

2018 Annual Groundwater Monitoring and Corrective Action Report

CCR Annual Monitoring Report

Slag Pond Area

Coyote Station Beulah, North Dakota

Prepared for Otter Tail Power Company

January 2019

2018 CCR Annual Groundwater Monitoring and Corrective Action Report

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January 2019

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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 Coyote Station, a coal-fired generation unit near Beulah, North Dakota. Coal combustion residuals (CCR) from the generating station are placed in three on-site surface impoundments: the Slag Pond, the Sluice Outfall, and Nelsen Pond. These impoundments are existing CCR surface impoundments that are 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).

The Slag Pond Area, in which the groundwater monitoring system is located, consists of the Slag Pond, Sluice Outfall, and Nelsen Pond. The location of the Slag Pond Area is shown on (Figure 1). The groundwater monitoring system is a Multiunit Groundwater Monitoring System, as allowed in §257.91 (d). It is not feasible to install a separate groundwater monitoring system for each CCR unit.

This 2018 Annual Groundwater Monitoring and Corrective Action Report (Annual Report) describes the monitoring program and results for the Slag Pond Area at Coyote Station (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, Slag Pond Area (Barr, 2018) documented the results of the baseline monitoring. The evaluation of groundwater monitoring data for statistically significant increases over background levels for the constituents listed in Appendix III 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 1 CCR Rule Requirements

CCR Rule Reference	Content Required in Report	Location
§257.90(e)(1)	Map showing the CCR unit and all monitoring wells that are part of the groundwater monitoring system	Section 2.1.1 Documentation - see Figure 1
§257.90(e)(2)	Discuss any new or decommissioned monitoring wells	Section 2.1.2 Changes to Monitoring System
§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 are included in the Groundwater Monitoring System Report, Coyote Station Slag Pond Area (Barr, 2016).

2.1.2 Changes to Monitoring System

The groundwater monitoring system was unchanged in 2018.

2.2 Monitoring and Analytical Results

A total of 10 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 from monitoring wells MW 2S, POND N3, POND 6, and POND 16S.
- One semiannual sample from monitoring wells POND 10 and POND 12.

In addition to the semiannual samples, one resample was collected from monitoring well POND 16S for boron on May 3, 2018.

2.3 Key Actions Completed/Problems Encountered

The following key actions were completed for the groundwater monitoring program through 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 all downgradient monitoring
 wells, except for monitoring well POND 16S.

Determined, pursuant to § 257.93(h), that a statistically significant increase over background levels
occurred for boron at downgradient monitoring well POND 16S. A successful demonstration that
a source other than the CCR unit caused the SSI is provided in Appendix B.

Problems encountered during the report period include:

- The field logs indicate that recharge was insufficient for sampling monitoring well POND 10 and POND 12 for Appendix III (Part 257) constituents on February 27, 2018. Monitoring well POND 12 recharged and was sampled on March 1, 2018, but monitoring well POND 10 did not recharge and no sample was collected.
- The field logs indicate that recharge was insufficient for sampling monitoring well POND 12 for Appendix III (Part 257) constituents on August 7, 2018.

2.4 Key Activities for Upcoming Year

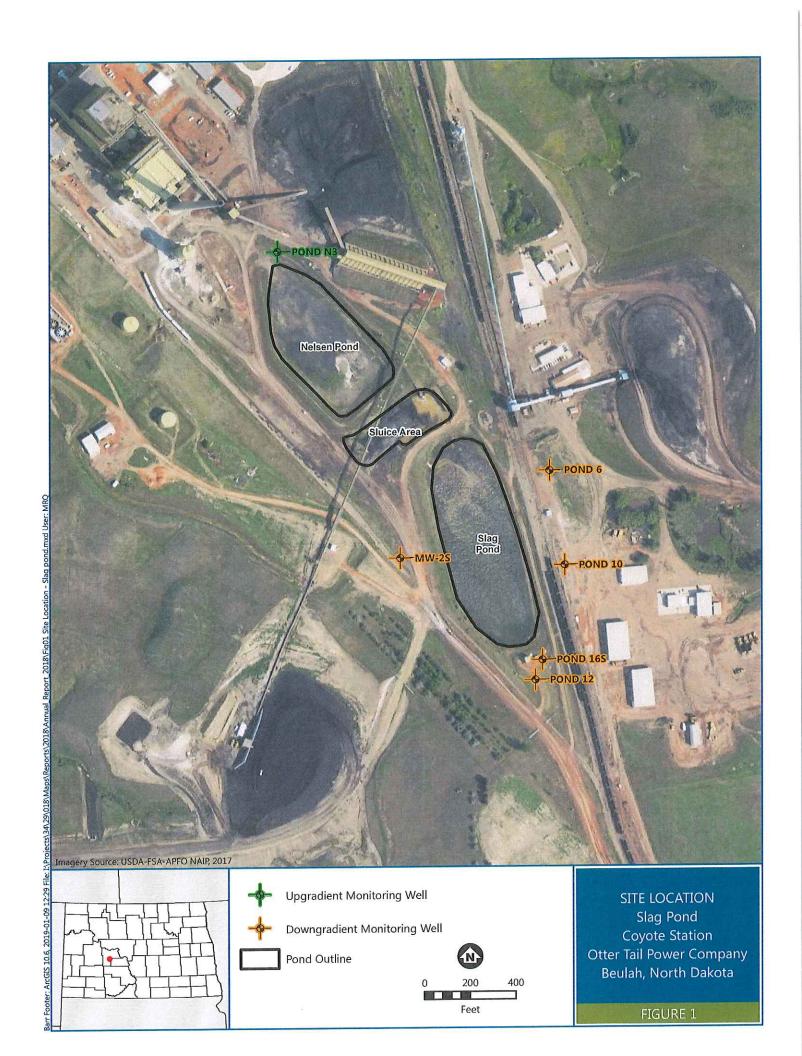
The following key groundwater monitoring program activities are planned for 2019:

- 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).
- Continue the groundwater monitoring program in accordance with the CCR rule.
- Closure of the Slag Pond, Sluice Outfall, and Nelsen Pond will begin in the Spring of 2019.

3.0 References

- Barr, 2018. 2017 Annual Groundwater Monitoring and Corrective Action Report, Coyote Station Slag Pond Area. Prepared for Otter Tail Power Company. January 2018.
- Barr, 2016. Groundwater Monitoring System Report, Coyote Station Slag Pond Area. Prepared for Otter Tail Power Company. November 2016.
- Carlson McCain, 2017. CCR Groundwater Sampling and Analysis Plan (Including Statistical Method Selection and Certification), Coyote Station Slag Pond 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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CASE NARRATIVE

MVTL Lab Reference No/SDG:

201882-0393

Client:

Ottertail Power Company

Location:

Coyote Station

Project Identification:

CCR Slag Pond

Event & Year

February 2018

MVTL Laboratory Identifications:

18-W285 through 18-W289

Page 1 of 1

Sample Identification	MVTL Laboratory #
FB Slag	18-W285
Pond6	18-W286
PondN3	18-W287
Pond10	No sample
Pond12	No sample
Pond16S	18-W288
MW2S	18-W289

I. RECEIPT

- All samples were received at the laboratory on 1 Mar 18 at 0800.
- Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
- · Samples were received on ice and evidence of cooling had begun.
 - o Temperature of samples upon receipt was 2.6°C.
- All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
- No other exceptions on sample receipt were encountered on this sample set unless noted here.

II. HOLDING TIMES

• With the exception of laboratory pH, all holding times were met for both preparation and analysis unless noted here.

III. METHODS

Approved methodology was followed for all sample analyses.

IV. ANALYSIS

 All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted here and/or flagged on the individual analytical laboratory report.

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MEMBER

Page: 1 of 1

Quality Control Report Lab Ds: 18-W285 to 18-W289

Project: OTP Coyote-Slag Pond CCR

Work Order: 201882-0393

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	Spike	Rec		Spike		SARA!	Spike	36%		Orig	Dup	Rec	Dup	RPD	Rec	% Rec	Method
Analyte		%	Limits Amt				4.4		Limits				200	Limit (<)		7000	Blank
Boron - Total mg/l	0.40	108	80-120	0.400	18-W285	< 0.1	0.42	105		0.42	0.43	108	2.4	20	ı	ı	< 0.1
				0.400	18-W294	0.36	0.74	95	75-125	0.74	92.0	100	_	20	3	1	< 0.1
Calcium - Total mg/l	20.0	110	80-120	100	18W285q	<1	103	103	75-125	103	102	102	1.0	20	r	I.	× 1
				100	18W294q	144	238	94	75-125	238	236	92	8.0	20		ī	<1
Chloride mg/l	30.0	101	80-120	30.0	18-W294	11.4	44.5	110	80-120	44.5	42.6	104	4.4	20	â	ı	< 1
	30.0	101	80-120												ī	ı	^
Fluoride mg/l	0.50	102	90-110 0.500	0.500	18-M405	1.97	2.42	06	80-120	2.42	2.41	88	0.4	20	1	1	< 0.1
				0.500	18-W288	0.19	0.72	106	80-120	0.72	0.72	106	0.0	20		1	< 0.1
pH units	ï	ť	i	t	ĭ	ı		ı	1	5.0	5.1	i	2.0	20	ř	ï	ı
	1	j	ı	1		1	1	,	1	7.4	7.4	1	0.0	20	,	1	1
Sulfate mg/l	100	103	80-120	500	18-W294	865	1450	117	80-120	1450	1330	93	9.8	20	,	ı	< 5
	100	106	80-120	100	18-W285	< 5	104	104	80-120	104	87.8	96	8.2	20	ī	ı	\ \ 5
Total Dissolved Solids mg/l	ĵ	1	,		55 E	-	3			1770	1800	1	1.7	20	1	1	< 10
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Approved by:

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CERTIFICATE of ANALYSIS - CCR

Josh Hollen Otter Tail Power Co. PO Box 496 Fergus Falls MN 56538-0496

Project Name: OTP Coyote-Slag Pond CCR

Sample Description: FB Slag

Event and Year: February 2018

1 of 5 Page:

Report Date: 13 Mar 18 Lab Number: 18-W285 Work Order #:82-0393 Account #: 006106

Date Sampled: 28 Feb 18

Date Received: 1 Mar 18 8:00 Sampled By: MVTL Field Services

PO #: 48895

Temp at Receipt: 2.6C

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion	* 9.1	s.u.	0.1	EPA 200.2 SM4500 H+ B	1 Mar 18 1 Mar 18 17:00	svs svs
Lab, pH Fluoride	< 0.1	mg/l	0.10	SM4500-F-C ASTM D516-07	1 Mar 18 17:00 13 Mar 18 9:47	SVS RAG
Sulfate Chloride	< 5 < 1	mg/l mg/l	1.0	SM4500-C1-E	2 Mar 18 13:44 2 Mar 18 10:29	RAG SVS
Total Dissolved Solids Calcium - Total	< 10 < 1	mg/l mg/l	10 1.0	I1750-85 6010D	5 Mar 18 9:50	SZ
Boron - Total	< 0.1	mg/l	0.10	6010D	5 Mar 18 11:11	BT

* Holding time exceeded

Approved by:

K. Canter 15 Mar 18 Clauditte

Claudette K, Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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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CERTIFICATE of ANALYSIS - CCR

Josh Hollen Otter Tail Power Co. PO Box 496 Fergus Falls MN 56538-0496

Project Name: OTP Coyote-Slag Pond CCR

Sample Description: Pond6

Event and Year: February 2018

2 of 5 Page:

Report Date: 13 Mar 18 Lab Number: 18-W286 Work Order #:82-0393 Account #: 006106

Date Sampled: 27 Feb 18 13:23 Date Received: 1 Mar 18 8:00 Sampled By: MVTL Field Services

PO #: 48895

Temp at Receipt: 2.6C

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion Field pH Lab, pH Field Temperature Field Conductivity Fluoride Sulfate Chloride Total Dissolved Solids Calcium - Total Boron - Total	6.95 * 7.4 9.33 4241 0.33 1690 28.5 3280 214 2.92	s.u. s.u. Degrees C umhos/cm mg/1 mg/1 mg/1 mg/1 mg/1 mg/1	0.1 0.1 0.1 1 0.10 5.00 1.0 1.0 0.10	EPA 200.2 SM 4500 H+ B SM4500 H+ B SM 2550B EPA 120.1 SM4500-F-C ASTM D516-07 SM4500-C1-E I1750-85 6010D 6010D	1 Mar 18 27 Feb 18 13:23 1 Mar 18 17:00 27 Feb 18 13:23 27 Feb 18 13:23 1 Mar 18 17:00 6 Mar 18 10:59 2 Mar 18 10:29 5 Mar 18 9:50 5 Mar 18 11:11	SVS DJN DJN SVS RAG RAG SVS SZ

* Holding time exceeded

Approved by: Claudite K. Cantle 15 MA-18

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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© = Due to sample matrix # = Due to con
! = Due to sample quantity + = Due to int

= Due to concentration of other analytes + = Due to internal standard response



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CERTIFICATE of ANALYSIS - CCR

Josh Hollen Otter Tail Power Co. PO Box 496

Fergus Falls MN 56538-0496

Project Name: OTP Coyote-Slag Pond CCR

Sample Description: PondN3

Event and Year: February 2018

3 of 5 Page:

Report Date: 13 Mar 18 Lab Number: 18-W287 Work Order #:82-0393 Account #: 006106

Date Sampled: 27 Feb 18 14:54 Date Received: 1 Mar 18 8:00 Sampled By: MVTL Field Services

PO #: 48895

Temp at Receipt: 2.6C

	As Recei Result	ived	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion Field pH Lab, pH Field Temperature Field Conductivity Fluoride Sulfate Chloride Total Dissolved Solids	6.69 * 7.1 11.0 5278 0.25 3520 39.5 5180	s.u. s.u. Degrees C umhos/cm mg/1 mg/1 mg/1	0.1 0.1 0.1 1 0.10 5.00 1.0	EPA 200.2 SM 4500 H+ B SM4500 H+ B SM 2550B EPA 120.1 SM4500-F-C ASTM D516-07 SM4500-C1-E I1750-85 6010D	1 Mar 18 27 Feb 18 14:54 1 Mar 18 17:00 27 Feb 18 14:54 27 Feb 18 14:54 1 Mar 18 17:00 6 Mar 18 10:59 2 Mar 18 13:44 2 Mar 18 10:29 5 Mar 18 9:50	DJN DJN SVS RAG RAG SVS
Calcium - Total Boron - Total	515 0.66	mg/l mg/l	0.10	6010D	5 Mar 18 11:11	BT

* Holding time exceeded

Approved by: Claudite K. Cantle

CC 15MAr 18

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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CERTIFICATE of ANALYSIS - CCR

Josh Hollen Otter Tail Power Co. PO Box 496 Fergus Falls MN 56538-0496

Project Name: OTP Coyote-Slag Pond CCR

Sample Description: Pond16S

Event and Year: February 2018

4 of 5 Page:

Report Date: 13 Mar 18 Lab Number: 18-W288 Work Order #:82-0393 Account #: 006106

Date Sampled: 27 Feb 18 17:00 Date Received: 1 Mar 18 8:00 Sampled By: MVTL Field Services

PO #: 48895

Temp at Receipt: 2.6C

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion Field pH Lab, pH Field Temperature Field Conductivity Fluoride Sulfate Chloride Total Dissolved Solids Calcium - Total Boron - Total	6.88 * 7.3 8.53 3190 0.19 1570 26.5 2440 184 2.44	s.u. s.u. Degrees C umhos/cm mg/l mg/l mg/l mg/l mg/l mg/l mg/l	0.1 0.1 0.1 1 0.10 5.00 1.0 1.0	EPA 200.2 SM 4500 H+ B SM4500 H+ B SM 2550B EPA 120.1 SM4500-F-C ASTM D516-07 SM4500-C1-E 11750-85 6010D 6010D	1 Mar 18 27 Feb 18 17:00 1 Mar 18 17:00 27 Feb 18 17:00 27 Feb 18 17:00 1 Mar 18 17:00 6 Mar 18 10:59 2 Mar 18 10:29 5 Mar 18 9:50 5 Mar 18 11:11	SVS DJN DJN SVS RAG RAG SVS SZ

* Holding time exceeded

CC 15 Mar 18

Approved by:

Claudite K. Canteo

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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CERTIFICATE of ANALYSIS - CCR

Josh Hollen Otter Tail Power Co. PO Box 496

Fergus Falls MN 56538-0496

Project Name: OTP Coyote-Slag Pond CCR

Sample Description: MW2S

Event and Year: February 2018

5 of 5 Page:

Report Date: 13 Mar 18 Lab Number: 18-W289 Work Order #:82-0393 Account #: 006106

Date Sampled: 28 Feb 18 10:17 Date Received: 1 Mar 18 8:00 Sampled By: MVTL Field Services

PO #: 48895

Temp at Receipt: 2.6C

	As Receiv Result	red	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion Field pH Lab, pH Field Temperature Field Conductivity Fluoride Sulfate Chloride Total Dissolved Solids Calcium - Total Boron - Total	6.96 * 7.4 7.00 5361 0.26 3320 27.2 5070 560 < 0.5 @	s.u. s.u. Degrees C umhos/cm mg/1 mg/1 mg/1 mg/1 mg/1 mg/1	0.1 0.1 0.1 1 0.10 5.00 1.0 1.0 0.10	EPA 200.2 SM 4500 H+ B SM4500 H+ B SM 2550B EPA 120.1 SM4500-F-C ASTM D516-07 SM4500-C1-E 11750-85 6010D 6010D	1 Mar 18 28 Feb 18 10:17 1 Mar 18 17:00 28 Feb 18 10:17 28 Feb 18 10:17 1 Mar 18 17:00 6 Mar 18 10:59 2 Mar 18 13:44 2 Mar 18 10:29 5 Mar 18 19:50 6 Mar 18 11:11	SVS DJN SVS DJN DJN SVS RAG RAG SVS SZ BT

* Holding time exceeded

1c 15 Mar 18 Clauditte K. Canto Approved by:

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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



Chain of Custody Record

Name of Sampler(s): Darren Nieswang Work Order Number: Feb 2018 Carbon Copy: Attn: Address: Event: Otter Tail Power Josh Hollen PO Box 496 Fergus Falls, MN 56538-0496 OTP Coyote - Slag Pond CCR ihollen@otpco.com Project Name: Report To: Attn: Address: phone: email:

200											
Analysis	Analysis Required					OTP CCR Annendix 3					
meters	Hd	NA	6.95	69.9	1)	6.88	6.96			
Field Parameters	Spec. Cond.	NA A	4241	5278	1	١	3190	5361			
Fie	Temp (°C)	N A	9.33	10.96	١)	8.53	7,00			
0	1 IIIOI NIIIIC										
Bottle Type											
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Bot	500mL Withic					.1.					
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		<u>×</u>	<u>×</u>	×	-	1	_	$\hat{-}$	-	-	
G.	Appearance (Clear, Parily Cloudy, Cloudy)	J	clear	clear	}	1	1/2an	clear			
	Sample Type	W	GW	GW	GW	GW	CW	GW (
	əmiT	NA	No.	_	de	1532	1700	1017			
Sample Information	Date	28Feb18	27 12618 1323	27F618 1454	1 819515	275618		28 Feb.19 1			
Sample	Sample ID	FB Slag		PondN3	Pond10		(0)	MW2S 2			
	Lab Number	W285	1286	W287	1	}-	882M	V289			

* 27Fがり8月か

Relinquished By:		Sar	Sample Condition:
Name:	Date/Time	Location:	Temp (°C)
/	2812618	Log In	7,6
Market	1820	Walk In #2	TM562 /(TM588)
2		7	

NECEIV	Received by.
Name:	Date/Time
6	1 Mar 18
BUCHMANN	Oxeo



Field Datasheet

Groundwater Assessment

OTP Coyote Feb 2018 Company: Event:

Sampling Personal: Sample ID:

Sunny Partly Cloudy / Cloudy

Precip:

Phone: (701) 258-9720

Sampling Information Wind: liters Electric Water Level Indicator Not Visible 5 Temp: Well Information S S 2 Š 2 Measurement Method: Casing Diameter: Depth to Top of Pump: Water Level After Sample: Total Well Depth: Well Volume: Water Level Before Purge: Yes Well Locked? Grout Seal Intact? Weather Conditions: Well Labeled? Casing Straight? Repairs Necessary:

				3		
Purgin	Purging Method:	Bladder		ပိ	Control Settings	(D
Samplin	Sampling Method:	Bladder		Purge:	5	sec.
Dedicate	Dedicated Equip?:	Yes (No		Recover. 55	Si	sec.
Duplicate Sample?:	Sample?:	Yes Mo		PSI:	30	
Duplicate Sample ID:	Sample ID:	\			72	
P.	urge Date:	Purge Date: 2 7 Fc6 18	Time Purging Began:	าg Began:	1236	am/ध्रिमे
Well Pu	Well Purged Dry?	Yes 160	Time Pu	Fime Purged Dry:		amlpm
Sar	mple Date:	Sample Date: 277-611	Time of	Time of Sampling:	1323	am/pp
		G .				
Bottle	1L Raw, 500mL Nitric	00mL Nitric				
List:						

Field Measurements

Stabili	Stabilization	Temp	Spec.		20	ORP	Turbidity	Water	Pumping	шГ	Discription:
(3 cons	(3 consecutive)	(၃)	Cond.	Hd	(mg/L)	(mV)	(NTU)	Level (ft)	Rate	Removed	Clarity, Color, Odor, Ect.
SEQ#	Time		72%	±0.1	±10%	±20 mV	∓10%	0.25 ft	Junin		clear, partly cloudy, cloudy
-	1243	643	7957	78.7	250	42.0	7.27	16.52	\$-00-10¢	500	Clear
2	Dr. CI	20,6	9966	6.83	52,0	43,2	16.6	16,48	100	200	G
က	1253	2016	250 7	£1819	8210	43.5	8.47	16.45	100	25	cle
4	1258	90%	180h	188 7	0.26	43.8	7.61	16.46	100	200	ch
ည	1203	6/2	ゴデー	16.9	277	43,9	5.21	16.48	100	ees	cles
9	1308	9,33	89 15	6.92	72,0	43,9	3.05	16.50	100	200	S
7	1213	22.6	1124	1669	5210	43.6	3,10	16.48	100	290	Z
∞	1318	9,40	42.38	46,3	0,0	43,3	3.02	16.48	/00	200	777
6	1323	9,33	17241	36.9	6,22	43,7	2,83	16.45	100	005	an
10	()				7	٨		
	1					ł			60	-	

Comments.

Total Volume Removeď: ずかつ r リジン



Field Datasheet

OTP Coyote Company:

Feb 2018

Sunny Partly Cloudy / Cloudy

Sampling Information

Precip:

Sampling Personal: Sample ID: Event:

Groundwater Assessment 2616 E. Broadway Ave, Bismarck, ND Phone: (701) 258-9720

Weather Conditions:	Temp:	32 ₽	Wind:
Well Information	rmation		
Well Locked?	No		
Well Labeled?	No		
Casing Straight?	No		
Grout Seal Intact?	No	Not Visible	
Repairs Necessary:			
Casing Diameter.		2".~	
Water Level Before Purge:		13.58 A	
Total Well Depth:	18	37.05 A	
Well Volume:) イ、C liters	٠.
Depth to Top of Pump:	(N	30,80 A	
Water Level After Sample:	j	7,78 A	
Measurement Method:	Electric V	Electric Water Level Indicator	

Purging Method:	: Bladder		ပိ	Control Settings	"
Sampling Method:	l: Bladder		Purge:	S	sec.
Dedicated Equip?:	Yes (TO		Recover.	25	sec.
Duplicate Sample?:	Yes My		PSI:	30	
Duplicate Sample ID:					
Purge Date	Purge Date: 27 F6519	Time Purg	Fime Purging Began:	1349	am/pm
Well Purged Dry?	? Yes (AD	Time P	Time Purged Dry:		am/pm
Sample Date	Sample Date: 27Fc5/8	Time of	Fime of Sampling:	1452	am/@m
	6	170000			
Bottle 1L Raw,	1L Raw, 500mL Nitric				
List:					

Field Measurements

					3	0);;;);;;			STATE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN C	
Stabil	Stabilization	Temp	Spec.		00	ORP	Turbidity	Water	Pumping	Тш	Discription:
(3 cons	(3 consecutive)	(၃)	Cond.	Hd	(mg/L)	(mV)	(NTU)	Level (ft)	Rate	Removed	Clarity, Color, Odor, Ect.
SEQ#	Time		72%	+0.1	±10%	±20 mV	+10%	0.25 ft	mUmin		clear, partly cloudy, cloudy
-	1364	10.79	2240	12/9	3,78	72.24	181	14.32	87:00	200	Rathy Cloudy
2 141	者のます) 07/1	2422	11.79	89.0	30.5	1917	16,73	100	2000	Party cloudy
က	1429	10.93	2267	6.71	670	30.0	99.2	17,23	100	1500	PC: 1
4	1424	19.0	8975	02/7	876	29,7	73.6	17,39	100	500	74
22	1430	10,90	47.17	-	0,0	79.4	1.01	17.46	100	500	70
ဖ	でとてつ	1	5273	6,70	5,50	29,0	56.2	17.49	100	(201)	Clear
7	1210	(0, q/	5269	6919	05'8	26.5	565	17.56	100	500	Che
œ	カンで	10.96	8275	1999	82.0	28:4	52,1	17,60	001	500	
ത		,							,		
10											
10.00	(NO.	AI.				ř	Total Volumo Demoyled.	Domonou.	~のい/	E	

Stabilized: (Yes No Comments: 27Fe4/8@ (No

lotal Volume Removed: (, > 00 mL



Field Datasheet

Groundwater Assessment

OTP Coyote	Feb 2018	01
OTE	Feb	Land
Company:	Event:	Sample ID:

Sampling Personal: Janua

1/1 Precip: Sunny / Partly Cloudy / Cloudy	Sampling Information	Purging Method: \Bladder \Control Settings	Sampling Method: Bladder Purge: \	Dedicated Equip?: Yes No Recover:	Duplicate Sample?: Yes No PSI:	Duplicate Sample ID:		Purge Date:	Well Purged Dry? Yes No Time Purged Dry: ar	Sample Date: 2フデジ/タ Time of Sampling: 0928 和		Bottle - 11 Raw, 500mL Mitric	35
Wind: Cisht			S	Ď	Dup	Dupl			>			Bo	
ıp: / / °F	, u				Not-Visible		2"	21.88 A	22,10 A	2, 1 d liters	+1		The admin Mater and Indianter
Temp:	Well Information	Yes No	(Yes) No	Yes	Yes No		Casing Diameter:		Total Well Depth: 2	Well Volume:	of Pump:	r Sample:	
Weather Conditions:	>	Well Locked?	Well Labeled?	Casing Straight?	Grout Seal Intact?	Repairs Necessary:	Casing I	Water Level Before Purge:	Total We	Wel	Depth to Top of Pump:	Water Level After Sample:	Page 12 months and the colonial colonia

am/pm am/pm

sec. sec.

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Measurem
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Field
l-day

		0	000	T La Lad Share	18/oton	D.:		Disciplination
Spec.		2	ה ה	I urbidity water	Water	Buidmin	m L	Discription:
Cond. pH	т	(mg/L)	(mV)	(NTU) Level (ft)	Level (ft)	Rate	Removed	Clarity, Color, Odor, Ect.
±5% ±0.1	_	+10%	±20 mV	±10%	0.25 代	mL/min		clear, partly cloudy, cloudy
l	П					1		
/				*	/			
/	7							
			\					
		\langle						
	1							
\)			
\								
_								
			F	Total Volume Removed:	Removed:		mL	

Insufficat volume to collect a sample.

Comments:



Field Datasheet

Groundwater Assessment

OTP Coyote Feb 2018 Sampling Personal: Sample ID: Company: Event:

Weather Conditions:	Temp:	32 *	Wind: 4	4 3		Precip:	1	Sunny / Partly C
Well I	Well Information)		Sampling	Sampling Information	u
Well Locked? Yes	S Me			Purgin	Purging Method:	Bladder	7300	Cor
Well Labeled?	No No			Samplin	Sampling Method:	Bladder		Purge:
Casing Straight?	S No			Dedicate	Dedicated Equip?:	Yes No		Recover:
Grout Seal Intact? Yes	oN e	Not Visible		Duplicate Sample?:	Sample?:	Xes No		PSI:
Repairs Necessary:)			Duplicate Sample ID:	ample ID:			\
Casing Diameter:	er:	2"			,			
Water Level Before Purge:	V.	39.71 A		4	Purge Date:		Time Purging Began:	ng Began:
Total Well Depth:	th:	10, [0] ft		Well Pu	Well Purged Dry?	Yes No	Time P	Time Purged Dry:
Well Volume:	oe: γΦ	154 0,55 liters		Sar	Sample Date: 27 たら	2750518	Time of	Time of Sampling:
Depth to Top of Pump:	np:	#			:e			
Water Level After Sample:	ole:	fi		Bottle	1L Raw, 500mL Nitric	mL Nitric		
Measurement Method:		Electric Water Level Indicator		List:				

am/pp

am/pm am/pm

sec.

sec.

Control Settings

/ Partly Cloudy / Cloudy

	Stabilization	(3 consecutive)	SEQ#	1	2	က	4	5	9		8	6	10	Stabilized:
	ion	itive)	Time	The state of the s										Yes
	Temp	(၁)					- A							No
	Spec.	Cond.	72%)	
		Hd	±0.1		/						/			
Field	8	(mg/L)	710%							/				
Field Measurements	ORP	(mV)	±20 mV					/						ĭ
ments	ORP Turbidity Water Pumping	(NTU)	±10%		- 1									Total Volume Removed:
	Water	Level (ft)	0.25 ft		1									Removed:
	Pumping	Rate	mL/min											
	mL	Removed				*								m.
	Discription:	Clarity, Color, Odor, Ect.	clear, partly cloudy, cloudy											

I did try to parse but didn't have enough to oct a leadine, can out of water in wall. * 2 Trobago Trobago centraling and different pump, it still didn't work to set enough water to sample,

28 Febil water Herel Was 39,24ft.

Those wash trough water in well to get a sample,

Comments:



Field Datasheet

Groundwater Assessment

OTP Coyote Company:

Feb 2018 Sample ID: Event:

Sampling Personal:

Sunny / Partly Cloudy / Cloudy

Sampling Information

Precip:

810

The second secon				
Weather Conditions:		Temp:	33 °F	Wind:
	Well Information	rmation		
Well Locked?	Yes	(all		
Well Labeled?	Xes	No		
Casing Straight?	Xes S	No		
Grout Seal Intact?	海	No	(Not Visible	
Repairs Necessary:))	
Casing	Casing Diameter:		2"	
Water Level Before Purge:	ore Purge:	.j	れいか	III
Total W	Total Well Depth:	7.	48.85	표
Me	Well Volume:		リブ liters	S
Depth to Top of Pump.	of Pump:	h	りょっくん	#
Water Level After Sample:	er Sample:	7	42.80	TT)
Measurement Method:	it Method:	Electric W	Electric Water Level Indicator	

sbu	sec.	sec.				am/@m	amfpm	am/pfh			
Control Settings	5	55				1545	\	1700			
S	Purge:	Recover: 55	PSI:			lime Purging Began:	Time Purged Dry:	Time of Sampling:			
	-				1	Time Pur	Time	Time o			
er	er	No	No			iß	ON O	0	0		
pp	dd		,	1		2					
Bladder	Bladder	Yes	Yes)		27 56	Yes	135/12		30mL Nitric	
Purging Method: Bladd	Sampling Method: Bladd	Dedicated Equip?:	Duplicate Sample?: Yes	Duplicate Sample ID:		Purge Date: 27 F26 10	Well Purged Dry?	Sample Date: 27 / 元ら		1L Raw, 500mL Nitric	

Field Measurements

					בושוב	rield Measurements	SHEELS	99			
Stabilization	ation	Temp	Spec.		OQ	ORP	Turbidity	Water	Pumping	mL	Discription:
(3 consecutive)	cutive)	(၁)	Cond.	pH	(mg/L)	(mV)	(NTU)	Level (ft)	Rate	Removed	Clarity, Color, Odor, Ect.
SEQ#	Time		%S T	±0.1	¥10%	±20 mV	±10%	0.25 ft	mUmin		clear, partly cloudy, cloudy
1	0551	12/3	4028	46.7	1.78	10.9	132	8314	100	005	Party Clouds
2	1610	8,46	7237	929	9.86	5,3	199	h17h	100	2000	Pc' /
က	1630	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	3219	28'9	5670	15.	9.115	15.24	00/	2000	Clean
4	5491	17.3	13210	5819	10.85	2.6	16.91	£77h	100	1500.	clean
2	0,1	555	oors	6.87	0,83	1'8	11.8	42,71	100	500	Clan-
9	1655	8.5	300	101	86,0	13,4.	12,6	CL 2h	100	500	<u>Ch</u>
7	1700	6,53	14 50	887	0,76	14.8	11,2	たしてか	001	200	Ch
8			,)	
6			BX.								15. The state of t
10											1.5
Stabilized:	/(Yes	ON (F	Total Volume Removed: 7500 mL	Removed:	7500	шĻ	

No (Stabilized: //Yes



Field Datasheet

Groundwater Assessment

OTP Coyote Company:

Feb 2018 Sample ID: Event:

Sunny/ Partly Cloudy / Cloudy

Sampling Information

Sampling Personal:

Phone: (701) 258-9720

liters Electric Water Level Indicator Not Visible 7 Temp: Well Information å B å S S Measurement Method: Casing Diameter: Water Level Before Purge: Total Well Depth: Well Volume: Depth to Top of Pump: Water Level After Sample: Yes Yes Ke Kes Grout Seal Intact? Casing Straight? Weather Conditions: Well Locked? Well Labeled? Repairs Necessary:

Purging Method:	Bladder		ပိ	Control Settings	
Sampling Method:	Bladder		Purge:	5	sec.
Dedicated Equip?:	Yes (Mo		Recover:	55	sec.
Duplicate Sample?:	ØN∕ səY		PSI:	35	
Duplicate Sample ID:					
Purge Date:	Purge Date: 28 F= 618	Time Purging Began: 0927	ig Began:	0927	am/pm
Well Purged Dry?	Yes (No	Time Pu	Time Purged Dry:		am/pm
Sample Date: 28 17eb,	\$190180	Time of 3	Time of Sampling:	1017	ath/pm
Bottle 1L Raw, 50	1L Raw, 500mL Nitric				
List:					

Field Measurements

					בוטוב	rield Measurelliells	CHIELLS	KI)			
Stabilization	zation	Temp	Spec.		00	ORP	Turbidity	Water	Pumping	шĻ	Discription:
(3 consecutive)	scutive)	(၃)	Cond.	ЬH	(mg/L)	(mV)	(NTU)	Level (ft)	Rate	Removed	Clarity, Color, Odor, Ect.
SEQ#	Time		%5∓	±0.1	%0₹∓	±20 mV	±10%	0.25 ft	mL/min		clear, partly cloudy, cloudy
۲	5932	8.01	5945	687	1.94	8.55	"" " " " " " " " " " " " " " " " " " "	8512	001	500	clear
2	16250	159	21/2	166'9	h572	しいろ	14.38	126.94	001	2000	Class
8	2001	201	2462	1267	547	1250	4,79	12728	100	1000	(64-
4	1001	771	5359	1,95	2,97	655	ts h	12/27,34	001	00.5	chan
5	2101	7.13	5 350	16.9	3.19	45,9	14.63	27,47	100	500	clar
9	1017	7.00	1385	6.96	3,24	1 4 1/2 /	4,34	34 27,56	700	500	
7		,		•		-	,	3×105	1251200	Ü	
8									B		
6							¥				
10											
Stabilized:	(Yes)	No				ent.	otal Volume	Total Volume Removed: 5000		mL	

Comments:



MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890

2 North German 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



CASE NARRATIVE

MVTL Lab Reference No/SDG:

201882-0405

Client:

Ottertail Power Company

Location:

Covote Station

Project Identification:

CCR Slag Pond

Event & Year

February 2018

MVTL Laboratory Identifications:

18-W306

Page 1 of 1

1 466 2 01 2	
Sample Identification	MVTL Laboratory #
Pond12	18-W306

RECEIPT ı.

- All samples were received at the laboratory on 1 Mar 18 at 1616.
- Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
- Samples were received on ice and evidence of cooling had begun.
 - Temperature of samples upon receipt was 0.3°C.
- All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
- No other exceptions on sample receipt were encountered on this sample set unless noted here.

11.

With the exception of laboratory pH, all holding times were met for both preparation and analysis unless noted here.

METHODS III.

Approved methodology was followed for all sample analyses.

ANALYSIS IV.

All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted here and/or flagged on the individual analytical laboratory report.

All laboratory data has been approved by MVTL Laboratories. DATE: 12 Mar 18 SIGNED: Claudette Carroll - MVTL Bismarck Laboratory Manager

MINNESOTA VALLEY TESTING LABORATORIES, INC.

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 1126 N. Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890 www.mvtl.com

MEMBER

Page: 1 of 1

Quality Control Report Lab D: 18-W306

Work Order: 201882-0405 Project: OTP Coyote-Slag Pond CCR

ממרי מי יחד משוד		7 7 7	מייים מייים מייים	3000	THE TOTAL		TO THE COL	107 - 101	מוני במינים יומים מינים							0.00	The second second
	CCS	TCS	TCS	Matrix		Matrix Spike	Matrix	Matrix Spike	Matrix Spike			MSD	MSD/	MSD/ Dup	Known	Known	
Analyte	Spike Amt	Rec %	% Rec Limits	Spike Amt	% Rec Spike Spike Limits Amt D	Orig Result	Spike Result	Rec %	% Rec Limits	Orig Result	Dup Result	Rec %	Dup RPD	RPD Rec Limit (<) (%)	Rec (%)	% Rec Limits	Method Blank
Boron - Total mg/l	0.40	110	80-120 0.400	0.400	18-W297	0.47	0.84	93	75-125	0.84	98.0	86	2.4	20	j	1	< 0.1
															i		< 0.1
Calcium - Total mg/l	20.0	110	80-120	500	18W297q	155	999	102	75-125	599	029	103	0.7	20	ī		V 1
				100	18W301q	108	204	96	75-125	204	204	96	0.0	20	t	•	<1
Chloride mg/l	30.0	86	80-120	30.0	18-W301	8.6	37.4	96	80-120	37.4	37.3	96	0.3	20		ı	\
Fluoride mg/l	0.50	86	90-110 0.500	0.500	18-W294	0.23	0.74	102	80-120	0.74	0.73	100	1.4	20	ı	ı	< 0.1
				0.500	18-W301	0.24	92.0	104	80-120	0.76	0.77	106	1.3	20		1	< 0.1
pH units				ï	ī		ı		ı	7.2	7.2	ı	0.0	20	1		ı
	ì	1	į	ì	j	1	,	•		7.3	7.4	1	1.4	20		ı	1
Sulfate mg/l	100	117	80-120	2000	18-W306	1870	3980	106	80-120	3980	3940	104	1.0	20		1	< 5
Total Dissolved Solids mg/l	ı	ī		i	ī	ı		-	I	1770	1800	r	1.7	20			< 10
	1	1	1		,	1	9	9	į	1790	1790	1	0.0	20	,	,	

C-Gurd 12Mer 18

Approved by:



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



CERTIFICATE of ANALYSIS - CCR

Josh Hollen Otter Tail Power Co. PO Box 496 Fergus Falls MN 56538-0496

Project Name: OTP Coyote-Slag Pond CCR

Sample Description: Pond12

Event and Year: February 2018

1 of 1 Page:

Report Date: 7 Mar 18 Lab Number: 18-W306 Work Order #:82-0405 Account #: 006106

Date Sampled: 1 Mar 18 14:40 Date Received: 1 Mar 18 16:16 Sampled By: MVTL Field Services

PO #: 48895

Temp at Receipt: 0.3C

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion Field pH Lab, pH Field Temperature Field Conductivity Fluoride Sulfate Chloride Total Dissolved Solids Calcium - Total	7.28 * 7.6 8.42 3307 < 0.1 1870 29.1 2630 220 1.56	s.u. s.u. Degrees C umhos/cm mg/l mg/l mg/l mg/l mg/l mg/l mg/l	0.1 0.1 0.1 1 0.10 5.00 1.0 1.0	EPA 200.2 SM 4500 H+ B SM4500 H+ B SM 2550B EPA 120.1 SM4500-F-C ASTM D516-07 SM4500-C1-E I1750-85 6010D 6010D	1 Mar 18 1 Mar 18 14:40 2 Mar 18 17:00 1 Mar 18 14:40 1 Mar 18 14:40 2 Mar 18 17:00 6 Mar 18 11:56 2 Mar 18 10:29 5 Mar 18 10:50 5 Mar 18 10:50	SVS DJN DJN SVS RAG RAG SVS SZ

* Holding time exceeded

Claudette K. Canto Approved by:

12 Marl8

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

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



Field Datasheet

Groundwater Assessment

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pany	
Cod	

Feb 2018 Sample ID: Event:

Sunny / Partly Cloudy / Cloudy Sampling Personal: Wind: ĥ Temp: 2616 E. Broadway Ave, Bismarck, ND Phone: (701) 258-9720 Weather Conditions:

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	2	2		
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ì	2	3	,	
	7	8	•	

	((
Well Locked?	Yes	(N)	
Well Labeled?	Xes	No	
Casing Straight?	(Kes	No	
Grout Seal Intact?	Yes	No	Not Visible
Repairs Necessary:			
Casing	Casing Diameter.		2"
Water Level Bef	ore Purge:	275419 39.21	Water Level Before Purge:セルド マタント 2864パ マタンザ fl
Total M	Fotal Well Depth:	01.00	Č f
We	Well Volume:	وبذخ	liters
Depth to Top of Pump:	of Pump:		Ħ
Water Level After Sample:	er Sample:	. Prv	f
Measurement Method:	it Method:	Electric	Electric Water Level Indicator

Sampling Information

Bottle 1L Raw, Submit Nitric 100 mc Notric

Field Measurements

Stabilization	ation	Temp	Spec.		8	ORP	Turbidity	Turbidity Water Pumping	Pumping	mL	Discription:
(3 consecutive)	cutive)	(၃)	Cond.	Hd	(mg/L)	(mV)	(NTU)	(NTU) Level (ft)	Rate	Removed	Clarity, Color, Odor, Ect.
SEQ#	Time		72%	±0.1	710%	±20 mV	+10%	0.25 ft	mL/min		clear, partly cloudy, cloudy
1 /	0/4	248	3307	2,28	6.89	38,0	\	\)	\	Touch
2			>	>							
8											×
4											
r,											
9											
Ø											
6											
10		(
Stabilized:	Yes	ON)	1) 	Total Volume Removed:	Removed:		Jm.	

Comments:

Parged well 27Feb 18, Jet it redungs until I Mar 18.

Only able to collect about 500ml and a 100ml bottle persench with nitic atter recharge Ser field sheet from the 27 Febls for purse notes and water here information.



Chain of Custody Record

roject Name:	0.	Event:	Work Order Number:
OTP	OTP Coyote - Slag Pond CCR	Feb 2018	50KD-7 K
Report To: Attn: Address:	Otter Tail Power Josh Hollen PO Box 496 Fergus Falls, MN 56538-0496	Carbon Copy: Attn: Address:	Name of Sampler(s): Darry Nizswaag
ohone: email:	jhollen@otpco.com		

1				-	 			
Analysis	Analysis Required				C.::-	OLF COR Appendix 3		
neters	На	7.28	•					
Field Parameters	Spec, Cond.	3307						
Fiel	Temp (°C)	8,42						
ec ec	J. IIIOF WILLIO							
Bottle Type	SEOML Sulfation							
Bo	200WF NILLIG (UIII- EGGHAF-WILLIG NO.AL N 1 III-GE	×						
lomi lo lo lo lo lo lo lo lo lo lo lo lo lo	Appearance (Clear, Partly Cloudy, Cloudy)	/out						
	Sample Type	M						
u	₉ miT	0241						
Sample Information	Dale	march 18						
Sample	Sample ID	Pond12						
	Lab	W306						

Comments: Was only able to collect 500ml for Il rawsample and 100ml. for the 500mlnitic bottle.

* Imarch (8/A)m

Relinquished By:		Sa	Sample Condition:
Name:	Date/Time	Location:	Temp (°C)
· \	1 March 18	A gent	0.3
Hare March	7/7/	Walk In #2	TM562 / FM588
1)

Name: Date/Time



MINNESOTA VALLEY TESTING LABORATORIES, INC.

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May 4, 2018

Otter Tail Power Company Josh Hollen P.O. Box 496 Fergus Falls, MN 56538-0496

RE: Coyote Station Groundwater Sampling - Well 16s

Dear Mr. Hollen,

On May 3, 2018, MVTL Laboratories' Field Services division collected a groundwater sample from well 16s at the Coyote Station near Beulah, ND. The well was sampled for Boron using the CCR sampling method. Collected samples were placed on ice and then transported back to the MVTL laboratory for analysis.

Thank you for your trust and support of our services. If you have any questions, please call me at (800) 279-6885.

Sincerely,

Jeremy Meyer

MVTL Field Services



Field Datasheet

Groundwater Assessment

Company:

OTP Coyote

Event:

Sample ID:

Sampling Personal: Da

Sunny / Partly Cloudy / Cloudy

Precip:

Sampling Information 4 Wind: Not Visible Temp: Well Information 3 å No 9N Mes. Yes Yes Grout Seal Intact? Well Locked? Well Labeled? Casing Straight? Weather Conditions:

Purgin	Purging Method:	Bladder		Control Settings	
Samplin	Sampling Method:	Bladder	Purge:	ge: >	sec.
Dedicate	Dedicated Equip?:	Yes Ne	Recover:	er. 55	sec.
Duplicate Sample?:	Sample?:	Yes <no< td=""><td>a.</td><td>PSI:</td><td></td></no<>	a.	PSI:	
Duplicate Sample ID:	ample ID:)			
		100000			
<u>.</u>	Purge Date:	3/nay18	Time Purging Began:	an: 1750	am/pm
Well Pu	Well Purged Dry?	Yes No	Time Purged Dry:	ry:	am/bm
Sar	Sample Date:	3/m1/8	Time of Sampling:	19: 1,5:51	am/pm
		9.1			
Bottle					
List:					

Field Measurements

Electric Water Level Indicator

45,43

Depth to Top of Pump: Water Level After Sample: Measurement Method:

Ī

liters

5 カニカ

Water Level Before Purge:

Casing Diameter:

Repairs Necessary:

Total Well Depth: Well Volume:

					3		2101				
Stabilization	ation	Temp	Spec.		00	ORP	Turbidity	Water	Pumping	mL	Discription:
(3 consecutive)	cutive)	(၁)	Cond.	ЬН	(mg/L)	(mV)	(NTU)	Level (ft)	Rate	Removed	Clarity, Color, Odor, Ect.
SEQ#	Time		%5∓	±0.1	±10%	±20 mV	±10%	· 0.25 ft	mL/min		clear, partly cloudy, cloudy
1	755	12,90	3312	769	181	6776	550	42,05	201	2025	· Partly cleurly
2	のいた	78. HI	3310	6.43	1.56	Jr49,	21/5	42,22	100	1500	Pc1 /
က	1505	12.62	3305	した。シ	1.86	6'93	7.28	156 rt	100	15051	Clear
4	1776	12.00	330	6.75	2,33	6 トブ	8,42	1 8h 2h	/60	1500	C/cec
2	15351	12,84	1825 4	92,0	7,34	小で	181	257h	00/	ISOC	C/20,0
9	25	12.68	3278	6,76	3,78	h'h9.	13.6	42,59	100	500.	Chan
7	レアム	12,94	3277	44.9	七多2	64.2	13,2	42,65	00/	200	Chta)
8	15.50	12,89	3280	82.19	2,93	7749	12,4	172.68	100	500	c/can
თ	1555	12,65	3274	6.78	2,70	64,2	1501	63.24	001	500	Chan
10	2091										
Stabilized:	Yes	No				Ĕ	Total Volume Removed:	Removed:	STOC	뒽	
	1								,		

Comments(



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CASE NARRATIVE

MVTL Lab Reference No/SDG:

201882-0914

Client:

Ottertail Power Company

Location:

Coyote Station

Project Identification:

CCR Slag Pond

Event & Year

Boron Test May 2018

MVTL Laboratory Identifications:

18-W871

Page 1 of 1

TOLI	
Sample Identification	MVTL Laboratory #
Pond 16S	18-W871
Folia 105	

RECEIPT 1.

- All samples were received at the laboratory on 4 May 18 at 0800.
- Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
- Samples were received on ice and evidence of cooling had begun.
 - o Temperature of samples upon receipt was 4.3°C.
- All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
- No other exceptions on sample receipt were encountered on this sample set unless noted here.

II. HOLDING TIMES

All holding times were met for both preparation and analysis unless noted here.

III. **METHODS**

Approved methodology was followed for all sample analyses.

IV. **ANALYSIS**

All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted here and/or flagged on the individual analytical laboratory report.

All laboratory data has been approved by MVTL Laboratories. 9 May 18 DATE: SIGNED: Claudette Carroll - MVTL Bismarck Laboratory Manager

MINNESOTA VALLEY TESTING LABORATORIES, INC.

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MEMBER ACIL

Page: 1 of 1

Quality Control Report

Work Order: 201882-0914 Tond CCR Clar

No. of Concession, Name of Street, or other Persons, Name of Street, or other Persons, Name of Street, Name of	ii (S)	
	MSD/ Dup RPD Limit (<)	70
	MSD/ Dup RPD	9.0
	MSD Rec %	104
	MSD/ Dup Result	4.85
	MSD/ Dup Orig Result	4.82
907-0714	Matrix Spike % Rec Limits	75-125
der: 201	Matrix Spike Rec %	102
WORK Order: 201002-0914	Matrix Spike Result	4.82
	Matrix Spike Orig Result	2.78
roject: Olly Coyote-Siag Fond CCR	Matrix Spike D	18-W871
r Coyote	Matrix Spike Amt	2.00
lect: OI	LCS % Rec Limits	80-120
Pro	LCS Rec %	108
	LCS Spike Amt	0.40
Lab ID: 18-W871	Analyte	Boron - Total mg/l

Method Blank

Known % Rec Limits

Known Rec (%)

< 0.1
< 0.1</pre>

Approved by:

C. GWD C. 9418





CERTIFICATE of ANALYSIS - CCR

Josh Hollen Otter Tail Power Co. PO Box 496 Fergus Falls MN 56538-0496

Project Name: OTP Coyote-Slag Pond CCR

Sample Description: Pond 16S

1 of 1 Page:

Report Date: 8 May 18 Lab Number: 18-W871 Work Order #:82-0914 Account #: 006106

Date Sampled: 3 May 18 15:55 Date Received: 4 May 18 8:00 Sampled By: MVTL Field Services

PO #: 48895

Temp at Receipt: 4.3C ROI

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion Field pH Field Temperature Field Conductivity Boron - Total	6.78 12.6 3274 2.78	s.u. Degrees C umhos/cm mg/l	0.1 0.1 1 0.10	EPA 200.2 SM 4500 H+ B SM 2550B EPA 120.1 6010D	4 May 18 3 May 18 15:55 3 May 18 15:55 3 May 18 15:55 7 May 18 13:27	DJN DJN

Approved by:

Claudite K. Cantes Thy 18

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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



Chain of Custody Record

Project Name:	-:	Event:	Work Order Number:
OTP	OTP Coyote - Slag Pond CCR		4160-28
Report To: Attn: Address:	Otter Tail Power Josh Hollen PO Box 496 Fergus Falls, MN 56538-0496	Carbon Copy: Attn: Address:	Name of Sampler(s): Dallen MeSumas
phone: email:	jhollen@otpco.com		

Analysis	/ Analysis Required	201			ć	Богоп		
neters	Hd	84.7						
Field Parameters	Spec. Cond.	3274						
Fiel	Temp (°C)	12,6513						
. 8					П			
4	200							
Bottle Type	1 liler Nitric							
le T	Some Sulfite Some Sulfite The							
ottl	200mL With							
B	500mL Nitric	X						
	1 III BF		-	_				
	Appearance Cloudy, Partly Cloudy, Cloudy)	Clear						
10.16	Sample Type	GW						
	өміТ	1555	50					
Sample Information	Date d	3/201/8	, ,			+		
Sample	Sample ID	S						
	Sar	Pond 16S						
	Lab Number	W871						

Comments:

Sample Condition:	Temp (°C)	5.h 10	N" (FTM562)/ TM588)
Sar	Location:	Log In	Walk In #2	
	Date/Time	87KoUE	1728	,
Relinquished By:	Name:		The Min	2 %

Received by:	
Name:	Date/Time
. 6.	81 Know to
Nordingan	080,



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CASE NARRATIVE

MVTL Lab Reference No/SDG:

201882-2031

Client:

Ottertail Power Company

Location:

Coyote Station

Project Identification:

CCR Slag Pond

Event & Year

August 2018

MVTL Laboratory Identifications:

18-W2520 through 18-W2524

Page 1 of 2

Sample Identification	MVTL Laboratory #
FB Slag	18-W2520
Pond6	18-W2521
PondN3	18-W2522
Pond10	No sample
Pond12	No sample
Pond16S	18-W2523
MW2S	18-W2524

١. RECEIPT

- All samples were received at the laboratory on 9 Aug 18 at 1520.
- Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
- Samples were received on ice and evidence of cooling had begun.
 - Temperature of samples upon receipt was 1.5°C.
- All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
- No other exceptions on sample receipt were encountered on this sample set unless noted here.

HOLDING TIMES 11.

With the exception of laboratory pH, all holding times were met for both preparation and analysis unless noted here.

METHODS III.

Approved methodology was followed for all sample analyses.

ANALYSIS IV.

- All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted here and/or flagged on the individual analytical laboratory report.
 - o For some analytes, the reported results were elevated due to additional dilutions required to minimize the effects of sample matrix.





CASE NARRATIVE

MVTL Lab Reference No/SDG:

201882-2031

Client:

Ottertail Power Company

Location:

Coyote Station

Project Identification:

CCR Slag Pond

Event & Year

August 2018

MVTL Laboratory Identifications:

18-W2520 through 18-W2524

Page 2 of 2

o One chloride matrix spike duplicate recovery was outside the acceptable limits. Recovery for the matrix spike was acceptable. RPD for the recoveries of the matrix spike duplicate and the matrix spike was within limits. No further action was taken.

All laboratory data has been approved by MVTL Laboratories. DATE: 28 Avg 18 Claudette Carroll - MVTL Bismarck Laboratory Manager

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

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Page: 1 of 1

Quality Control Report Lab Ds: 18-W2520 to 18-W2524

Project: OTP Covote - Slag Pond

Work Order: 201882-2031

Lab LUS: 18-W 2220 to 18-W 2224	47C7	Frc	Ject: Oll	Coyote	Project: Olf Coyote - Slag Fond	\$	VORK Ord	Work Order: 201882-2051	87-7031								2
Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt		Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Spike Sec %	Matrix Spike % Rec (Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ I Dup F RPD I	MSD/ Dup I RPD I Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Boron - Total mg/l	0.40	105	80-120 80-120	0.400 0.400 0.400 2.00	18-D2807 18-M2004 18-W2491 18-W2524	0.45 0.82 0.51 < 0.5	0.82 1.25 0.96 2.45	92 108 112 122	75-125 75-125 75-125 75-125	0.82 1.25 0.96 2.45	0.81 1.27 0.95 2.41	90 112 110 120	1.2 1.6 1.0	20020	1 1 1 1	1 1 T I	<pre></pre>
Calcium - Total mg/l	20.0	101	80-120	100	18D2882q 18W2527q	27.2 170	122 262	95 92	75-125 75-125	122 262	122 258	95 88	0.0	20			7777
Chloride mg/l	30.0 30.0 30.0 30.0	92 91 92	80-120 80-120 80-120 80-120	30.0 30.0 30.0	18-W2505 18-W2527 18-W2534	10.2 7.7 8.0	35.6 35.0 33.2	85 91 84	80-120 80-120 80-120	35.6 35.0 33.2	33.8 34.3 36.7	79 89 96	5.2 2.0 10.0	20 20 20		111	$\forall \ \forall \ \forall \ \forall$
Fluoride mg/l	0.50	102	90-110	0.500	18-W2527 18-W2547	0.20	0.71	102	80-120 80-120	0.71	0.70	100 86	1.4	20 20			< 0.1 < 0.1
pH units	1 1	1 1	1 1	1 1	1 1	L	T 1	E I	1 1	7.0	7.0	1 1	0.0	20 20	1 1		1 1
Sulfate mg/l	100	101 115	80-120 80-120	100	18-W2520 18-W2527	<5 1010	110	110	80-120 80-120	110	106 1890	106 88	3.7	20 20		1 1	< 5 < 5
Total Dissolved Solids mg/l		1 1 1		1 1 1	1 (1 1	1 1 1	1 1 1	3 E 1	a a: 1	2030 2070 3090	2040 2060 3140	1 1 1	0.5 0.5 1.6	20 20 20	7 N 4	1 1 1	<10

C. Church

Approved by:





CERTIFICATE of ANALYSIS - CCR

Josh Hollen Otter Tail Power Co. PO Box 496 Fergus Falls MN 56538-0496

Project Name: OTP Coyote - Slag Pond

Sample Description: FB Slag

Event and Year: Aug 2018

1 of 5 Page:

Report Date: 28 Aug 18 Lab Number: 18-W2520 Work Order #:82-2031 Account #: 006106

Date Sampled: 8 Aug 18
Date Received: 9 Aug 18 15:20

Sampled By: MVTL Field Services

PO #: 48895

Temp at Receipt: 1.5C

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion Lab, pH Fluoride Sulfate Chloride Total Dissolved Solids Calcium - Total Boron - Total	* 5.9 < 0.1 < 5 < 1 < 10 < 1 < 0.1	s.u. mg/l mg/l mg/l mg/l mg/l mg/l	0.1 0.10 5.00 1.0 1.0 0.10	EPA 200.2 SM4500 H+ B SM4500-F-C ASTM D516-07 SM4500-C1-E 11750-85 6010D 6010D	9 Aug 18 10 Aug 18 17:00 13 Aug 18 17:00 15 Aug 18 13:36 16 Aug 18 10:38 13 Aug 18 12:07 15 Aug 18 9:34 13 Aug 18 13:47	SVS EV EV SVS SZ

* Holding time exceeded

Approved by:

Clauditte K. Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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





2 of 5 Page:

CERTIFICATE of ANALYSIS - CCR

Josh Hollen Otter Tail Power Co. PO Box 496

Fergus Falls MN 56538-0496

Project Name: OTP Coyote - Slag Pond

Sample Description: Pond6

Event and Year: Aug 2018

Report Date: 28 Aug 18 Lab Number: 18-W2521 Work Order #:82-2031 Account #: 006106

Date Sampled: 7 Aug 18 14:17 Date Received: 9 Aug 18 15:20 Sampled By: MVTL Field Services

PO #: 48895

Temp at Receipt: 1.5C

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed		Analyst
Metal Digestion Field pH Lab, pH Field Temperature Field Conductivity Fluoride Sulfate Chloride Total Dissolved Solids Calcium - Total	6.89 * 7.3 15.4 1764 0.35 425 12.2 1170 72.5	s.u. s.u. Degrees C umhos/cm mg/l mg/l mg/l mg/l mg/l	0.1 0.1 0.1 1 0.10 5.00 1.0 1.0	EPA 200.2 SM 4500 H+ B SM4500 H+ B SM 2550B EPA 120.1 SM4500-F-C ASTM D516-07 SM4500-C1-E I1750-85 6010D 6010D	9 Aug 18 7 Aug 18 7 Aug 18 7 Aug 18 7 Aug 18 13 Aug 18 13 Aug 18 13 Aug 18 15 Aug 18	14:17 17:00 14:17 14:17 17:00 13:57 11:17 3 12:07 3 9:34	DJN DJN SVS EV EV SVS SZ

* Holding time exceeded

Approved by:

Claudite K. Cantes

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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





Page: 3 of 5

CERTIFICATE of ANALYSIS - CCR

Josh Hollen Otter Tail Power Co. PO Box 496

Fergus Falls MN 56538-0496

Project Name: OTP Coyote - Slag Pond

Sample Description: PondN3

Event and Year: Aug 2018

Report Date: 28 Aug 18 Lab Number: 18-W2522 Work Order #:82-2031 Account #: 006106

Date Sampled: 7 Aug 18 15:35 Date Received: 9 Aug 18 15:20 Sampled By: MVTL Field Services

PO #: 48895

Temp at Receipt: 1.5C

	As Recei Result	.ved	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion Field pH Lab, pH Field Temperature Field Conductivity Fluoride Sulfate Chloride Total Dissolved Solids Calcium - Total Boron - Total	6.59 * 7.0 17.5 5436 0.28 3210 35.7 5320 498 0.59	s.u. s.u. Degrees C umhos/cm mg/l mg/l mg/l mg/l mg/l mg/l	0.1 0.1 0.1 1 0.10 5.00 1.0 1.0	EPA 200.2 SM 4500 H+ B SM4500 H+ B SM 2550B EPA 120.1 SM4500-F-C ASTM D516-07 SM4500-C1-E I1750-85 6010D 6010D	9 Aug 18 7 Aug 18 1 10 Aug 18 1 7 Aug 18 1 7 Aug 18 1 13 Aug 18 1 15 Aug 18 1 16 Aug 18 1 13 Aug 18 1 14 Aug 18 1 15 Aug 18 1 15 Aug 18 1 15 Aug 18 1 15 Aug 18 1	7:00 SVS 5:35 DJN 5:35 DJN 7:00 SVS 3:57 EV 1:17 EV 2:07 SVS 9:34 SZ

* Holding time exceeded

Approved by:

Claudette K. Cantel

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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





CERTIFICATE of ANALYSIS - CCR

Josh Hollen Otter Tail Power Co.

PO Box 496 Fergus Falls MN 56538-0496

Project Name: OTP Coyote - Slag Pond

Sample Description: Pond16S

Event and Year: Aug 2018

4 of 5 Page:

Report Date: 28 Aug 18 Lab Number: 18-W2523 Work Order #:82-2031 Account #: 006106

Date Sampled: 7 Aug 18 17:10 Date Received: 9 Aug 18 15:20 Sampled By: MVTL Field Services

PO #: 48895

Temp at Receipt: 1.5C

	As Recei Result	ved	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion Field pH Lab, pH Field Temperature Field Conductivity Fluoride Chloride Total Dissolved Solids	6.65 * 7.1 15.3 3360 0.22 1490 23.7 2510	s.u. s.u. Degrees C umhos/cm mg/l mg/l mg/l mg/l	0.1 0.1 0.1 1 0.10 5.00 1.0	EPA 200.2 SM 4500 H+ B SM4500 H+ B SM 2550B EPA 120.1 SM4500-F-C ASTM D516-07 SM4500-C1-E I1750-85 6010D	9 Aug 18 7 Aug 18 17:10 10 Aug 18 17:10 7 Aug 18 17:10 7 Aug 18 17:10 13 Aug 18 17:10 15 Aug 18 11:17 16 Aug 18 11:17 13 Aug 18 12:00 15 Aug 18 12:00	SVS DJN DJN SVS EV EV SVS
Calcium - Total	189 2,67	mg/l mg/l	0.10	6010D	13 Aug 18 13:47	SZ

* Holding time exceeded

Approved by:

Claudette K. Cantep

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

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





CERTIFICATE of ANALYSIS - CCR

Josh Hollen Otter Tail Power Co. PO Box 496 Fergus Falls MN 56538-0496

Project Name: OTP Coyote - Slag Pond

Sample Description: MW2S

Event and Year: Aug 2018

5 of 5 Page:

Report Date: 28 Aug 18 Lab Number: 18-W2524 Work Order #:82-2031 Account #: 006106

Date Sampled: 8 Aug 18 12:50 Date Received: 9 Aug 18 15:20 Sampled By: MVTL Field Services

PO #: 48895

Temp at Receipt: 1.5C

	As Receiv Result	ed	Method RL	Method Reference	Date Analyzed	Analys
Metal Digestion				EPA 200.2	9 Aug 18	SVS
2000 P 6 15	6.91	s.u.	0.1	SM 4500 H+ B	8 Aug 18 12:50	
Field pH	* 7.4	s.u.	0.1	SM4500 H+ B	10 Aug 18 17:00	
Lab, pH	15.4	Degrees C	0.1	SM 2550B	8 Aug 18 12:50	DJN
Field Temperature		umhos/cm	1	EPA 120.1	8 Aug 18 12:50) DJN
Field Conductivity	5185		0.10	SM4500-F-C	13 Aug 18 17:00	SVS
luoride	0.29	mg/l		ASTM D516-07	15 Aug 18 13:5'	
Sulfate	3190	mg/l	5.00	SM4500-C1-E	16 Aug 18 11:1'	
Chloride	23.8	mg/l	1.0		13 Aug 18 12:0'	
Total Dissolved Solids	5110	mg/l	10	I1750-85	15 Aug 18 9:34	
Calcium - Total	560	mg/l	1.0	6010D		
Boron - Total	< 0.5 @	mg/l	0.10	6010D	13 Aug 18 13:4	1 54

* Holding time exceeded

Approved by:

Clauditte K. Canto

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit

The reporting limit was elevated for any analyte requiring a dilution as coded below:

@ = Due to sample matrix # = Due to co

! = Due to sample quantity + = Due to in

= Due to concentration of other analytes + = Due to internal standard response



Field Datasheet

Groundwater Assessment

Company: OTP Coyote
Event: Aug 2018

Event: Aug 2018 Sample ID: MW

Sampling Personal: Dayren Nicsula

Phone: (701) 258-9720

Well Locked?	Yes	B		
Well Labeled?	(Se)	No		
Casing Straight?	Ţ	No		
Grout Seal Intact?	Sez.	No	Not Visible	ple
Repairs Necessary:)		4.5	
Casing	Casing Diameter:		2"	
Water Level Before Purge:	ore Purge:		13.61	并
Total V	Total Well Depth:		18.83	Ħ
We	Well Volume:		3.3	liters
Depth to Top of Pump:	p of Pump:		17.30	Ĥ
Water Level After Sample:	er Sample:		13.71	Ħ
Measurement Method:	nt Method:	Electric	Electric Water Level Indicator	licator

Sampling Information

Precip:

Sunny / Partly Cloudy / Cloudy

Purgir	Purging Method:	Bladder		S	Control Settings	
Samplir	Sampling Method:	Bladder		Purge:	2	sec.
Dedicate	Dedicated Equip?:	Yes (No		Recover:	から	sec.
Duplicate	Duplicate Sample?:	Yes Mo		PSI:		
Duplicate \$	Duplicate Sample ID:					
<u>a</u>	Purge Date:	7 An 18	Time Purging Began:	g Began:	1332	am/pm
Well P	Well Purged Dry?	Yes (Mo	Time Pur	Time Purged Dry:		am/pm
Sai	Sample Date: 77 A	of Ausis	Time of Sampling:	ampling:	4/6)	am/pm
Bottle	1L Raw, 500mL Nitric	OmL Nitric				
List:						

Field Measurements

					בוטוב	LICIA INICASAI CIII CIII C	2 2 2			The Street Street	
Stabilization	ation	Temp	Spec.		DO	ORP	Turbidity	Water	Pumping	mL	Discription:
(3 consecutive)	cutive)	(၁)	Cond.	ЬН	(mg/L)	(mV)	(NTU)	Level (ft)	Rate	Removed	Clarity, Color, Odor, Ect.
SEQ#	Time		%5∓	±0.1	%0T∓	±20 mV	700∓	0.25 ft	mL/min		clear, partly cloudy, cloudy
-	4881	15,55	1429	18.9	120	14,1	15.68	1981/65	001	500	Partly Choules
	いるが	15.18	0731	289	010	1.6.	124.9	13,73	100	1500	class
-	£36!	4.97	1991	E1819	108 G	74,2	5,35	13,96	1,00	500	clou
	COTI	15.62	1679	8819	80,0	£,91-	125H	13,75	(JW)	,005	cler
	tron!	15.85	1699	8819	0,08	8761-	2,39	13,93	QQ^{I}	cos	ch
	1417	15.58	#1734	6830	0,00	-23,3	3,40	18.71	eOI	005	chi
	1417	15,39	1764	6.89	0,07	-24 C	13,30	1221	901	005	dr
				,)					
10											
Stabilized:	(kes)	No				7	otal Volume	Removed:	Total Volume Removed: イスのO mL	ᆸ	
	/ 11							7/			

Comments:



CTO PION

OTP Coyote Company: Suphy / Partly Cloudy / Cloudy

Control Settings

Purge:

Recover:

PSI:

10000		上のロコピルドル		
ノビィダン		וסות המוסר הוטו	Event:	Aug 2018
	Groundwa	Groundwater Assessment	Sample ID:	, , ,
2616 E. Broadway Ave, Bismarck, ND			Sampling Personal:	Darlen
Phone: (701) 258-9720				
Veather Conditions:	Temp: 9/ °F	Wind: NS	Precip:	/Suphy
Well Ir	Well Information		Sampling	Sampling Information
Well Locked? Yes	(D)	Purging Method:	od: Bladder	
Well Labeled?	oN G	Sampling Method:	od: Bladder	
Casing Straight? (XES)	No S	Dedicated Equip?:	22: Yes (No	8
Grout Seal Intact? Yes	No Not Visible	Duplicate Sample?:	?: Yes (NO	
Repairs Necessary:		Duplicate Sample ID:	, \ D:	
Casing Diameter:	er: 2"			
Water Level Before Purge:	Je: 15,22	ft Purge Date:	Ite: 7.451/8	Time Purging
Total Well Depth:	th: 37.54	ft Well Purged Dry?	ry? Yes (M)	Time Pur
Well Volume:	4,41	liters Sample Date: 7.7,	ite: 7-12.18	Time of Sa
Depth to Top of Pump:	1p: 27,68	代	0.7	
Water Level After Sample:	115.77	ft Bottle 1L Raw	1L Raw, 500mL Nitric	
Measurement Method:	id. Flectric Water I evel Indicator	r List:		

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Electric Water Level Indicator

Measurement Method:

am/pm

Time of Sampling:

Time Purged Dry:

am/om am/pm

りよって

Time Purging Began:

sec. sec.

							7	\							
	Discription:	Clarity, Color, Odor, Ect.	clear, partly cloudy, cloudy	chea	Cler	Can.	of - fath cloud	elex PC	, 70	PC					
The second secon	mL	Removed		500	0051	1500.	Soo	500	200	200)			m.	
The second secon	Pumping	Rate	mL/min	100	100	100	001,	100	00)	100			400	Total Volume Removed: \$500 mL	31
	Water	Level (ft)	0.25 ft	13.84	14.83	15.42	15.46	15,49	, 95'51	15.60	44.5th			Removed:	
2	Turbidity	(NTU)	±10%	22, (061	18.3h,	82.6	648	91,1	29,2	オ			otal Volume	
Silving Sport Silving	ORP	(mV)	±20 mV	24.5	17.9	なら	876	2	077	-0,3				T	
5	8	(mg/L)	±10%	80.9	5.5.8	28.6	169 H	77.72	7,20	811'H		55%			
		Hd	±0.1	39.9	129.9	6919	1.9.9	19.9	07.9	6.59					
	Spec.	Cond.	%5∓	£545	たわんら	5454	3445	カカトS	6942	9245					
	Temp	(၁)		17.71	17.66	17,98	17.89	17.75	17.65	カルレ				No	
	zation	scutive)	Time	プクセー	0e51	1515	1520	1525	1530	1635				X Yes	
	Stabilization	(3 consecutive)	SEQ#	-	2	က	4	2	9	7	8	6	10	Stabilized:	Comments:



Phone: (701) 258-9720

Field Datachoot

OTP Coyote Aug 2018 Sampling Personal: Company:

ופות המשופפו	Event:
Groundwater Assessment	Sample ID:

Weather Conditions:	Temp:	90 F	Wind: ひぐ		Precip:	V	y Partly Cl	Sunpy / Partly Cloudy / Cloudy	dy
Well In	Well Information)		Sampling Information	Informatio	u		
Well Locked? Yes	(OM		Purgi	Purging Method:	Bladder		So	Control Settings.	
Well Labeled?	No No		Sampli	Sampling Method:	Bladder		Purge:		sec.
Casing Straight? Yes	No		Dedica	Dedicated Equip?:	Yes No	1	Recover:		sec.
Grout Seal Intact? Yes	No <	Not Visible	Duplicate	Duplicate Sample?:	Yes No		PSI		
Repairs Necessary:	3		Duplicate	Duplicate Sample ID:			,		
Casing Diameter:	ar:	2".					•		
Water Level Before Purge:		29.29 #		Purge Date:	TAGA 18	Time Purg	Time Purging Began:	5551	am/ma
Total Well Depth:	h:	10.00 H	Well F	Well Purged Dry?	Yes No	Time P	Time Purged Dry:		am/pm
Well Volume:	.o.	0,5 liters	Š	Sample Date:		Time of	Time of Sampling:		am/pm
Depth to Top of Pump:	p:	ft							
Water Level After Sample:	e:	ff	Bottle	1L Raw, 500mL Nitric	0mL Nitric				
Measurement Method:		Electric Water Level Indicator	List:						

Field Measurements

				בופום	rieid Medsuleilleills	SHELLS				
Stabilization	Temp	Spec.		OQ	ORP	Turbidity Water Pumping	Water	Pumping	m	Discription:
(3 consecutive)	(၃)	Cond.	핌	(mg/L)	(mV)	(NTU)	(NTU) Level (ft)	Rate	Removed	Clarity, Color, Odor, Ect.
SEQ# Time		#2%	±0.1	%0T∓	±20 mV	±10%	0.25 ft	mL/min		clear, partly cloudy, cloudy
									1	
J							\			
					\setminus					
			\setminus							
										/
/	\ -									
10										
Stabilized: Yes	No				F	Total Volume Removed:	Removed:		mL	

Stabilized: Comments:

Insufficent volume 10 Sample



Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

OTP Coyote Company: Event:

Aug 2018 grat Sample ID: Sampling Personal: Dayran

Sunny / Partly Cloudy / Cloudy

Precip:

Wind: liters Electric Water Level Indicator Mot-Visible からって 00 2, 45,74 0. かなな Temp: Well Information 3 2 9 N ŝ Measurement Method: Water Level Before Purge: Casing Diameter: Total Well Depth: Well Volume: Depth to Top of Pump: Water Level After Sample: Yes Kes (8) Yes Grout Seal Intact? Weather Conditions: Well Labeled? Casing Straight? Well Locked? Repairs Necessary:

Sampling Information	Control Settings	Purge: Sec.	Recover: 5 5 sec.	PSI:		Time Purging Began: / 605 am/6m	Time Purged Dry:	Time of Sampling: 177 (0 am/pm)	3		
Sampling l	od: Bladder	od: Bladder	Pes (MQ)	?: Yes No	D:	te: 7 Aux 18	y? Yes Mo	te: 17 Aug 18		1L Raw, 500mL Nitric	
,	Purging Method:	Sampling Method:	Dedicated Equip?:	Duplicate Sample?:	Duplicate Sample ID:	Purge Date:	Well Purged Dry?	Sample Date:		Bottle 1L Raw,	List

Field Measurements

					Lield	LIEIG MEGSAI EIIIEIIS	2 2				
Stabilization	ation	Temp	Spec.		20	ORP	Turbidity	Water	Pumping	mL	Discription:
(3 consecutive)	cutive)	(၁)	Cond.	ЬH	(mg/L)	(mV)	(NTU)	Level (ft)	Rate	Removed	Clarity, Color, Odor, Ect.
SEQ#	Time		72%	±0.1	¥10%	±20 mV	±10%	0.25 ft	mL/min		clear, partly cloudy, cloudy
1	1610	16.77	1288	16,74	3.26	ろもと	112	41,34	100	500	fartly cloudy
2	1625	12,25	3394	6.62	0,83	3.8	297	11/11	100	1500	, pc /
ო	0 17	7.36	13374	679	1,31	0,6	146,2	1183	100	1500	alean
4	1655	0/5/	1722	19.94	1972	797	34.9	75.14	001	1500.	che
ro	1789	15.00	3368	17919	2,58	1815	100	11,90	001	500	cler
9	1705	15.15	2360	4919	2,54	66-	21.0	18616	001	500	ch
7	1710	15.26	3360	5919	101 4512	101	202	10°25	00/	000	ch.
8	7					-	4			1	
6											
10									•		
Stabilized.	/ Yes	N				F	Total Volume Removed: 67 C0 t	Removed.	0000	Ē	

Comments:\



Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

OTP Coyote Company:

Aug 2018

2 W 2

Sampling Personal: Event: Sample ID:

Weather Conditions:		Temp:	8'8' ÷	Wind: #/	0/10
	Well Information	rmation			-
Well Locked?	Yes	(NG)		0	Purging 1
Well Labeled?	ges ges	No			Sampling I
Casing Straight?	Ness N	No			Dedicated
Grout Seal Intact?	Yes	No	Mot Visible		Duplicate Sa
Repairs Necessary:					Duplicate San
Casing	Casing Diameter:		2".		
Water Level Before Purge:	ore Purge:	7	,53	Ħ	Purg
Total W	Total Well Depth:	76	09.9	Ħ	Well Purg
We	Well Volume:	,	75 liters	SIIS	Samp
Depth to Top of Pump:	of Pump:	3.	1,25	±	
Water Level After Sample:	er Sample:	28		#	Bottle
Measurement Method:	t Method:	Electric V	Electric Water Level Indicator		List:

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Precip:

Sunny/ Partly Cloudy / Cloudy

Discussion Adott	hod.	Diador		Č	Control Settings	
Fulging Menion.	100	Diaduei	_1	5	ומסו סבווווא	
Sampling Method:	hod:	Bladder		Purge: ح	(,	sec.
Dedicated Equip?:	ip?:	Yes (No)		Recover:	5	sec.
Duplicate Sample?:	le?:	Yes (No		PSI:		
Duplicate Sample ID:	e ID:					
			P			
Purge Date:	Jate:	8 Aug 18	Time Purging Began:	ng Began:	1150	amph
Well Purged Dry?	Dry?	Yes	Time Pu	Time Purged Dry:		-am/pm
Sample Date:	Jate:	Mrs 18	Time of	Time of Sampling:	1250 ampin	amoun
						200
Bottle 1L Ra	w, 500	1L Raw, 500mL Nitric				
List:						

Field Measurements

	mL Discription:	Removed Clarity, Color, Odor, Ect.	clear, partly cloudy, cloudy	500 clear	3000 Clear	500 00	200 (6	500	500 clar	500 600				_m_	N
	Pumping	Rate	mL/min	100	(00)	100	100	100	1.00	ool,	4			0009	
	Water	Level (ft)	0.25 ft	24:32	27.87	8,612	6422	27.52	17.72	27,73				Removed:	
ments	Turbidity	(NTU)	±10%	3.07	2.81	836	202	3,52	248	3,55				Total Volume Removed: 6000 mL	
rield Measurements	ORP	(mV)	±20 mV	40,1	63,8	8,79	67.7	76,4	71,3	72,7				Ĭ	
rieid	OO	(mg/L)	±10%	115t	157 h	181	429	450.7	4.32	カナイ					
		Hd	±0.1	28.9	£18'9	68.7	689	0000	1, 2, 2	1.9.1	3				
	Spec.	Cond.	72%	5825	4775	4233	5187	5176	4174	2012	0 0				
	Temp	ပ္ပ		15.76	12.14	15.64	10.50	15.70	52,51	15,42				No	
	ation	cutive)	Time	1155	1225	1230	1230	1270	1245	1250			(/Yes/)
	Stabilization	(3 consecutive)	SEQ#	-	2	က	4	က	9	7	8	0	10	Stabilized:	Commonte.

Best.

1



Chain of Custody Record

Davien Nieswang Work Order Number: Name of Sampler(s): Aug 2018 Carbon Copy: Attn: Address: Event: OTP Coyote - Slag Pond CCR Josh Hollen PO Box 496 Fergus Falls, MN 56538-0496 ihollen@otpco.com Otter Tail Power Project Name: Report To: Address: phone: email:

/ Analysis Required				\$100 00 Act	CTD OTO OTO	o simpled too Lio				
Hd	NA	16.89	65.9	7.00		6.65	16:31			
	AA	961	5431	4000		3380	5.18			
Temp (°C)	NA	15:34	17.47	14.11	blume	15.26	72451			
					cont >					
				7	7					
JUDOO THING			_	\vdash	Insi					
200mL Wite	×	×	×	X	k	×	×			
	×	×	×	X	×	×	×			
Appearance (Clear, Parily Cloudy, Cloudy)	clear	clear	tiveload	- troops	, –	clear	clear	•		
Sample Type	Λ	GW	GW 1	GW G	GW	GW	GW			
əmiT	NA	1-6/1/1	1535	1730	4551	1710	1250			
Date O	8/24918	2/20/18	7 Aug 18	Howiff	7 Aug 18	7 Ans 18	8 Ang 18	000		
Sample ID	FB Slag	Pond6	PondN3	Pond10	Pond12	Pond16S	MW2S			
Lab Number	13530	18380	23538	JA 9 Ame 18 @	1	19533	JA524			N ₁
	Sample ID Sample ID Sample ID Sample Type Sample Type	Sample ID Sample ID	Sample ID FB Slag Pond6 FB Slag Fig. 6 FB Slag FB Sl	Sample ID	Sample ID Sample ID Date Sample ID Date Sample Type FB Slag FB Slag FD Sample Type Appearance Appearance	Sample ID	Sample ID Sample ID Date Fig. Sample ID Sample	Sample ID Sample ID Date FB Slag Fine FB Slag Fonds Fonds	Sample ID Bate FB Slag FB Slag FD S	Sample ID Date Sample Type Ponds Pon

Comments: * 7Am 180NB

1	Relinquished By:		Sar	Sample Condition:
	Name:	Daţe/Time	Location;	Temp (°C)
	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	9 Augh		1.5 1.5
	Marin	15/2/	Walk In #2	TM562 TM568
	b	,		an entro

INCOCINCU Dy.	d by.
Name:	Date/Time
	9 Aug 3013
	0851
4	



1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890 2 North German 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



CASE NARRATIVE

MVTL Lab Reference No/SDG:

201882-2035

Client:

Ottertail Power Company

Location:

Coyote Station

Project Identification:

CCR Slag Pond

Event & Year

August 2018

MVTL Laboratory Identifications:

18-W2539

Page 1 of 1

18-W25

MVTL Laboratory #
18-W2539

I. RECEIPT

- All samples were received at the laboratory on 9 Aug 18 at 1601.
- Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
- Samples were received on ice and evidence of cooling had begun.
 - Temperature of samples upon receipt was 1.5°C.
- All samples were properly preserved unless noted here and/or flagged on the individual analytical laboratory report.
- No other exceptions on sample receipt were encountered on this sample set unless noted here.

II. HOLDING TIMES

• With the exception of laboratory pH, all holding times were met for both preparation and analysis unless noted here.

III. METHODS

Approved methodology was followed for all sample analyses.

IV. ANALYSIS

 All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted here and/or flagged on the individual analytical laboratory report.

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Page: 1 of 3

Quality Control Report Lab D: 18-W2539

Lab ID: 18-W2539		Project: C	TP Coyote	Project: OTP Coyote - Slag Pond	W	ork Orc	Work Order: 201882-2035						The state of the s	The state of the s	The second secon	
LCS Spike	LCS Rec	LCS % Rec Limits	Matrix Spike	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
0.1000	96 00	80-120	0 0.400 0.400 0.400	18W2424q 18W2539q 18-M2004	<pre></pre>	0.3974 0.3818 0.3806	99 95 95	75-125 75-125 75-125	0.3974 0.3818 0.4008	0.3970 0.4074 0.3916	99 95 102	0.1 6.5 2.3	20 20 20	1 1 1		< 0.001
0.1000	06 00	80-120	104	18W2424q 18W2539q	< 0.002	0.3860	96	75-125 75-125	0.3860	0.4008	100	3.8	20 20	1 1		< 0.002
0.1000	00 103	80-120	0.400 0.400 0.400 0.400 0.400 0.400 0.400 0.400	18W2424q 18W2539q 18W2004q 18M2044q 18M2046q 18M2048q 18M2050q 18M2050q	0.0079 0.1780 0.2630 0.1433 0.2538 0.0600 0.2854 0.0639	0.4226 0.6036 0.6872 0.5712 0.6730 0.4668 0.7438	104 106 106 107 107 115 115	75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125	0.4226 0.6036 0.5712	0.4208 0.6390 0.5666	103 115 106	0.4 5.7 0.8	20 20 20			< 0.002
0.1000	102	80-120	0.400 0.400 0.400	18W2424q 18W2539q 18-M2004	< 0.0005 < 0.0005 < 0.002	0.3992 0.4048 0.4102	100 101 103	75-125 75-125 75-125	0.3992 0.4048 0.4266	0.4114 0.4454 0.4238	103 100 111	3.0 9.6 0.7	20 20 20		1 1 1	< 0.0005
0.40	0 110	80-120	0.400	18-W2527 18-W2539	0.40	0.85	112 88	75-125 75-125	0.85	0.83	108	2.4	20 20	1 1	1 1	< 0.1
0.1000	94	80-120	0.400 0.400 0.400 0.400 0.400 0.400 0.400 0.400 0.400	18W2424q 18W2539q 18-M2004 18-M2044 18-M2046 18-M2046 18-M2048 18-M2050 18-M2050	 0.0005 0.0005 0.002 0.002 0.002 0.002 0.002 0.002 0.002 0.002 0.002 	0.3800 0.3698 0.3764 0.3620 0.3576 0.3594 0.3694 0.3614 0.3506	25 4 4 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125	0.3698 0.3764 0.3620	0.3830 0.3906 0.3762 0.3616	96 98 90 94	0.8 5.5 0.1 0.1	20 20 20 20		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	< 0.0005

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Page: 2 of 3

Quality Control Report Lab D: 18-W2539

Lab ID: 18-W2539		Pro	ject: OTF	Coyote .	Project: OTP Coyote - Slag Pond	*	Vork Orc	Work Order: 201882-2035	82-2035								
	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike D	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
Calcium - Total mg/l	20.0	101	80-120	100	18W2583q	89.2	179	06	75-125	179	176	87	1.7	20	3 E		V V
Chloride mg/l	30.0	92	80-120 80-120	30.0	18-W2527 18-W2534	7.7	35.0 33.2	91 84	80-120 80-120	35.0 33.2	34.3 36.7	86 96	2.0	20	1 1		\ \ \ \ \ \
Chromium - Total mg/l	0.1000	93	80-120	0.400 0.400 0.400 0.400 0.400 0.400 0.400	18 W2424q 18 W2539q 18-M2004 18-M2044 18-M2046 18-M2046 18-M2050 18-M2050 18-M2052	 0.0056 0.0056 0.0180 0.008 0.0089 0.0089 0.008 0.008 0.0108 	0.3578 0.3606 0.3788 0.3952 0.4206 0.3548 0.348	89 89 99 99 87 87 95	75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125	0.3578 0.3606 0.3788 0.3952	0.3730 0.3908 0.3734 0.3920	93 88 89	4.2 8.0 1.4 0.8	20020			< 0.002
Cobalt - Total mg/l	0.1000	94	80-120	0.400 0.400 0.400	18W2424q 18W2539q 18-M2004	< 0.002 0.0056 < 0.008	0.3640 0.3624 0.3622	91 89 91	75-125 75-125 75-125	0.3640	0.3818	95 97	8.5	20	1 (1	111	< 0.002
Fluoride mg/l	0.50	102	90-110	0.500	18-W2527 18-W2547	0.20	0.71	102 86	80-120 80-120	0.71	0.70	100 86	1.4	20 20	j t	1 1	< 0.1 < 0.1
Lead - Total mg/l	0.1000	100	80-120	0.400 0.400 0.400 0.400 0.400 0.400 0.400 0.400	18W2424q 18W2539q 18W2004q 18W2044q 18W2046q 18W2046q 18W205q 18W2050q 18W205q	 < 0.0005 0.0025 < 0.002 	0.3828 0.3816 0.3918 0.3836 0.3912 0.3980 0.3884 0.3738	96 95 98 96 98 100 97	75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125	0.3828 0.3816 0.3836	0.3836 0.4056 0.3844	96 101 96	0.2 6.1 0.2	20 20 20			۸ 0.0005

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 1126 N. Front St. \sim New Ulm, MN 56073 \sim 800-782-3557 \sim Fax 507-359-2890 www.mvtl.com

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> 3 of 3 Page:

> > **Ouality Control Report**

Project: OTP Coyote - Slag Pond

Lab ID: 18-W2539

Work Order: 201882-2035

% Rec Known Limits Known Rec % Limit (<) MSD/ Dup RPD 20 MSD/ Dup RPD 3.3 MSD Rec 112 % Dup Result MSD/ 0.61 Orig Result MSD/ Dup 0.59 Spike % Rec Limits Matrix 75-125 Matrix Spike Rec 108 % Matrix Spike Result 0.59 Matrix Result Spike Orig 0.16 18-W2539 Matrix Spike ID Matrix Spike Amt 0.400 LCS % Rec Limits 80-120 TCS Rec % 108 LCS Spike Amt 0.40 Lithium - Total mg/l

< 0.0002

222

5.1

95

0.0019 0.0019 0.0019

0.0020 0.0019 0.0019

70-130 70-130 70-130

0.002 0.002 0.002

85-115

100

0.0020

Mercury - Total mg/l

Analyte

0.400 0.400 0.400

80-120

95

0.1000

Molybdenum - Total mg/l

< 0.04 < 0.04

Method

Blank

< 0.002

1 3 1

20

0.0

101 104

0.4050 0.4156

0.4048 0.3906

75-125 75-125 75-125

20

0.0

7.0

7.0

20

8.3

102

0.4144

0.4076

75-125 75-125

20

1.7

107

0.4222 0.4184

0.4152 0.4256

75-125 75-125 75-125 75-125 75-125 75-125

< 0.005

102 104 106 106 105 103 108 110 100 95 95 101 98 95 1 1 0.0020 0.0019 0.0019 0.4048 0.3906 0.4220 0.4232 0.4076 < 0.0002 < 0.0002 < 0.0002 < 0.002 0.2028 < 0.002 < 0.005 18-W2434 18-W2608 18W2539q 18-M2004 18W2424q A41975

0.4152 0.4256 0.4184 0.4128 < 0.02 < 0.02< 0.02< 0.02< 0.02< 0.02 8M2004q 8M2044q 8M2046q 18W2424q 8W25399

80-120

86 1 1

0.1000

Selenium - Total mg/l

pH units

18M2048q 18M2050q 0.400 0.400 0.400 0.400 0.400 0.400 0.400

18M2052q 18M2054q 18-W2534 500

0.4326 0.4420

> > 0.1000

t. 1

Total Dissolved Solids mg/l

Thallium - Total mg/l

Sulfate mg/1

100

< 0.0005

< V

20 20

0.7 4.2

95

1400

1390

80-120

93

1390

926

107

0.4264

0.4090

75-125

102

0.4090

< 0.0005

< 10
< 10</pre>

1 1 1

222

0.5

1 1 1

2040 2060 3140

2030 2070 3090

1 1 1

1 1 1

1 1

Approved by:





CERTIFICATE of ANALYSIS - CCR

Josh Hollen Otter Tail Power Co. PO Box 496 Fergus Falls MN 56538-0496

Project Name: OTP Coyote - Slag Pond

Sample Description: Pond10

Event and Year: Aug 2018

1 of 1 Page:

Report Date: 22 Aug 18 Lab Number: 18-W2539 Work Order #:82-2035 Account #: 006106

Date Sampled: 7 Aug 18 17:30 Date Received: 9 Aug 18 16:01 Sampled By: MVTL Field Services

PO #: 48895

Temp at Receipt: 1.5C

	As Received Result	d	Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion Field pH Lab, pH Field Appearance Field Temperature Field Conductivity Fluoride Sulfate Chloride Mercury - Total Total Dissolved Solids Calcium - Total Lithium - Total Boron - Total Antimony - Total Arsenic - Total Barium - Total Beryllium - Total Cadmium - Total Chromium - Total Cobalt - Total Lead - Total Molybdenum - Total Selenium - Total Thallium - Total	7.00 * 7.4 Cloudy 14.7 4000 0.50 1950 38.9 < 0.0002 3090 359 0.16 2.33 < 0.001 0.0062 0.1780 < 0.0005 < 0.0005 0.0056 0.0056 0.0056 0.0025 < 0.002 0.0051 < 0.0005	s.u. s.u. Degrees C umhos/cm mg/l mg/l mg/l mg/l mg/l mg/l mg/l mg/	0.1 0.1 NA 0.1 1 0.10 5.00 1.0 0.0002 10 1.0 0.04 0.10 0.0010 0.0020 0.	EPA 200.2 SM 4500 H+ B SM4500 H+ B SM 2110 SM 2550B EPA 120.1 SM4500-F-C ASTM D516-07 SM4500-C1-E EPA 245.1 I1750-85 6010D 6010D 6010D 6020B	9 Aug 18 7 Aug 18 17:30 10 Aug 18 17:30 7 Aug 18 17:30 7 Aug 18 17:30 7 Aug 18 17:30 13 Aug 18 17:30 15 Aug 18 14:16 16 Aug 18 11:55 13 Aug 18 12:07 15 Aug 18 12:07 15 Aug 18 12:07 15 Aug 18 12:07 15 Aug 18 12:07 16 Aug 18 13:22 10 Aug 18 13:22 11 Aug 18 17:21 11 Aug 18 17:21 12 Aug 18 17:22 13 Aug 18 17:22 14 Aug 18 17:22 15 Aug 18 17:22 16 Aug 18 17:22 18 Aug 18 17:20	SVS DJN DJN SVS SS

* Holding time exceeded

Claudite K. Canteo Approved by:

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit



Field Datasheet

OTP Coyote Aug 2018 Company: Event:

	Groundwater Assessment	Assessment	Sample ID:	Pond10	
2616 E. Broadway Ave, Bismarck, ND			Sampling Personal:	Janen Nichard	
Phone: (701) 258-9720			•	_	
Vii.			r.		
Weather Conditions:	Temp: $q oldsymbol{o}$ arphi	Wind: VS	Precip:	Sunny / Fartly Cloudy / Cloudy	
Well Information	tion	8	Sampling Information	ormation	
Well Locked? Yes (Na	7	Purging Method:	Bladder 0	./ Control Settings	/
Well Labeled?		Sampling Method:	Bladder DO.	/e Purge: s	sec.
Casing Straight? (Yes No	0	Dedicated Equip?:	Yes /No	Recover: s	sec.
Grout Seal Intact?	o Not Visible	Duplicate Sample?:	Yes Mo	PSI:	
Repairs Necessary:		Duplicate Sample ID:	\	Pumping-Rate: mL/r	mL/min
Casing Diameter:	2"		5)	
Water Level Before Purge:	18.81 A	Purge Date:	7 Auch 8	Time Purging Began: i 320 am/	am/pm
Total Well Depth:	22.16 A	Well Purged Dry?	Yes No	Time Purged Dry:	am/pm
Well Volume:	2,/ liters	Sample Date:	: 7 Aug 18	Time of Sampling: 1730 am/	am/pm
Depth to Top of Pump:	# *)
Water Level After Sample:	1	Bottle (1L Raw)	L Raw, 600mL Nitric, 4-1L Nitric		
Measurement Method: Ele	Electric Water Level Indicator	List:			

															field readings.
	Discription:	Clarity, Color, Odor, Ect.	clear, partly cloudy, cloudy	Cloude									C/Ough	mL	in well and slow recharge the full sample set of bottles was not able to be collected at time of sample field readings.
	mF	Level (ft) Removed		2,1									Jechy		s not able to b
	Water	Level (ft)	0.25 ft	١									7	Removed:	bottles was
ments	Turbidity	(NTU)	±10%	252								,	659	Total Volume Removed: 2,	mple set of
rield Measurements	ORP	(mV)	±20 mV	7.88									61.2	TC	the full sar
rield	DO	(mg/L)	710%	40.7									700 7,05		w recharge
		ЬH	±0.1	6.93									17,00		well and slo
	Spec.	Cond.	72%	3922	2								000/		volume in
	Temp	(၁့)		12,77									アグ	/6N)	Due to low volume
	ation	cutive)	Time	1323									1730	Yes	
	Stabilization	(3 consecutive)	SEQ#	1	2	က	4	гO	9	7	8	တ	10	Stabilized:	Comments:

Had to bail the well toget enough water to fill the Samples

Collected 1L Nitrics

Collected 1L Nitrics 2 at: 0845

Date/Time

That live Nitric at:

Date/Time

Collect 1/ Range 1730



Chain of Custody Record

Project Name:	26	Event:	Work Order Number:
TO	OTP Coyote - Slag Pond CCR	Aug 2018	80035
Report To:	Otter Tail Power	on Copy:	Name of Sampler(s):
Attn:	Josh Hollen	Attn:	
Address:	PO Box 496	Address:	Valley Migward
	Fergus Falls, MN 56538-0496		
phone:			
email:	<u>ihollen@otpco.com</u>		
	.,		Circles A Analysis of the Control of the Cont

Analysis	Analysis Required	OTP List 1				
Field Parameters	Hd	3.00				
ld Para	Spec. Cond.	4000				
Fie	(D°) qm o T	14,7(
1						
g	1 IIIGE WILTIC					
T	Spom Sulfing					
Bottle Type	TUDOS			_	_	
Bo	500mL VIItic	×				
	J9) L	×			_	
	Appearance (Clear, Partly Cloudy, Cloudy)	Cloude	/			
	Sample Type	GW	_			
	өшіТ	1730				
Sample Information	Date	The 18				
Sample	Sample ID	Pond10				
	Lab Number	WA539				

Comments:

Relinquished By:		Sal	Sample Condition:
Name:	Date/Time	Location;	Temp (°C)
\ .	944218	74697 14697	Cosing 51
Dan Prien	1201	Walk In #2	TM562 / HM588
2	•		Bry & Satio

, Received by:	d by:
Mame:	Date/Time
	9 Ang 2018
	1001



1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890 2 North German 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



CASE NARRATIVE

MVTL Lab Reference No/SDG:

201882-2036

IML Lab Reference No/SDG:

S1808230

Client:

Ottertail Power Company

Location:

Coyote Station

Project Identification:

CCR Radiochem Slag Pond

Event & Year

August 2018

MVTL Laboratory Identifications:

18-W2540

IML Laboratory Identifications:

S1808230-001

Page 1 of 1

MVTL Laboratory #	IML Laboratory
	\$1808230-001
	MVTL Laboratory # 18-W2540

I. RECEIPT

- All samples were received at the laboratory on 9 Aug 18 at 1601.
- Samples were collected and hand delivered by MVTL Field Service personnel to the laboratory.
- Samples were received on ice and evidence of cooling had begun.
 - Temperature of samples upon receipt was 1.5°C.
- No other exceptions on sample receipt were encountered on this sample set unless noted here.
- All samples requiring radiochemistry analysis were sent via courier to Inter-Mountain Labs (IML) for analysis there. Samples were received at IML on 14 Aug 18.
 - All samples were properly preserved unless noted on the individual analytical laboratory report or on the IML Case Narrative.

II. HOLDING TIMES

 All holding times were met for both preparation and analysis unless noted on the individual analytical laboratory report or on the IML Case Narrative.

III. METHODS

- Approved methodology was followed for all sample analyses.
 - Please refer to the IML Case Narrative for more information regarding methodology.

IV. ANALYSIS

 All acceptance criteria was met for calibration, method blanks, laboratory control samples, laboratory fortified matrix/matrix duplicates unless noted on the individual analytical laboratory report or on the IML Case Narrative.

All laborator	ry data has been approv	ed by MVTL Lab	oratories.		
SIGNED:	Claudette	Gula	DATE:_	145ep18	
Clau	idette Carroll - MVTL Bis	marck Laborato	ry Manager		



MINNESOTA VALLEY TESTING LABORATORIES, INC.

1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890

2 North German St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890

2616 Flort Broadway Ave. of Bismoods AND 56501 of 200 6005 of Fax 701 250 0724 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



CERTIFICATE of ANALYSIS - CCR

Josh Hollen Otter Tail Power Co. PO Box 496 Fergus Falls MN 56538-0496

Project Name: OTP Coyote - Slag Pond

Sample Description: Pond10

Event and Year: Aug 2018

1 of 1 Page:

Report Date: 14 Sep 18 Lab Number: 18-W2540 Work Order #:82-2036 Account #: 006106

Date Sampled: 7 Aug 18 17:30 Date Received: 9 Aug 18 16:01 Sampled By: MVTL Field Services

PO #: 48895

Temp at Receipt: 1.5C

	As Received Result	Method RL	Method Reference	Date Analyzed	Analyst
Field pH Field Appearance Field Temperature Field Conductivity Radium 226 Radium 228	7.00 s.u. Cloudy 14.7 Degrees C 4000 umhos/cm See Attached Report See Attached Report	0.1 NA 0.1 1	SM 4500 H+ B SM 2110 SM 2550B EPA 120.1	7 Aug 18 17:30 7 Aug 18 17:30 7 Aug 18 17:30 7 Aug 18 17:30 5 Sep 18 10 Sep 18	DJN DJN

Approved by:

Claudite K. Cantle

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

RL = Method Reporting Limit



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Date: 9/13/2018

CLIENT: Project: MVTL Laboratories, Inc.

201882-2036

Lab Order:

S1808230

CASE NARRATIVE

Report ID: S1808230001

Sample 18-W2540 Pond 10 was received on August 14, 2018.

All samples were received and analyzed within the EPA recommended holding times, except those noted below in this case narrative. Samples were analyzed using the methods outlined in the following references:

"Standard Methods For The Examination of Water and Wastewater", approved method versions Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition 40 CFR Parts 136 and 141 40 CFR Part 50, Appendices B, J, L, and O Methods indicated in the Methods Update Rule published in the Federal Register Friday, May 18, 2012 ASTM approved and recognized standards

All Quality Control parameters met the acceptance criteria defined by EPA and Inter-Mountain Laboratories except as indicated in this case narrative.

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Page 1 of 1



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

Sample Analysis Report

Company:

MVTL Laboratories, Inc.

2616 E Broadway Ave.

Bismarck, ND 58501

ProjectName:

201882-2036

Lab ID:

S1808230-001

ClientSample ID: 18-W2540 Pond 10

COC: PWS ID: 201882-2036

Date Reported

9/13/2018

Report ID

S1808230001

WorkOrder:

S1808230

CollectionDate: 8/7/2018 5:30:00 PM 8/14/2018 1:17:00 PM

DateReceived:

FieldSampler: Matrix:

Water

			01	D.	N.H al.J N.H.	Date Analyzed/	nit
Analyses	Result	Units	Qual	RL	Method	Date Allaryzeum	
Radionuclides - Total							
Radium 226	0.5	pCi/L		0.2	SM 7500 Ra-B	09/05/2018 834	WN
Radium 226 Precision (±)	0.1	pCi/L			SM 7500 Ra-B	09/05/2018 834	WN
Radium 228	-0.9	pCi/L		1	Ga-Tech	09/10/2018 845	WN
Radium 228 Precision (±)	1.2	pCi/L			Ga-Tech	09/10/2018 845	WN

These results apply only to the samples tested.

Qualifiers:

Analyte detected in the associated Method Blank

Value above quantitation range

Holding times for preparation or analysis exceeded Н

Analyzed by another laboratory

Not Detected at the Reporting Limit ND

Spike Recovery outside accepted recovery limits S

Matrix Effect

RL - Reporting Limit

Calculated Value

Analyzed at IML Gillette laboratory

Analyte detected below quantitation limits

Value exceeds Monthly Ave or MCL or is less than LCL

Outside the Range of Dilutions

Analysis reported under the reporting limit

Reviewed by:

Wade Nieuwsma, Assistant Laboratory Manager

Page 1 of 1



Inter-Mountain Labs

1673 Terra Avenue, Sheridan, Wyoming 82801 ph: (307) 672-8945

ANALYTICAL QC SUMMARY REPORT

CLIENT: Work Order:

Project:

MVTL Laboratories, Inc.

S1808230

201882-2036

Date: 9/13/2018

Report ID: S1808230001

2010	10Z Z000							
Radium 228 by Ga/	Tech	Sample Type MBLK		Units: pCi/L				
MB-524 (09/0	09/18 09:24)	RunNo: 161107	PrepD	Date: 08/27/18 0:00		hID 15029		
	Analyte	Result	RL	Spike Ref Samp	%REC	% Rec Limits	Qua	
	Total Radium 228	ND	1					
Radium 228 by Gal	Tech	Sample Type LCS		Units: pCi/L				
LCS-524 (09)	(09/18 12:27)	RunNo: 161107	Prepl	Date: 08/27/18 0:00	17450001040	hID 15029		
	Analyte	Result	RL	Spike Ref Samp	%REC	% Rec Limits	Qua	
	Total Radium 228	37	1	39	94.5	65.9 - 132		
Radium 228 by Gal	Tech	Sample Type MS		Units: pCi/L				
MS-524 (09/0	09/18 18:33)	RunNo: 161107	PrepD	Date: 08/27/18 0:00		chID 15029	100000	
•	Analyte	Result	RL	Spike Ref Samp	%REC	% Rec Limits	Qua	
· L	Total Radium 228	36	1	39 ND	91.7	50 - 139		
Radium 228 by Ga/	Tech	Sample Type MSD		Units: pCi/L				
E CONTRACTOR OF THE CONTRACTOR	0/09/18 23:37)	RunNo: 161107	PrepD	Date: 08/27/18 0:00		chID 15029		
	Analyte	Result	RL	Conc %RPD	%REC	% RPD Limits	Qua	
	Total Radium 228	34	1	36 3.95	88.2	20		
adium 226 in Water -		Sample Type MBLK		Units: pCi/L				
MB-1894 (09/04	/04/18 17:26)	RunNo: 160865	Prepl	Date: 08/23/18 0:00	550000	chID 14991		
	Analyte	Result	RL	Spike Ref Samp	%REC	% Rec Limits	Qua	
	Radium 226	ND	0.2	0				
Radium 226 in Wat	er -	Sample Type LCS		Units: pCi/L				
LCS-1894 (0	9/04/18 17:26)	RunNo: 160865	60 08000000	Date: 08/23/18 0:00		chID 14991	-	
	Analyte	Result	RL	Spike Ref Samp	%REC	% Rec Limits	Qua	
	Radium 226	4.9	0.2	5.98	82.7	67.1 - 122		
Radium 226 in Wat		Sample Type MS		Units: pCi/L	Company of the Compan			
MS-1894 (09	0/04/18 17:26)	RunNo: 160865	Prepl	Date: 08/23/18 0:00	Bato	chID 14991		
WG-1654 (66	Analyte	Result	RL	Spike Ref Samp	%REC	% Rec Limits	Qua	
	Radium 226	4.8	0.2	5.98 ND	79.6	65 - 131		
Radium 226 in Wat	er -	Sample Type MSD		Units: pCi/L				
	09/04/18 17:26)	RunNo: 160865	Prepl	Date: 08/23/18 0:00	Bato	chID 14991		
MOD 1004 (C	Analyte	Result	RL	Conc %RPD	%REC	% RPD Limits	Qua	
	Radium 226	5.4	0.2	ND	90.2			
	VIV. 0.77 (17.00 pp. 10.00 pp. 10.0							

Qualifiers:

Analyte detected in the associated Method Blank

G Analyzed at IML Gillette laboratory

J Analyte detected below quantitation limits

ND Not Detected at the Reporting Limit

R RPD outside accepted recovery limits

X Matrix Effect

E Value above quantitation range

H Holding times for preparation or analysis exceeded

L Analyzed by another laboratory

O Outside the Range of Dilutions

S Spike Recovery outside accepted recovery limits



LABORATORIES, Inc.

Bismarck, ND 58501

2616 E Broadway Ave

Chain of Custody Record

of. ~ Page_

Temp: 0 -0 ccarroll@mvtl.com Analysis Required Ra226 & Ra228 For faxed report check For e-mail report check box Analysis 701-258-9720 IT 10-Aug-18 BL6080 . . . Purchase Order #: 201882-2036 Date Submitted: 8.4.6 Date: E-mail: Phone #: Fax #: төңіС **Bottle Type** スポランからつ Glass Jar Umpreserved Received by: **NOC Nials** 1000 ml HNO3 Claudette Untreated Project Name/Number: Sampled Time 1730 Name of Sampler: Quote Number: 07-Aug-18 Account #: Sampled Sample Condition: Contact: Date Sample Type \otimes 1700 Comments: All results must be reported as a numerical value. Sample Information Time: Client Sample ID Fax: (701) 258-9724 Pond 10 Billing Address (indicate if different from above): 10-Aug-18 New Ulm, MN 56073 Bismarck, ND 58501 2616 E Broadway Date: Phone: (701) 258-9720 PO Box 249 MVTL MVTL Lab Number 18-W2540 Company Name and Address: Toll Free: (800) 279-6885 Transferred by: 51808730 Nathan Buchmann IML Lab Number 63



Field Datacheet

OTP Coyote Company:

						1											
				No.		\[\tilde{\pi}\]	sec.	sec.		mL/min		am/om/	am/pm	am/pm)		
	0	rich	\	Sunny / Partly Cloudy / Cloudy		Control Settings)			iii		320		1730			
0.000	Pond10	N. Conans		Partly Clo		Cont	Purge:	Recover:	PSI:	Pumping Rate:		Began: j	ed Dry:	mpling:			
Aug 2018		16 Num		Sunny /	rmation		7			Pu		Time Purging Began: 1320	Time Purged Dry:	Time of Sampling:			
Auç		1		Precip:	Sampling Information	7	001/	.6	0			Tim	No		(Nitric	
	Sample ID:	Sampling Personal:			Sampl	Bladder	Bladder	Yes ANO	Yes Mo	1		7 Anel 8	ľ	440 19	\ \ \	1L Raw 600mL Nitric, 4-1L Nitric	
Event:	Samp	Samp				od:	od:			<u>:</u>				ite: 7		(600mL	
						Purging Method:	Sampling Method:	Dedicated Equip?:	Duplicate Sample?:	Duplicate Sample ID:		Purge Date:	Well Purged Dry?	Sample Date:			
0	ment			Wind: 7		Pur	Sam	Dedic	Duplica	Duplicat			Well	0,		Bottle	List:
200	Assess			Wind:													
a Dalasiicel	undwater Assessment			l.					/isible			₽	ff	liters	ff	Ħ	ndicator
	Grou			200					Not Vis		2"	181	12.16	211	À	١	ter Level I
				Temp:	nation	(No	No .	No	No			7	2			V	Electric Water Level Indicator
		rck, ND			Well Information	Yes (25 X 25	(Yes)	Yes) N	ameter:	Purge:	Depth:	Well Volume:	f Pump:	Sample:	/lethod:
NA STAN	/	y Ave, Bisma	Phone: (701) 258-9720	itions:	W	cked?		aight?	ntact?	sary:	Casing Diameter:	Water Level Before Purge:	Total Well Depth:	Well \	Depth to Top of Pump:	Water Level After Sample:	Measurement Method:
Z		2616 E. Broadway Ave, Bismarck, ND	Phone: (7	Weather Conditions:		Well Locked?	Well Labeled?	Casing Straight?	Grout Seal Intact?	Repairs Necessary:		Water Le			Dept	Water Le	Meas
		2616		Wea					O	Rep							

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O
正

L						2			
Temp	_	. Spec.		8	ORP	Turbidity	Water	mL	Discription:
ပ္ပ		Cond.	pH	(mg/L)	(mV)	(NTU)	Level (ft)	Level (ft) Removed	Clarity, Color, Odor, Ect.
		±5%	1.0∓	700€ 700€	±20 mV	±10%	0.25 ft		clear, partly cloudy, cloudy
12.7	17	2265	869	1207	7.88	252)	2,1	(10,1,
									and the same of th
							ī		
江江	1	7000		7,05	61.2	652	1	Pechnip	recture clouds
(gN)		27		}	Ĕ	Total Volume Removed: 2,	Removed:	2.1	- Tu

Total Volume Removed: 2 , / mL / Total Volume Removed: 2 , / mL / Due to low volume in well and slow recharge the full sample set of bottles was not able to be collected at time of sample field readings. Stabilized: Comments:

Date/Time

Date/Time

Date/Time

Park Brill Collected 500mL (olected 12 Range 1730

Collected 1L Nitrics at:の8ゼジ

Collected 1L Nitrics

Had to bail the well toget enough water to fill the Samples



Chain of Custody Record

roject Name:	le:	Event:	Work Order Number:	0	
OT	OTP Coyote - Slag Pond CCR	Aug 2018	89-	-4056	_
Report To:	Otter Tail Power Josh Hollen PO Box 496 Fergus Falls, MN 56538-0496	Carbon Copy: Attn: Address:	Name of Sampler(s): Darren Wizsunaug	nas	*****
ohone: email:	jhollen@otpco.com				
	Sample Information	7	Bottle Type Field Parameters	neters Analysis	Г

Analysis	Analysis Required	Rad 226 & Rad 228			
meters	Hd	7.30			
Field Parameters	Spec. Cond.	4000			
Ĕ	Temp (°C)	14:41			
Bottle Type	1 liter Nitric SoomL Nitric SoomL Nitric SoomL Nitric SoomL Nitric	4			
7	Appearance (Clear, Parily Cloudy)	Loudy	/		
	Sample Type	GW			
c	өшіТ	1730			
Sample Information	Date	17 Aug (8			
Sample	Sample ID	540 Pond10			
	Lab Number	0428CI			

Comments:

Relinquished By:		Sar	Sample Condition:
Name:	Date/Time	Location:	Temp (°C)
~	9 Ansis	विद्	Comment 31
Mrs Nierra	1,297	Walk In #2	TM562 / 11488
			CANAS CANAS

Name: Date/Time 9 Aug 2013

Appendix B

Alternative Source Demonstration (ASD), Slag Pond Area, Coyote Station



Technical Memorandum

To:

Josh Hollen, Otter Tail Power Co.

From:

Paul Swenson and James S. Aiken, Barr Engineering Co.

Subject: Alternative Source Demonstration (ASD), Slag Pond Area, Coyote Station

September 9, 2018 Date:

Project: 34291075 Coyote Station CCR

Introduction 1.0

Otter Tail Power Company (OTP)'s Coyote Station near Beulah, ND, has implemented a Detection Monitoring Program in accordance with the U.S. Environmental Protection Agency (EPA) Coal Combustion Residuals (CCR) Rule (40 CFR Parts 257 and 261). As part of the Detection Monitoring Program, a statistically significant increase (SSI) in boron concentration was identified at Slag Pond Area monitoring well POND 16S for the February 27, 2018 sampling event and the subsequent resampling event on May 3, 2018. The analysis of the May 3 resampling data was complete with a confirmed SSI on June 13, 2018.

1.1 **Purpose**

This memorandum is intended to provide written documentation of an Alternative Source Demonstration (ASD) and certification of accuracy as described in the CCR Rule (§257.94(e)(2)).

Statistically Significant Increases 1.2

The detection monitoring sampling event conducted in February 2018 identified an SSI over background in boron concentration in POND 16S. Attached Figure 1 shows the location of POND 16S and other Slag Pond Area wells. The measured value of 2.44 mg/L was above the background interwell prediction limit of 0.77 mg/L (Figure 2).

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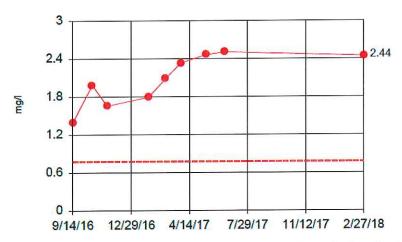


Figure 2 POND 16S Boron Data with Interwell Prediction Limit (0.77 mg/L)

1.3 Rule Requirements

The requirements for written documentation and certification of accuracy for an ASD are included in §257.94(e)(2):

The owner or operator may demonstrate that a source other than the CCR unit caused the statistically significant increase over background levels for a constituent or that the statistically significant increase resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. The owner or operator must complete the written demonstration within 90 days of detecting a statistically significant increase over background levels to include obtaining a certification from a qualified professional engineer verifying the accuracy of the information in the report.

In accordance with the above requirement, this memorandum is being issued within 90 days of the SSI determination.

1.4 Potential Alternative Sources Review

Based on the rule (above), there are five categories that we evaluated for this Alternative Source Demonstration. These include:

- 1. A source other than the CCR unit
- 2. Error in sampling
- 3. Error in laboratory analysis
- 4. Statistical methods
- 5. Natural variation in groundwater

The purpose of this ASD is to provide the technical basis and a written certification that the CCR unit did not cause the boron SSI in POND 16S.

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2.0 Lines of Evidence Supporting an ASD

As part of the ASD, site data was evaluated to identify potential causes for elevated concentrations of boron in POND 16S. The following potential sources were selected for investigation:

- Historical groundwater and Slag Pond data from the Annual Monitoring Report (AMR) data required under state permit
- Field sampling procedures and field datasheets
- Analytical laboratory data
- Statistical methodology
- The conceptual model of groundwater flow was evaluated for indication of site-specific natural variation

A hypothesis was developed to evaluate each of the potential sources listed above and then tested to determine if site data support the hypothesis. The results of the determinations show that there are multiple lines of evidence supporting the ASD and establish that interpretation of the SSI for boron meets the alternative source requirements of the CCR Rule (§257.94(e)(2)). Supporting information for each hypothesis is provided in Attachment A. The hypotheses and corresponding determinations are summarized below according to which of the five categories they address as required by the CCR Rule.

2.1 A "source other than the CCR unit" (SSI not consistent with a release)

- Hypothesis: The Slag Pond is the source of a release to groundwater that caused the SSI for boron at POND 16S.
- Analysis: If a release from the Slag Pond is the source of the boron SSI at POND 16S, then it should be accompanied by SSIs in several other Appendix III parameters during the same event.
- Result: No other Appendix III parameters exhibited SSIs during the February sampling event.
 Therefore, the hypothesis is rejected and consequently, the Slag Pond is not a likely source of the SSI at POND 16S.

2.2 Error in sampling

- Hypothesis: Sampling procedures did not meet the requirements of the Sampling and Analysis Plan.
- Analysis: Field sampling procedures and field datasheets were reviewed for adherence to the Sampling and Analysis Plan (Carlson McCain, 2017).

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• Result: No obvious evidence of sampling error was discovered during our review. Therefore, the hypothesis is rejected.

2.3 Laboratory methods

- Hypothesis: Laboratory analyses did not meet quality assurance/quality control requirements.
- Analysis: The lab report is reviewed for quality upon receipt.
- Result: No obvious evidence of laboratory inconsistency was discovered during our review.
 Therefore, the hypothesis is rejected.

2.4 Statistical Method 1 (incorporation of mixing from multiple aquifers)

- Hypothesis: Boron concentrations observed in samples from monitoring well POND 16S are due
 to convergence of groundwater flow from the lower and upper aquifers. The SSI for boron was
 based on the interwell prediction limit that does not adequately account for elevated boron in the
 deeper upgradient well because only one upgradient well from the uppermost saturated unit is
 required for comparison. If the upgradient boron concentrations from the lower aquifer are used
 to calculate the interwell prediction limit, there is no SSI for boron from the February event.
- Analysis: Two separate flow units are present at the Site. Flow from each unit converges near the
 downgradient edge of the Site where POND 16S is located resulting in a merging of the upper
 and lower water quality conditions (attached Figure 3). Upgradient water quality data from the
 lower aquifer indicates that it is much higher in boron than the upgradient data from the upper
 aquifer used to determine the SSI. Pooling background data from the upper (POND N3) and
 lower (POND N1) aquifers, the non-parametric interwell prediction limit is 6.68mg/L, which is
 much higher than the result at POND 16S during the February event.
- Result: Incorporating the deeper upgradient well and using an interwell prediction limit indicates
 that no SSI for boron is associated with the February 2018 event at POND 16S. Consequently, the
 hypothesis is accepted.

2.5 Statistical Method 2 (natural variation at POND 16S)

- Hypothesis: An apparent increasing trend at POND 16S may be an indication of a release from the CCR Unit in the circumstance where the February 2018 event shows a concentration that is consistent with that increasing trend. However, if the apparent increasing trend at POND 16S is due to natural variation in boron concentrations, intrawell methods are justified at this location.
- Analysis: Using only eight background events results in potential bias toward temporal changes
 that may appear in the short term to be a trend. Intrawell prediction limits better address the
 uncertainty due to natural spatial variation and do not show an SSI for boron is present from the
 February 2018 event for POND 16S. However, an upward trend in boron precluded the use of this
 method in accordance with guidance (EPA, 2009). An alternative trend testing method, detailed in

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> Appendix A.5.2, was used that indicated that the most recent value for boron is not part of an increasing trend.

Result: Statistical trend testing indicates that the most recent value is not part of an increasing trend (and as above, an upward trend is present in the upgradient background dataset). The use of an intrawell prediction limit indicates that the February 2018 result for boron at POND 16S is not an SSI and confirms the hypothesis.

Natural variation (in groundwater quality) 2.6

Arguments for natural variation are included in the sections 2.4 and 2.5 discussions regarding statistical methods.

Certification 3.0

I certify that the written demonstration provided (above) for boron at POND 16S and supported by the data in Attachment A is accurate and consistent with our review of the groundwater data collected to date and as required under the CCR Rule ((§257.94(e)(2)).

Paul Swenson, P.E. Vice President

James S. Aiken Hydrogeologist

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Attachment A

A.1 SSI at POND 16S is not consistent with release from CCR Unit

A.1.1 Hypothesis

If we assume that the Slag Pond is the source of a release to groundwater that caused the SSI for boron at POND 16S, then we should see elevated concentrations of other parameters that are similar geochemically to boron appear at about the same time. This is because the Slag Pond (CCR Unit, sampled as POND SW) water would contain a mixture of all of the Appendix III parameters. Conversely, if we do not see elevated parameters in POND 16S for the remaining Appendix III parameters, we would then reject the hypothesis above and conclude that the SSI is not the result of a release from the CCR Unit.

A.1.2 Analysis

All Appendix III parameters are present in samples of the CCR Unit. An indication that the SSI for boron is not due to a release from the facility is that a sharp increase in concentration would be expected in the event of a release but very little indication of a trend in the data is observed for any of the parameters. In addition, the increasing trend in boron appears to have occurred during the baseline rather than the February event. Also, except for fluoride, all of these parameters are relatively non-reactive in that they do not adsorb or precipitate in the geologic matrix at the Site as they move in groundwater. Therefore, a release from the CCR Unit would result in an increase in most or all of the parameters at about the same time, not just boron. No other SSIs were detected at POND 16S other than boron.

A.1.3 Result

The data presented above does not support the hypothesis that a release from the CCR Unit has occurred, and the hypothesis is rejected. This provides a line of evidence that a release from the CCR Unit is not the likely cause for the SSI at POND 16S.

A.2 Error in sampling

A.2.1 Hypothesis

Sampling procedures did not meet the requirements of the Sampling and Analysis Plan (Carlson McCain, 2017).

A.2.2 Analysis

During sampling activities, the sampler records their activities and field data for later review to verify quality assurance and conformance with the Sampling and Analysis Plan. The field sampling procedures and field datasheets were reviewed for quality assurance and for adherence to the Sampling and Analysis Plan.

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A.2.3 Result

No obvious evidence of sampling error was discovered during our review. Therefore, the hypothesis is rejected.

A.3 Laboratory methods

The result of the SSI is largely the result of an apparent increasing trend that occurred during baseline data collection. Standard QA/QC validation procedures were conducted on each of the laboratory reports provided by the lab. Although this review was not exhaustive, no obvious evidence of laboratory inconsistency was discovered following standard protocols for data review.

A.4 Statistical Methods 1 (natural variation due to mixing from multiple aquifers)

There are two hypotheses that are related to natural variation of boron concentrations at the Site as they apply to the statistical methods used. As such, these hypotheses fit under both the "statistical method" and "natural variation" categories allowed for an ASD in the CCR Rule. Each is described below.

A.4.1 Hypothesis

Boron concentrations observed in samples from monitoring well POND 16S are due to convergence of groundwater flow from the lower and upper aquifers. The SSI for boron was based on the interwell prediction limit that does not adequately account for elevated boron in the deeper aquifer because only one upgradient well from the uppermost saturated unit is required for comparison. If the background boron concentrations present in the lower aquifer are used to calculate the interwell prediction limit, there is no SSI for boron.

A.4.2 Analysis

The CCR Rule states that groundwater monitoring must be conducted in the uppermost aquifer. The Statistical Analysis Plan (included as part of the SAP; Carlson McCain, 2017) specified intrawell analysis as the preferred statistical method for the Slag Pond wells but allowed for use of interwell and trend testing to augment the primary intrawell method in order to confirm or disconfirm an SSI.

The intrawell methods proposed are not recommended by the Unified Guidance (EPA, 2009) when there is an increasing trend in the baseline dataset. Therefore, the SSI was determined based on interwell methods per the SAP. The only upgradient well in the certified CCR groundwater monitoring system at the Slag Pond Area that could be used under the current method is POND N3. Boron concentrations in POND N3 are lower than those observed in POND 16S. Therefore, the SSI at POND 16S is based primarily on the concentrations observed at POND N3 using the interwell prediction limit derived from that well.

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However, detailed review of the conceptual model for the Site (attached Figure 3) indicates that groundwater flows in two saturated units at the Site. POND N3 and POND 16S are located in the upper Coleharbor Formation, which is shown with the white contours on Figure 3. However, groundwater in the lower Coleharbor Formation (dark blue contours) flows in the same general direction as the upper Coleharbor Formation. As shown in cross-section on Figure A.1, both the upper and lower units pinch out near the downgradient edge of the Site under the CCR Unit and at POND 16S. This results in mixing of the groundwater from the two units. Groundwater quality in the lower unit is represented by monitoring well POND N1. POND N1 is not part of the CCR monitoring network but has been monitored previously as part of the state groundwater monitoring program (Barr, 2018).

Concentrations of boron are as much as 10 times greater at POND N1 than are observed at POND N3 (Barr, 2018). If POND N1 data were pooled with the data from POND N3, the background concentrations would be much higher and there would be no SSI at POND 16S.

This variation is addressed in the EPA statistical guidance (EPA, 2009) as follows:

"Several other critical assumptions apply to the interwell approach. It is assumed that the upgradient and downgradient well samples are drawn from the same aquifer and that wells are screened at essentially the same hydrostratigraphic position. At some sites, more than one aquifer underlies the waste site or landfill, separated by confining layers of clay or other less permeable material. The fate and transport characteristics of groundwater contaminants likely will differ in each aquifer, resulting in unique concentration patterns. Consequently, upgradient and downgradient observations may not be comparable (i.e., drawn from the same statistical population)." (EPA 2009, p. 6-29)

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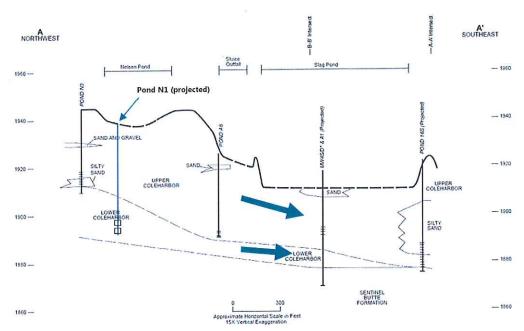


Figure A.1 Cross section through Site along groundwater flow gradient showing convergence of flow from upper and lower portions of the Coleharbor Formation near POND 16S

Spatial heterogeneity of natural systems is a common challenge in developing statistical methods that adequately balance detection of a release from the regulated unit with avoiding false positives. The ASD provision in the CCR Rule allows for natural variation that can lead to erroneous statistical results even if the selected statistical method is appropriately selected. Based on the analysis above, it appears that the statistical method used to determine the SSI was not able to discern the differences in groundwater flow that demonstrate that the boron SSI is related to natural variation in upgradient groundwater quality and is not due to a release from the CCR Unit. This evaluation indicates that interwell statistical tests may be used if those tests include well POND N1 in the background dataset.

A.4.3 Result

Incorporating the data from the deeper background well and using an interwell prediction limit indicates that no SSI for boron is associated with the February 2018 event at POND 16S.

A.5 Statistical Methods 2 (no statistical trend at POND 16S)

A.5.1 Hypothesis

An apparent increasing trend at POND 16S may be an indication of a release from the CCR Unit in the circumstance where the February 2018 event shows a concentration that is consistent with that increasing trend. However, if the apparent increasing trend at POND 16S is due to natural variation in boron concentrations, intrawell methods are justified at this location.

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A.5.2 Analysis

The SAP for the Site (Carlson McCain, 2017) specified intrawell analysis as the preferred statistical method for the Slag Pond wells. As shown in Figure 2 of this memo, use of this method would have incorporated an increasing trend in the background, therefore normalizing those increases into the intrawell prediction limit. The baseline data for boron in POND 16S exhibited a significant increasing trend. According to the EPA's Unified Guidance, alternate methods may be necessary when there is an intrawell trend:

"Roughly linear trends in intrawell background usually signify the need to switch from an intrawell prediction limit or control chart to an explicit trend test....Otherwise the background variance will be overestimated and biased on the high side, leading to higher than expected and ultimately less powerful prediction and control limits" (EPA 2009, p. 5-8).

One such explicit trend test is a 95% prediction interval calculated for the baseline trend. This test was used to see if the linear trend continued to predict the February boron concentration. If the trend is present, the February 2018 sample would be within the limits predicted by the statistical trend line (Figure A.2).

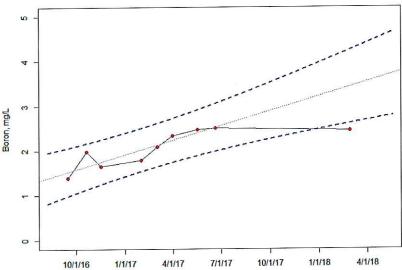


Figure A.2 POND 16S Boron baseline trend line with 95% prediction interval

The linear trend line for the baseline boron data (shown on Figure A.2 as a dotted gray line) has a slope of 1.3 mg/L per year. The boron concentration on 2/27/18, if it were positioned on that trend line, would be 3.4 mg/L, which is 1 mg/L greater than the measured value of 2.44 mg/L. The lower limit of the 95% prediction interval (shown on Figure A.2 as dashed blue lines) for 2/27/18 is 2.6 mg/L, which is also higher than the measured concentration. The February 2018 boron concentration measured in POND 16S is lower than would be predicted by the baseline trend and is therefore not part of a statistically significant increasing trend in boron concentration. Because a release from the CCR Unit would show a consistently increasing trend within the statistical limits, it is unlikely that the February event is due to a release.

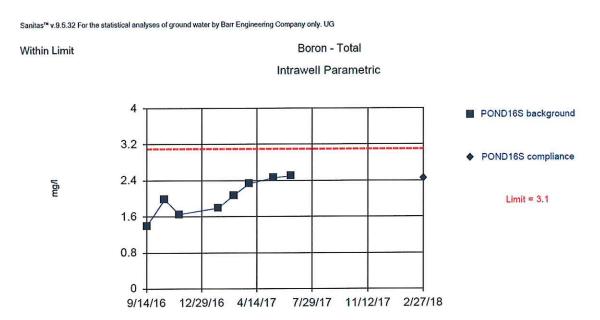
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Because it does not appear consistent with a release, the apparent trend in the background data reflects natural variation in the aquifer at this location (perhaps in part due to mixing of upgradient groundwater cited above). The February boron result of 2.44 mg/L at POND 16S is also below the prediction limit calculated from the intrawell method (3.1 mg/L, Figure A.3).



Background Data Summary: Mean=2.023, Std. Dev.=0.3986, n=8. Normality test: Shapiro Wilk @alpha = 0.05, calculated = 0.95, critical = 0.818. Kappa = 2.616 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188.

Figure A.3 Intrawell prediction limit for POND 16S

A.5.3 Result

Using a different statistical trend test indicates that the most recent value is not part of an increasing trend. The use of an intrawell prediction limit indicates that the February 2018 result for boron at POND 16S is not an SSI.

A.6 Conclusions

The analysis summarized in this memorandum supports a demonstration that the boron SSI determined for POND 16S from the February 27, 2018, sampling event resulted from a source other than the CCR Unit, based on the statistical methods that did not adequately account for natural variation or the mixing from multiple aquifers. Taken as a whole, these lines of evidence presented above provide adequate written documentation that an alternative source is responsible for the concentrations at POND 16S and that the SSI does not appear to be the result of a release from the Slag Pond CCR unit.

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A.7 References

Barr Engineering Co., 2018. 2017 Annual Monitoring Report, Coyote Station. Prepared for Otter Tail Power Company, February 2018.

Carlson McCain, Inc., 2017. CCR Groundwater Sampling and Analysis Plan (Including Statistical Method Selection and Certification), Slag Pond Area, Coyote Station. Prepared for Otter Tail Power Company, October 2017.

U.S. Environmental Protection Agency, 2009, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities - Unified Guidance. EPA 530/R-09-007.

