8517

VIVIII AUGI AGO	essment			Site:	Otter Tail Pow	er Co./ Big Stone
Sampling Personnel:				Facility ID:		
DF		-		Date: GNou	18	
		-		Unique Station ID:		
		-3		Sample ID:	N	/ell H6
Well Condition Well Locked? Well Labeled? Casing Straight? Repairs Necessary:	Ker No Ker No Ker No			Protective Posts? State ID Tag? Grout Seal Intact?	Yes Yes	No No No
Well Information						
Well Depth:	7.92	_		Well Casing Eleval	tion: NA	
Constructed Depth:	17.70			Static Water Eleva	tion:	
Casing Diameter:	2"	-		Previous Static:	1	
Water Level Before Pu	rge: 15.8	5		Water Level After	Sample: Bek	and Pump
Well Volume:	1.34	Gallons	-	Measurement Met	hod: Elec. V	VLI Steel Tape
Sampling Informati	on					
Weather Conditions:	Temp: 3		Wind: h	INW 19	Sky: Clou	dy
Sampling Method:	Grundfos	Bladder SSA	Disp. Bailer	Whale Grab	Other:	/
Dedicated Equipment	Yes No			Pumping Rate:	0.25	gpm
Dedicated Equipment:	Tes NO	_ 00		territoria de la constitución de la		
Well Purged Dry?	No No	-		Time Pump Began		am / 🕥
				Time Pump Began Time of Sampling:	: 1420 1427	
Well Purged Dry?	(6) No 1422 Yes (10)	ID:				am / 📶
Well Purged Dry? Time Purged Dry?	1422 No	-	Color: No	Time of Sampling: Sample EH:	1427 192.0	am / 📶
Well Purged Dry? Time Purged Dry? Duplicate Sample? Sample Appearance: 2 Time pH	Yes No H22 Yes No General: S Specific Cond.	1. Cloudy Temp °C	D. O. mg/L NA	Time of Sampling: Sample EH: Phase: No Turbidity Gallo NTU NA Remo	1427 192,0 ove sec sec sec sec sec sec sec sec sec se	am / ஹ am / ஹ
Well Purged Dry? Time Purged Dry? Duplicate Sample? Sample Appearance: 2	Yes No H22 Yes No General: S Specific Cond.	1. Cloudy Temp	D. O.	Time of Sampling: Sample EH: Phase: No Turbidity Gallo NTU NA Remo	1427 192,0 ns SEQ	am / m am / m Odor: Nor
Well Purged Dry? Time Purged Dry? Duplicate Sample? Sample Appearance: 2 Time pH	Yes No H22 Yes No General: S Specific Cond.	1. Cloudy Temp °C	D. O. mg/L NA	Time of Sampling: Sample EH: Phase: No Turbidity Gallo NTU NA Remo	1427 192,0 ove sec sec sec sec sec sec sec sec sec se	am / m am / m Odor: Nor
Well Purged Dry? Time Purged Dry? Duplicate Sample? Sample Appearance: 2 Time pH	Yes No H22 Yes No General: S Specific Cond.	1. Cloudy Temp °C	D. O. mg/L NA	Time of Sampling: Sample EH: Phase: No Turbidity Gallo NTU NA Remo	1427 192,0 one seq oved # .5 1	am / m am / m Odor: Nor
Well Purged Dry? Time Purged Dry? Duplicate Sample? Sample Appearance: 2 Time pH	Yes No H22 Yes No General: S Specific Cond.	1. Cloudy Temp °C	D. O. mg/L NA	Time of Sampling: Sample EH: Phase: No Turbidity Gallo NTU NA Remo	1427 192,0 oved # 5 1 2	am / m am / m Odor: Nor
Well Purged Dry? Time Purged Dry? Duplicate Sample? Sample Appearance: 2 Time pH	Yes No H22 Yes No General: S Specific Cond.	1. Cloudy Temp °C	D. O. mg/L NA	Time of Sampling: Sample EH: Phase: No Turbidity Gallo NTU NA Remo 35.7 0	1427 192,0 oved # 5 1 2 3	am / m am / m Odor: Nor

Comments:

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New Ulm, MN 56073

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507 354 8517

Groundwa	ater Asse	ssment			Site:	Otter 1	Tail Power C	Co./ Big Stone					
Sampling Pe	rsonnel:				Facility ID:								
	DF				Date: GNov 8								
			-		Unique Station ID:								
			-		Sample ID:		Well H	-18					
Well Condi	tion												
Well Locked	?	No No			Protective Po		No						
Well Labeled		Ces No			State ID Tag		No	•					
Casing Straig	ght?	Yes No			Grout Seal In	ntact? Yes?	No						
Repairs Nece	essary:					the second state							
Well Inform	nation												
Well Depth:	22	.33			Well Casing	Elevation:	2 201	31.23					
Constructed	Depth:	22.05			Static Water	Elevation:	1074.0	90					
Casing Diam	eter:	2"	-		Previous Sta	tic:	-						
Water Level	Before Purg	je: 7.23			Water Level								
Well Volume	: 2	46	Gallons	-	Measuremer	Steel Tape							
Sampling I	nformatio	n					10 10						
Weather Cor			31	Wind: ω	NW 19	Sky:	Goudy	1					
Sampling Me	ethod:	Grundfos	Bladder Sart	Disp. Bailer	Whale	Grab Other:	,						
Dedicated Ed	quipment:	Tes No			Pumping Rate: 0,25 gpm Time Pump Began: 1437 am /								
Well Purged	Dry?	Yes 15	-		Time Pump	am / 😥							
Time Purged	Dry?	-	2		Time of Sam	pling: 15	07	am / m					
Duplicate Sa	mple?	Yes Mo	ID:		Sample EH:	170.2							
Sample Appe	earance:	General:	Class	Color: No:	c Phase	: Nore	Od	or: None					
10		Specific	Temp	D. O.	Turbidity	Gallons	SEQ						
	pН	Cond.	°C			Removed	1 1	mments:					
1447	7.26	1323	10.43	4.15 1	0.1	2.5	1						
1457	7.26	1323	10.43	4.14	0.0	5	2						
1507	7.26	1323	10.43	4.13	0.0	7.5	3						
							4						
							5						
Stabilized? (Pes	No		Amount Wa	ter Removed:	7.5	Ga	llons					

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Comments:

New Ulm, MN 56073

507 354 8517

Groundwater Ass	sessment			Site: C	Otter Tail Power Co./ Big Stone
Sampling Personnel:				Facility ID:	
DF	8	_		Date: GNovit	7
		_		Unique Station ID:	_
		_ .		Sample ID:	Well H9
Well Condition					
Well Locked?	No No	_		Protective Posts?	Res No
Well Labeled?	Ces No				es No
Casing Straight?	Kes No	-		Grout Seal Intact? X	es> No
Repairs Necessary:					
Well Information					
Well Depth:	30.71	-		Well Casing Elevation	: 1086.21
Constructed Depth:	30.20	-0		Static Water Elevation	1075.23
Casing Diameter:	2"			Previous Static:	
Water Level Before Pu	irge: 0.95	3	647 	Water Level After San	nple: 11,95
Well Volume:	3.22	Gallons	-	Measurement Method:	Elec. WHI Steel Tape
Sampling Informati	on				
Maathan Conditional		1			
Weather Conditions:	Temp: 3		Wind: い	NW 19 s	iky: Clouchy
Sampling Method:	Grundfos	Bledder S&T	Wind: (J) Disp. Bailer		iky: Clouchy ther:
				Whale Grab O	
Sampling Method:	Grundfos			Whale Grab O	ther:
Sampling Method: Dedicated Equipment:	Grundfos			Whale Grab O Pumping Rate: C	ther: /
Sampling Method: Dedicated Equipment: Well Purged Dry?	Grundfos			Whale Grab O Pumping Rate: C Time Pump Began:	ther: / 2,25 gpm /520 am / @m /559 am / @m
Sampling Method: Dedicated Equipment: Well Purged Dry? Time Purged Dry?	Grundfos Yes No Yes	Bledder SS/T		Whale Grab O Pumping Rate: C Time Pump Began: Time of Sampling: Sample EH: 182.	ther: / 2,25 gpm /520 am / ஹு /559 am / ஹா . 8
Sampling Method: Dedicated Equipment: Well Purged Dry? Time Purged Dry? Duplicate Sample? Sample Appearance:	Grundfos Ves No Yes No Yes No General: Specific	ID:	Disp. Bailer Color: No n D. O.	Whale Grab O Pumping Rate: C Time Pump Began: Time of Sampling: Sample EH: 82. ℓ Phase: None Turbidity Gallons	ther: / 2,25 gpm 1520 am / @m 1559 am / @m .8 2 Odor: Nore SEQ
Sampling Method: Dedicated Equipment: Well Purged Dry? Time Purged Dry? Duplicate Sample? Sample Appearance: 13 Time pH	Grundfos Ves No Yes S Yes S General: Specific Cond.	ID:	Disp. Bailer Color: No n D. O.	Whale Grab O Pumping Rate: O Time Pump Began: Time of Sampling: Sample EH: 82. e Phase: None Turbidity Gallons NTU NA	ther: 2,25 gpm 1520 am / pm 1559 am / pm 38 2 Odor: Nore d \$EQ # Comments:
Sampling Method: Dedicated Equipment: Well Purged Dry? Time Purged Dry? Duplicate Sample? Sample Appearance:	Grundfos Ves No Yes No Yes No General: Specific Cond. 3\3%	ID:	Disp. Bailer Color: No n D. O.	Whale Grab O Pumping Rate: C Time Pump Began: Time of Sampling: Sample EH: 82. ℓ Phase: None Turbidity Gallons	ther: 2,25 gpm 1520 am / pm 1559 am / pm 38 2 Odor: Nore d \$EQ # Comments:
Sampling Method:Dedicated Equipment:Well Purged Dry?Time Purged Dry?Duplicate Sample?Sample Appearance:13Time1415336.71	Grundfos Ves No Yes No Yes No General: Specific Cond. 3138 3141	ID:	Disp. Bailer Color: Non D. O. mg/L NA 3,55	Whale Grab O Pumping Rate: O Time Pump Began: Time of Sampling: Sample EH: 182. e Phase: None Turbidity Gallons NTU NA Removed 13.3 3.25	ther: / 2,25 gpm 1520 am / pm 1559 am / pm 1559 am / pm 38
Sampling Method: Dedicated Equipment: Well Purged Dry? Time Purged Dry? Duplicate Sample? Sample Appearance:	Grundfos Ves No Yes No Yes No General: Specific Cond. 3138 3141	ID: Defi Temp °C 9.39	Disp. Bailer Color: Non D. O. mg/L AJA 3,55 3,35	Whale Grab O Pumping Rate: C Time Pump Began: Time of Sampling: Sample EH: 182. C Phase: None Turbidity Gallons NTU NA 13.3 3.25 13.0 6.5	ther: / 2,25 gpm 1520 am / pm 1559 am / pm 1559 am / pm 38
Sampling Method: Dedicated Equipment: Well Purged Dry? Time Purged Dry? Duplicate Sample? Sample Appearance: 13 Time pH 1533 6.71 1546 6.71	Grundfos Ves No Yes No Yes No General: Specific Cond. 3\3%	Bledder SSAT	Disp. Bailer Color: Non D. O. mg/L NA 3,55	Whale Grab O Pumping Rate: O Time Pump Began: Time of Sampling: Sample EH: 82. e Phase: None Turbidity Gallons NTU NA 13.3 3.25 13.0 6.5	ther: / 9:25 gpm 1520 am / pm 1559 am / pm 1559 am / pm 8 0dor: 2 0dor: 1 2 3 1
Sampling Method: Dedicated Equipment: Well Purged Dry? Time Purged Dry? Duplicate Sample? Sample Appearance: 13 Time pH 1533 6.71 1546 6.71	Grundfos Ves No Yes No Yes No General: Specific Cond. 3138 3141	Bledder SSAT	Disp. Bailer Color: Non D. O. mg/L AJA 3,55 3,35	Whale Grab O Pumping Rate: C Time Pump Began: Time of Sampling: Sample EH: 182. C Phase: None Turbidity Gallons NTU NA 13.3 3.25 13.0 6.5	ther: / 2,25 gpm 1520 am / pm 1559 am / pm 1559 am / pm 38

Comments:

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MINNESOTA VALLEY TESTING LABORATORIES, INC.

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MEMBER ACIL

Quality Control Report

Lab IDs: 18-A61777 to 18-A61789 Project: BIG STONE PLANT CCR								Work Order: 201831-0547											
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 Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank		
Alkalinity, Total mg/L CaCO3				82.0 82.0 82.0 82.0 82.0 82.0 82.0 82.0	18-A61765 18-A61771 18-A61782 18-A62213 18-A62221 18-A62227 18-A61651	409 397 505 223 193 200 398	484 472 579 297 267 273 478	91 91 90 90 90 89 98	77-115 77-115 77-115 77-115 77-115 77-115 77-115 77-115	484 472 579 297 267 273 478	483 473 580 297 266 270 477	90 93 91 90 89 85 96	0.2 0.2 0.2 0.0 0.4 1.1 0.2	5 5 5 5 5 5 5 5 5	93 94 94 95 95	90-110 90-110 90-110 90-110 90-110	< 20 < 20 < 20 < 20 < 20 < 20 < 20		
Antimony ug/L	25.0	106	85-115	25.0	18-A61788	< 5	26.7	107	75-125	26.7	27.7	111	3.7	10	100	90-110	< 0.5		
Arsenic ug/L	25.0	106	85-115	25.0	18-A61788	< 2.5	28.2	113	75-125	28.2	28.7	115	1.8	10	97	90-110	< 0.5		
Arsenic, Dissolved ug/L	-	-	-	50.0	18A61782q	1.54	60.2	117	75-125	60.2	59.6	116	1.0	10	108	90-110	< 0.5		
Barium mg/L	1.000 1.000	99 99	85-115 85-115	1.00 1.00	18A61786q 18A61776q	0.019 0.065	1.020 1.050	100 98	75-125 75-125		1.020 1.060	100 99	0.0 0.9	10 10	102 102	90-110 90-110	< 0.005 < 0.005		
Barium, Dissolved mg/L	1.000 1.000	97 98	85-115 85-115	1.00 1.00	18A61780q 18A63263q	0.082	1.060 0.973	98 97	75-125 75-125		1.060 0.966	98 97	0.0 0.7	10 10	98 103	90-110 90-110	< 0.005 < 0.005		
Beryllium ug/L	2.50	110	85-115	2.50	18-A61788	< 0.25	2.65	106	75-125	2.65	2.62	105	1.1	10	104	90-110	< 0.05		
Boron mg/L	1.000	100 98	85-115 85-115	1.00 1.00	18A61786q 18A61776q	1.400 46.40	2.470 45.20	107 -120	75-125 75-125		2.520 46.20	112	2.0 2.2	10 10	102 101	90-110 90-110	< 0.1 < 0.1		
Boron, Dissolved mg/L	1.00 1.00	93 95	85-115 85-115	1.00 1.00	18A61780q 18A63263q	3.88 < 0.1	4.91 0.97	· 103 · 97	75-125 75-125	4.91 0.97	4.96 0.96	108 96	1.0 1.0	10 10	97 99	90-110 90-110	<0.1 <0.1		
Cadmium ug/L	5.00	111	85-115	5.00	18-A61788	< 0.5	5.79	116	75-125	5.79	5.68	114	1.9	10	103	90-110	< 0.1		
Cadmium, Dissolved ug/L	-	-	-	10.0	18A61782q	< 0.2	10.6	106	75-125	10.6	9.82	98	7.6	10	105	90-110	< 0.1		
Calcium mg/L	50.00 50.00	103 102	85-115 85-115	50.0 50.0	18A61786q 18A61776q	121.0 177.0	174.0 220.0	106 86	75-125 75-125		175.0 225.0	108 96	0.6 2.2	10 10	106 106	90-110 90-110	1		
Chloride mg/L	-	-	-	60.0 60.0	18-A61786 18-A62204	5.7 9.6	63.9 74.1	97 108	86-117 86-117	63.9 74.1	62.6 71.2	95 103	2.1 4.0	5 5	94 95	90-110 90-110			
Chromium mg/L	1.000 1.000	102 102	85-115 85-115	1.00 1.00	18A61786q 18A61776q	< 0.01 < 0.1	1.020 0.977	102 98	75-125 75-125		1.020 1.000	102 100	0.0 2.3	10 10	102 104	90-110 90-110	< 0.01 < 0.01		

Page: 1 of 3

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MEMBER ACIL

Quality Control Report

Lab IDs: 18-A61777 to 18-A61789 Project: BIG STONE PLANT								Work Order: 201831-0547											
Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Límits	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		
Chromium, Dissolved mg/L	1.000 1.000	94 96	85-115 85-115	1.00 1.00	18A61780q 18A63263q	< 0.01 < 0.01	0.976 0.984	98 98	75-125 75-125	0.976 0.984	0.984 0.968	98 97	0.8 1.6	10 10	97 97	90-110 90-110	< 0.01 < 0.01		
Cobalt mg/L	1.000 1.000	103 101	85-115 85-115	1.00 1.00	18A61786q 18A61776q	< 0.005 < 0.05	0.997 0.966	100 97	75-125 75-125	0.997 0.966	1.000 0.992	100 99	0.3 2.7	10 10	104 104	90-110 90-110	< 0.005 < 0.005		
Copper, Dissolved ug/L	-	-	-	50.0	18A61782q	1.82	48.6	94	75-125	48.6	47.1	91	3.1	10	102	90-110	< 0.5		
Fluoride mg/L			-	1.00 1.00	a61785qc a61800qc	0.920 0.720	1.87 1.75	95 103	75-125 75-125	1.87 1.75	1.84 1.70	92 98	1.6 2.9	10 10	104 100	90-110 90-110	< 0.02		
Lead ug/L	25.0	108	85-115	25.0	18-A61788	< 2.5	28.0	112	75-125	28.0	27.1	108	3.3	10	102	90-110	< 0.5		
Lead, Dissolved ug/L	-	-	-	50.0	18A61782q	< 1	51.3	103	75-125	51.3	50.8	102	1.0	10	103	90-110	< 0.5		
Lithium mg/L	1.000 1.000	98 97	85-115 85-115	1.00 1.00	18-A61786 18A61776qc	0.166 0.718	1.190 1.720	102 100	75-125 75-125	1.190 1.720	1.200 1.740	103 102	0.8 1.2	10 10	100 100	90-110 90-110	< 0.02 < 0.02		
Magnesium mg/L	50.00	101	85-115	50.0	18A61786q	62.10	114.0	104	75-125	114.0	115.0	106	0.9	10	103	90-110	< 0.5		
Manganese, Dissolved mg/L	1.000 1.000	94 97	85-115 85-115	1.00 1.00	18A61780q 18A63263q	< 0.005 < 0.005	0.988 0.986	99 99	75-125 75-125		0.981 0.977	98 98	0.7 0.9	10 10	97 96	90-110 90-110	< 0.005 < 0.005		
Mercury ug/L	72 ° -	-	- **	0.10	18-A61789	< 0:005	0.109	109	63-111	0.109	0.112	112	2.7	18	95	76-113	< 0.005 < 0.005		
Mercury, Dissolved ug/L	342 (2) 	2	2 =	0.10 0.10	18-A61779 18-A62207	<`0.005 <`0.005	0.083 0.098	-83 98	63-111 63-111		0.080 0.096	80 96	3.7 2.1	18 18	97 500 97	76-113 76-113	<0.005 <0.005 <0.005 <0.005		
Molybdenum ug/L	25.0	109	85-115	25.0	18-A61788	8.42	35.7	109	75-125	35.7	34.9	106	2.3	10	104	90-110	< 0.5		
Nitrate+Nitrite mg/L as N	-	•	-	2.00	18-A61754	0.26	2.12	93	76-116	2.12	2.15	95	1.4	5	94	90-110	< 0.05		
pH units	-	-	-	-	-	-	-	-	-	7.0 7.4	7.0 7.4	-	0.0 0.0	2.5 2.5	101 101	90-110 90-110			
Potassium mg/L	50.00	97	85-115	50.0	18A61786q	108.0	164.0	112	75-125	164.0	166.0	116	1.2	10	100	90-110	< 0.5		
Selenium ug/L	25.0	107	85-115	25.0	18A61788q	<5	25.9	104	75-125	25.9	26.2	105	1.2	10	100	90-110	< 0.5		

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MVTL

Quality Control Report

MINNESOTA VALLEY TESTING LABORATORIES, INC.

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

Lab IDs: 18-A61777 to 18-A6	1789	Pro	oject: BIO	J STONE	E PLANT		Work (Order: 20	01831-05	47							
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, Dissolved ug/L	-	-	-	125	18A63258q	< 2.5	131	105	75-125	131	136	109	3.7	10	95	90-110	< 0.5 < 0.5
Silver, Dissolved mg/L	0.0500 0.0500	93 94	85-115 85-115	0.05 0.05	18A61780q 18A63263q	< 0.005 < 0.005	0.0486 0.0478	97 96	75-125 75-125	0.0486 0.0478	0.0491 0.0473	98 95	1.0 1.1	10 10	97 98	90-110 90-110	< 0.005 < 0.005
Sodium mg/L	50.00	99	85-115	50.0	18A61786q	45.70	98.70	106	75-125	98.70	99.30	107	0.6	10	101	90-110	< 0.5
Solids, Total Dissolved mg/L	- - -		-	-		-			-	3130 2360 1950 3570	3080 2320 1950 3480	- - -	1.6 1.7 0.0 2.6	7 7 7 7	102 105	85-115 85-115	< 10 < 10
Specific Conductance umhos/cm	• • • • •		-			-			- - - - -	3484 2949 3025 497.1 459.6 664.3 1573	3462 2952 2996 504.1 458.6 643.1 1594	- - - - -	0.6 0.1 1.0 1.4 0.2 3.2 1.3	5 5 5 5 5 5 5 5 5	98 99 100 97 101	90-110 90-110 90-110 90-110 90-110	
Strontium, Dissolved mg/L	1.000 1.000	-98 98	85-115 85-115	1.00 1.00	18A61780q 18A63263q	0.220 < 0.005	1.200 0.976	98 98	75-125 75-125	1.200 0.976	.1.200 0.972	98 97	0.0 0.4	10 10	97 100	90-110 90-110	< 0.005 < 0.005
Sulfate mg/L	ne din Fa			500 500	18-A61786 18-A61789	283 622	849 1200	113. 116	68-132 68-132	849 1200	846 1210	113 118	0,4	-5 -5	107 103	80-120 80-120	<5 <5
Thallium ug/L	5.00	107	85-115	5.00	18-A61788	< 0.5	5.58	112	75-125	5.58	5.51	110	1.3	10	102	90-110	< 0.1
Vanadium, Dissolved mg/L	1.000 1.000	97 98	85-115 85-115	1.00 1.00	18A61780q 18A63263q	<0.005 <0.005	0.992 0.991	99 99	75-125 75-125	0.992 0.991	1.000 0.976	100 98	0.8 1.5	10 10	102 103	90-110 90-110	< 0.005 < 0.005
Zinc, Dissolved mg/L	1.000 1.000	93 95	85-115 85-115	1.00 1.00	18A61780q 18A63263q	< 0.01 < 0.01	0.969 0.996	97 100	75-125 75-125	0.969 0.996	0.972 0.976	97 98	0.3 2.0	10 10	94 95	90-110 90-110	< 0.01 < 0.01

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The boron matrix spike and spike duplicate recoveries were outside the acceptance limits, see narrative. The mercury matrix spike duplicate recovery was outside the acceptance limits, see narrative.

Approved by: