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

234 West Century Avenue
Bismarck, ND 58503
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2018 CCR Annual Groundwater Monitoring and Corrective Action Report

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Beulah, North Dakota

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.

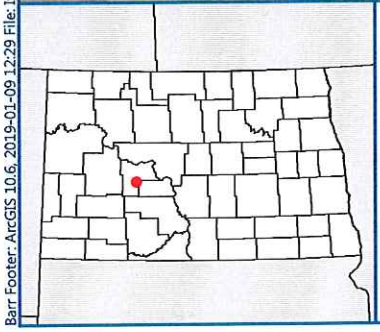
3.0 References

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



Upgradient Monitoring Well

Downgradient Monitoring Well

Pond Outline

N

0 200 400

Feet

SITE LOCATION
Slag Pond
Coyote Station
Otter Tail Power Company
Beulah, North Dakota

FIGURE 1

Barr Footer: ArcGIS 10.6, 2019-01-09 12:29 File: I:\Projects\34\29\018\Maps\Reports\2018\Annual_Report_2018\Fig01 Site Location - Slag pond.mxd User: MRQ

Appendices

Appendix A

Laboratory Reports and Field Sheets

MINNESOTA VALLEY TESTING LABORATORIES, INC.
1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
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
MEMBER ACIL

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.
  - 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.

All laboratory data has been approved by MVTL Laboratories.

SIGNED: Claudette Carroll DATE: 15 Mar 18

Claudette Carroll - MVTL Bismarck Laboratory Manager

MVTL

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

Lab IDs: 18-W285 to 18-W289 **Project:** OTP Coyote-Slag Pond CCR **Work Order:** 201882-0393

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Boron - Total mg/l	0.40	108	80-120	0.400	18-W285	< 0.1	0.42	105	75-125	0.42	0.43	108	2.4	20	-	-	< 0.1
				0.400	18-W294	0.36	0.74	95	75-125	0.74	0.76	100	2.7	20	-	-	< 0.1
Calcium - Total mg/l	20.0	110	80-120	100	18W285q	< 1	103	103	75-125	103	102	102	1.0	20	-	-	< 1
				100	18W294q	144	238	94	75-125	238	236	92	0.8	20	-	-	< 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	-	-	< 1
	30.0	101	80-120												-	-	< 1
Fluoride mg/l	0.50	102	90-110	0.500	18-M405	1.97	2.42	90	80-120	2.42	2.41	88	0.4	20	-	-	< 0.1
				0.500	18-W288	0.19	0.72	106	80-120	0.72	0.72	106	0.0	20	-	-	< 0.1
pH units	-	-	-	-	-	-	-	-	-	5.0	5.1	-	2.0	20	-	-	-
	-	-	-	-	-	-	-	-	-	7.4	7.4	-	0.0	20	-	-	-
Sulfate mg/l	100	103	80-120	500	18-W294	865	1450	117	80-120	1450	1330	93	8.6	20	-	-	< 5
	100	106	80-120	100	18-W285	< 5	104	104	80-120	104	95.8	96	8.2	20	-	-	< 5
Total Dissolved Solids mg/l	-	-	-	-	-	-	-	-	-	1770	1800	-	1.7	20	-	-	< 10
	-	-	-	-	-	-	-	-	-	1790	1790	-	0.0	20	-	-	

Approved by: C. Gould
15 Mar-18

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

CERTIFICATE of ANALYSIS - CCR

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

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

Project Name: OTP Coyote-Slag Pond CCR

PO #: 48895

Sample Description: FB Slag

Temp at Receipt: 2.6C

Event and Year: February 2018

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	1 Mar 18	SVS
Lab, pH	* 9.1	s.u.	0.1	SM4500 H+ B	1 Mar 18 17:00	SVS
Fluoride	< 0.1	mg/l	0.10	SM4500-F-C	1 Mar 18 17:00	SVS
Sulfate	< 5	mg/l	5.00	ASTM D516-07	13 Mar 18 9:47	RAG
Chloride	< 1	mg/l	1.0	SM4500-Cl-E	2 Mar 18 13:44	RAG
Total Dissolved Solids	< 10	mg/l	10	I1750-85	2 Mar 18 10:29	SVS
Calcium - Total	< 1	mg/l	1.0	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

CC

Approved by: Claudette K. Carroll 15 Mar 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

CERTIFICATION: ND # ND-00016

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

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

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

Project Name: OTP Coyote-Slag Pond CCR

PO #: 48895

Sample Description: Pond6

Temp at Receipt: 2.6C

Event and Year: February 2018

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	1 Mar 18	SVS
Field pH	6.95	s.u.	0.1	SM 4500 H+ B	27 Feb 18 13:23	DJN
Lab, pH	* 7.4	s.u.	0.1	SM4500 H+ B	1 Mar 18 17:00	SVS
Field Temperature	9.33	Degrees C	0.1	SM 2550B	27 Feb 18 13:23	DJN
Field Conductivity	4241	umhos/cm	1	EPA 120.1	27 Feb 18 13:23	DJN
Fluoride	0.33	mg/l	0.10	SM4500-F-C	1 Mar 18 17:00	SVS
Sulfate	1690	mg/l	5.00	ASTM D516-07	6 Mar 18 10:59	RAG
Chloride	28.5	mg/l	1.0	SM4500-Cl-E	2 Mar 18 13:44	RAG
Total Dissolved Solids	3280	mg/l	10	I1750-85	2 Mar 18 10:29	SVS
Calcium - Total	214	mg/l	1.0	6010D	5 Mar 18 9:50	SZ
Boron - Total	2.92	mg/l	0.10	6010D	5 Mar 18 11:11	BT

* Holding time exceeded

Approved by: Claudette K. Carroll CC 15 Mar-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

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

Project Name: OTP Coyote-Slag Pond CCR

PO #: 48895

Sample Description: PondN3

Temp at Receipt: 2.6C

Event and Year: February 2018

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

* Holding time exceeded

CC

Approved by: Claudette K. Carroll 15 Mar 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

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

Project Name: OTP Coyote-Slag Pond CCR

PO #: 48895

Sample Description: Pond16S

Temp at Receipt: 2.6C

Event and Year: February 2018

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	1 Mar 18	SVS
Field pH	6.88	s.u.	0.1	SM 4500 H+ B	27 Feb 18 17:00	DJN
Lab, pH	* 7.3	s.u.	0.1	SM4500 H+ B	1 Mar 18 17:00	SVS
Field Temperature	8.53	Degrees C	0.1	SM 2550B	27 Feb 18 17:00	DJN
Field Conductivity	3190	umhos/cm	1	EPA 120.1	27 Feb 18 17:00	DJN
Fluoride	0.19	mg/l	0.10	SM4500-F-C	1 Mar 18 17:00	SVS
Sulfate	1570	mg/l	5.00	ASTM D516-07	6 Mar 18 10:59	RAG
Chloride	26.5	mg/l	1.0	SM4500-Cl-E	2 Mar 18 13:44	RAG
Total Dissolved Solids	2440	mg/l	10	I1750-85	2 Mar 18 10:29	SVS
Calcium - Total	184	mg/l	1.0	6010D	5 Mar 18 9:50	SZ
Boron - Total	2.44	mg/l	0.10	6010D	5 Mar 18 11:11	BT

* Holding time exceeded

CC

Approved by: Claudette K. Carroll 15 Mar 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

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

Project Name: OTP Coyote-Slag Pond CCR

PO #: 48895

Sample Description: MW2S

Temp at Receipt: 2.6C

Event and Year: February 2018

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	1 Mar 18	SVS
Field pH	6.96	s.u.	0.1	SM 4500 H+ B	28 Feb 18 10:17	DJN
Lab, pH	* 7.4	s.u.	0.1	SM4500 H+ B	1 Mar 18 17:00	SVS
Field Temperature	7.00	Degrees C	0.1	SM 2550B	28 Feb 18 10:17	DJN
Field Conductivity	5361	umhos/cm	1	EPA 120.1	28 Feb 18 10:17	DJN
Fluoride	0.26	mg/l	0.10	SM4500-F-C	1 Mar 18 17:00	SVS
Sulfate	3320	mg/l	5.00	ASTM D516-07	6 Mar 18 10:59	RAG
Chloride	27.2	mg/l	1.0	SM4500-Cl-E	2 Mar 18 13:44	RAG
Total Dissolved Solids	5070	mg/l	10	I1750-85	2 Mar 18 10:29	SVS
Calcium - Total	560	mg/l	1.0	6010D	5 Mar 18 9:50	SZ
Boron - Total	< 0.5 @	mg/l	0.10	6010D	5 Mar 18 11:11	BT

* Holding time exceeded

Approved by: Claudette K. Carroll 15 Mar 18

Claudette K. Carroll, Laboratory Manager, Bismarck, ND

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CERTIFICATION: ND # ND-00016

MVTL Laboratories, Inc.
2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name:	Event:	Work Order Number:
OTP Coyote - Slag Pond CCR	Feb 2018	82-0393
Report To: Otter Tail Power Attn: Josh Hollen Address: PO Box 496 Fergus Falls, MN 56538-0496 phone: email: jhollen@otpco.com	**Carbon Copy:** Attn: Address:	**Name of Sampler(s):** Darren Nieswaag

Sample Information						Bottle Type							Field Parameters			Analysis
Lab Number	Sample ID	Date	Time	Sample Type	Appearance (Clear, Partly Cloudy, Cloudy)	1 liter	500mL Nitric	500mL Nitric (filtered)	250mL Sulfuric	1 liter Nitric			Temp (°C)	Spec. Cond.	pH	Analysis Required
W285	FB Slag	28Feb18	NA	W	–	X	X						NA	NA	NA	OTP CCR Appendix 3
W286	Pond6	27Feb18	1323	GW	clear	X	X						9.33	4241	6.95	
W287	PondN3	27Feb18	1454	GW	clear	X	X						10.96	5278	6.69	
–	Pond10	27Feb18	0928	GW	–	–							–	–	–	
–	Pond12	27Feb18	1532	GW	–	*~~X~~	~~X~~						–	–	–	
W288	Pond16S	27Feb18	1700	GW	clear	X	X						8.53	3190	6.88	
W289	MW2S	28Feb18	1017	GW	clear	X	X						7.00	5361	6.96	

Comments: * 27Feb18 @ pm

Relinquished By:		Sample Condition:	
Name:	Date/Time	Location:	Temp (°C)
1 Darren Nieswaag	28Feb18 1829	Log In ~~Walk In #2~~	2.6 TM562 / ~~TM588~~
2			

Received by:	
Name:	Date/Time
NBuchmann	1 Mar18 0800

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company:	OTP Coyote
Event:	Feb 2018
Sample ID:	Pond 6
Sampling Personal:	Darren Wiesmann

Weather Conditions: Temp: 30 °F Wind: S10 Precip: (Sunny) / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	(No)	
Well Labeled?	~~Yes~~	No	
Casing Straight?	~~Yes~~	No	
Grout Seal Intact?	(Yes)	No	Not Visible
Repairs Necessary:	—		

Casing Diameter:	2"	
Water Level Before Purge:	16.15	ft
Total Well Depth:	18.80	ft
Well Volume:	1.7	liters
Depth to Top of Pump:	17.25	ft
Water Level After Sample:	16.45	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder		
Sampling Method:	Bladder		
Dedicated Equip?:	Yes	(No)	
Duplicate Sample?:	Yes	(No)	
Duplicate Sample ID:	—		

Control Settings		
Purge:	5	sec.
Recover:	~~5~~ 3	sec.
PSI:	30	

Purge Date:	27Feb18	Time Purging Began:	1238 am/(pm)
Well Purged Dry?	Yes (No)	Time Purged Dry:	— ~~am/pm~~
Sample Date:	27Feb18	Time of Sampling:	1323 am/(pm)

Bottle List:	1L Raw, 500mL Nitric

Field Measurements

Stabilization (3 consecutive)		Temp (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate	mL Removed	Discription: Clarity, Color, Odor, Ect.
SEQ #	Time		±5%	±0.1	±10%	±20 mV	±10%	0.25 ft	mL/min		clear, partly cloudy, cloudy
1	1243	9.43	3957	6.82	0.52	42.0	22.2	16.52	*~~100~~ 100	500	clear
2	1248	9.05	3966	6.83	0.43	43.2	16.6	16.48	100	500	clear
3	1253	9.02	4055	6.87	0.28	43.5	8.47	16.45	100	500	clear
4	1258	9.06	4086	6.88	0.26	43.8	7.61	16.46	100	500	clear
5	1303	9.19	4151	6.91	0.25	43.9	5.21	16.48	100	500	clear
6	1308	9.33	4168	6.92	0.24	43.9	3.85	16.50	100	500	clear
7	1313	9.47	4211	6.94	0.23	43.6	3.10	16.48	100	500	clear
8	1318	9.40	4238	6.94	0.22	43.3	3.02	16.48	100	500	clear
9	1323	9.33	4241	6.95	0.22	43.1	2.83	16.45	100	500	clear
10											

Stabilized: (Yes) No

Total Volume Removed: *~~400~~ 4500 mL

Comments: *27Feb18 @ DN

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Field Datasheet

Groundwater Assessment

Company: OTP Coyote

Event: Feb 2018

Sample ID: Pond N3

Sampling Personal: Darren Kiesow

Weather Conditions: Temp: 32 °F Wind: E 13 Precip: (Sunny) / Partly Cloudy / Cloudy

Well Information

Well Locked?	(Yes)	No	
Well Labeled?	(Yes)	No	
Casing Straight?	(Yes)	No	
Grout Seal Intact?	(Yes)	No	Not Visible
Repairs Necessary:	—		

Casing Diameter:	2"	
Water Level Before Purge:	13.58	ft
Total Well Depth:	37.05	ft
Well Volume:	14.5	liters
Depth to Top of Pump:	30.80	ft
Water Level After Sample:	17.78	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder	Control Settings	
Sampling Method:	Bladder	Purge:	5 sec.
Dedicated Equip?:	Yes (No)	Recover:	55 sec.
Duplicate Sample?:	Yes (No)	PSI:	30
Duplicate Sample ID:	—		

Purge Date:	27 Feb 18	Time Purging Began:	1349 am/(pm)
Well Purged Dry?	Yes (No)	Time Purged Dry:	— am/pm
Sample Date:	27 Feb 18	Time of Sampling:	1454 am/(pm)

Bottle List: 1L Raw, 500mL Nitric

Field Measurements

Stabilization (3 consecutive) SEQ #	Time	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	Pumping Rate mL/min	mL Removed	Discription: Clarity, Color, Odor, Ect. clear, partly cloudy, cloudy
1	1354	10.79	5240	6.74	3.75	43.2	181	14.32	~~100~~	500	Partly Cloudy
2	1414 ~~1419~~ *	11.01	5272	6.71	0.68	30.5	1907	16.73	100	2000	Partly Cloudy
3	1429	10.93	5267	6.71	0.69	30.0	99.2	17.23	100	1500	PC
4	1434	10.91	5268	6.70	0.63	29.7	73.6	17.39	100	500	PC
5	1439	10.90	5272	6.70	0.58	29.4	70.1	17.46	100	500	PC
6	1444	10.92	5273	6.70	0.55	29.0	56.2	17.49	100	500	Clear
7	1449	10.91	5269	6.69	0.50	28.5	59.5	17.56	100	500	Clear
8	1454	10.96	5278	6.69	0.48	28.4	59.1	17.60	100	500	Clear
9											
10											

Stabilized: (Yes) No

Total Volume Removed: 6,500 mL

Comments: 27 Feb 18 @ pm

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Field Datasheet

Groundwater Assessment

Company: OTP Coyote
Event: Feb 2018
Sample ID: Pond 10
Sampling Personal: Darren Niswang

Weather Conditions: Temp: 14 °F Wind: Light Precip: **Sunny / ~~Partly Cloudy~~ / Cloudy**

Well Information

Well Locked?	Yes	(No)	
Well Labeled?	(Yes)	No	
Casing Straight?	(Yes)	No	
Grout Seal Intact?	Yes	No	~~Not Visible~~
Repairs Necessary:	—		

Casing Diameter:	2"	
Water Level Before Purge:	21.88	ft
Total Well Depth:	22.10	ft
Well Volume:	0.14	liters
Depth to Top of Pump:	—	ft
Water Level After Sample:	—	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	~~Bladder~~		
Sampling Method:	Bladder		
Dedicated Equip?:	Yes	No	
Duplicate Sample?:	~~Yes~~	No	
Duplicate Sample ID:			

Control Settings		
Purge:		sec.
Recover:		sec.
PSI:		

Purge Date:	—		Time Purging Began:	— am/pm
Well Purged Dry?	Yes	No	Time Purged Dry:	— am/pm
Sample Date:	27Feb18		Time of Sampling:	0928 (am)/pm

Bottle List: ~~1L Raw, 500mL Nitric~~

Field Measurements

Stabilization (3 consecutive)		Temp (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate	mL Removed	Discription: Clarity, Color, Odor, Ect.
SEQ #	Time		±5%	±0.1	±10%	±20 mV	±10%	0.25 ft	mL/min		clear, partly cloudy, cloudy
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Stabilized: Yes ~~No~~ Total Volume Removed: _____ mL

Comments: Insufficient volume to collect a sample.

MVTL

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Field Datasheet

Groundwater Assessment

Company: OTP Coyote

Event: Feb 2018

Sample ID: Road 12

Sampling Personal: Darren Wiesmaas

Weather Conditions: Temp: 32 °F Wind: 13 Precip: **Sunny / Partly Cloudy / Cloudy**

Well Information

Well Locked?	Yes	No	
Well Labeled?	Yes	No	
Casing Straight?	Yes	No	
Grout Seal Intact?	Yes	No	Not Visible
Repairs Necessary:			

Casing Diameter:	2"
Water Level Before Purge:	39.21 ft
Total Well Depth:	40.10 ft
Well Volume:	*~~0.54~~ 0.55 liters
Depth to Top of Pump:	ft
Water Level After Sample:	ft
Measurement Method:	Electric Water Level Indicator

Sampling Information

Purging Method:	Bladder		
Sampling Method:	Bladder		
Dedicated Equip?:	Yes	No	
Duplicate Sample?:	Yes	No	
Duplicate Sample ID:			

Control Settings	
Purge:	sec.
Recover:	sec.
PSI:	

Purge Date:		Time Purging Began:	am/pm
Well Purged Dry?	Yes No	Time Purged Dry:	am/pm
Sample Date:	27Feb18	Time of Sampling:	1532 am/pm

Bottle List:	1L Raw, 500mL Nitric

Field Measurements

Stabilization (3 consecutive)		Temp (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate	mL Removed	Discription: Clarity, Color, Odor, Ect.
SEQ #	Time		±5%	±0.1	±10%	±20 mV	±10%	0.25 ft	mL/min		clear, partly cloudy, cloudy
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Stabilized: Yes No

Total Volume Removed: _____ mL

Comments: There wasn't enough water in well to get a sample,
I did try to purge but didn't have enough to get a reading, ran out of water in well.
*27Feb18 Tried new tubing and different pump, it still didn't work to get enough water to sample.
28Feb18 water level was 39.24ft.

MVTL

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Field Datasheet

Groundwater Assessment

Company: OTP Coyote

Event: Feb 2018

Sample ID: Pond 165

Sampling Personal: Darren Nieswaag

Weather Conditions: Temp: 33 °F Wind: S10 Precip: ~~Sunny~~ / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	~~No~~	
Well Labeled?	~~Yes~~	No	
Casing Straight?	~~Yes~~	No	
Grout Seal Intact?	~~Yes~~	No	~~Not Visible~~
Repairs Necessary:			

Casing Diameter:	2"	
Water Level Before Purge:	41.22	ft
Total Well Depth:	48.55	ft
Well Volume:	4.7	liters
Depth to Top of Pump:	45.46	ft
Water Level After Sample:	42.80	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder		
Sampling Method:	Bladder		
Dedicated Equip?:	Yes	~~No~~	
Duplicate Sample?:	Yes	~~No~~	
Duplicate Sample ID:	—		

Control Settings		
Purge:	5	sec.
Recover:	55	sec.
PSI:		

Purge Date:	27 Feb 18	Time Purging Began:	1545 ~~am~~/pm
Well Purged Dry?	Yes ~~No~~	Time Purged Dry:	— am/pm
Sample Date:	27 Feb 18	Time of Sampling:	1700 ~~am~~/pm

Bottle List: 1L Raw, 500mL Nitric

Field Measurements

Stabilization (3 consecutive)		Temp (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate	mL Removed	Discription: Clarity, Color, Odor, Ect.
SEQ #	Time		±5%	±0.1	±10%	±20 mV	±10%	0.25 ft	mL/min		clear, partly cloudy, cloudy
1	1550	8.21	3204	6.74	1.78	10.9	135	41.83	100	500	Partly cloudy
2	1610	8.46	3237	6.76	0.86	5.3	108	42.14	100	2000	PC
3	1630	8.51	3219	6.82	0.93	1.5	41.6	42.51	100	2000	clear
4	1645	8.46	3210	6.85	0.85	3.6	18.9	42.67	100	1500	clear
5	1650	8.52	3200	6.87	0.83	3.1	11.8	42.71	100	500	clear
6	1655	8.50	3205	6.87	0.78	3.4	12.6	42.72	100	500	clear
7	1700	8.53	3190	6.88	0.76	4.8	11.2	42.72	100	500	clear
8											
9											
10											

Stabilized: Yes No

Total Volume Removed: 7500 mL

Comments:

MVTL

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Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: OTP Coyote

Event: Feb 2018

Sample ID: MW25

Sampling Personal: Darren Nieswand

Weather Conditions: Temp: 20 °F Wind: S S Precip: (Sunny) / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	~~No~~	
Well Labeled?	~~Yes~~	No	
Casing Straight?	~~Yes~~	No	
Grout Seal Intact?	Yes	No	~~Not Visible~~
Repairs Necessary:			

Casing Diameter:	2"	
Water Level Before Purge:	23.67	ft
Total Well Depth:	36.60	ft
Well Volume:	8.0	liters
Depth to Top of Pump:	34.00	ft
Water Level After Sample:	28.05	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder		
Sampling Method:	Bladder		
Dedicated Equip?:	Yes	~~No~~	
Duplicate Sample?:	Yes	~~No~~	
Duplicate Sample ID:			

Control Settings		
Purge:	5	sec.
Recover:	55	sec.
PSI:	35	

Purge Date:	28Feb18	Time Purging Began:	0927 ~~am~~/pm
Well Purged Dry?	Yes ~~No~~	Time Purged Dry:	~~am~~/pm
Sample Date:	28Feb18	Time of Sampling:	1017 ~~am~~/pm

Bottle List: 1L Raw, 500mL Nitric

Field Measurements

Stabilization (3 consecutive)		Temp (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate	mL Removed	Discription: Clarity, Color, Odor, Ect.
SEQ #	Time		±5%	±0.1	±10%	±20 mV	±10%	0.25 ft	mL/min		clear, partly cloudy, cloudy
1	0932	8.01	5465	6.89	1.94	55.8	4.16	24.58	100	500	clear
2	0952	6.51	5413	6.94	2.34	45.1	4.38	26.94	100	2000	clear
3	1002	7.05	5375	6.95	2.73	45.5	4.19	27.28	100	1000	clear
4	1007	7.16	5359	6.95	2.97	45.07	4.37	27.34	100	500	clear
5	1012	7.13	5350	6.96	3.19	45.9	4.63	27.47	100	500	clear
6	1017	7.00	5361	6.96	3.24	46.1	4.34	27.56	100	500	clear
7								~~28.05~~	On 28Feb18 @		
8											
9											
10											

Stabilized: (Yes) No

Total Volume Removed: 5000 mL

Comments:

MINNESOTA VALLEY TESTING LABORATORIES, INC.
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CASE NARRATIVE

MVTL Lab Reference No/SDG: 201882-0405
Client: Ottertail Power Company
Location: Coyote Station
Project Identification: CCR Slag Pond
Event & Year February 2018
MVTL Laboratory Identifications: 18-W306
Page 1 of 1

Sample Identification	MVTL Laboratory #
Pond12	18-W306

I. RECEIPT

- 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.

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.

All laboratory data has been approved by MVTL Laboratories.

SIGNED: Claudette Carroll **DATE:** 12 Mar 18

Claudette Carroll - MVTL Bismarck Laboratory Manager

MVTL

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Quality Control Report

Lab ID: 18-W306 **Project:** OTP Coyote-Slag Pond CCR **Work Order:** 201882-0405

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Boron - Total mg/l	0.40	110	80-120	0.400	18-W297	0.47	0.84	93	75-125	0.84	0.86	98	2.4	20	-	-	< 0.1
															-	-	< 0.1
Calcium - Total mg/l	20.0	110	80-120	500	18W297q	155	665	102	75-125	665	670	103	0.7	20	-	-	< 1
				100	18W301q	108	204	96	75-125	204	204	96	0.0	20	-	-	< 1
Chloride mg/l	30.0	98	80-120	30.0	18-W301	8.6	37.4	96	80-120	37.4	37.3	96	0.3	20	-	-	< 1
Fluoride mg/l	0.50	98	90-110	0.500	18-W294	0.23	0.74	102	80-120	0.74	0.73	100	1.4	20	-	-	< 0.1
				0.500	18-W301	0.24	0.76	104	80-120	0.76	0.77	106	1.3	20	-	-	< 0.1
pH units	-	-	-	-	-	-	-	-	-	7.2	7.2	-	0.0	20	-	-	-
	-	-	-	-	-	-	-	-	-	7.3	7.4	-	1.4	20	-	-	-
Sulfate mg/l	100	117	80-120	2000	18-W306	1870	3980	106	80-120	3980	3940	104	1.0	20	-	-	< 5
Total Dissolved Solids mg/l	-	-	-	-	-	-	-	-	-	1770	1800	-	1.7	20	-	-	< 10
	-	-	-	-	-	-	-	-	-	1790	1790	-	0.0	20	-	-	

Approved by: C Gault

12 Mar 18

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CERTIFICATE of ANALYSIS - CCR

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

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

Project Name: OTP Coyote-Slag Pond CCR

PO #: 48895

Sample Description: Pond12

Temp at Receipt: 0.3C

Event and Year: February 2018

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	1 Mar 18	SVS
Field pH	7.28	s.u.	0.1	SM 4500 H+ B	1 Mar 18 14:40	DJN
Lab, pH	* 7.6	s.u.	0.1	SM4500 H+ B	2 Mar 18 17:00	SVS
Field Temperature	8.42	Degrees C	0.1	SM 2550B	1 Mar 18 14:40	DJN
Field Conductivity	3307	umhos/cm	1	EPA 120.1	1 Mar 18 14:40	DJN
Fluoride	< 0.1	mg/l	0.10	SM4500-F-C	2 Mar 18 17:00	SVS
Sulfate	1870	mg/l	5.00	ASTM D516-07	6 Mar 18 11:56	RAG
Chloride	29.1	mg/l	1.0	SM4500-Cl-E	2 Mar 18 14:23	RAG
Total Dissolved Solids	2630	mg/l	10	I1750-85	2 Mar 18 10:29	SVS
Calcium - Total	220	mg/l	1.0	6010D	5 Mar 18 10:50	SZ
Boron - Total	1.56	mg/l	0.10	6010D	5 Mar 18 12:11	BT

* Holding time exceeded

Approved by: Claudette K. Carroll CC 12 Mar 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 sample quantity
= Due to concentration of other analytes
+ = Due to internal standard response

CERTIFICATION: ND # ND-00016

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: OTP Coyote

Event: Feb 2018

Sample ID: Pond 12

Sampling Personal: Darren Nicewarg

Weather Conditions: Temp: °F Wind: Precip: **Sunny / Partly Cloudy / Cloudy**

Well Information

Well Locked?	Yes	~~No~~	
Well Labeled?	~~Yes~~	No	
Casing Straight?	~~Yes~~	No	
Grout Seal Intact?	Yes	No	Not Visible
Repairs Necessary:			

Casing Diameter:	2"
Water Level Before Purge:	27Feb18 39.21 28Feb18 39.24 ft
Total Well Depth:	40.10 ft
Well Volume:	0.55 liters
Depth to Top of Pump:	ft
Water Level After Sample:	Dry ft
Measurement Method:	Electric Water Level Indicator

Sampling Information

Purging Method:	~~Bladder~~ Bailer		
Sampling Method:	~~Bladder~~ Bailer		
Dedicated Equip?:	Yes	No	
Duplicate Sample?:	Yes	No	
Duplicate Sample ID:			

Control Settings	
Purge:	sec.
Recover:	sec.
PSI:	

Purge Date:	27 Feb 18	Time Purging Began:	1532 am/~~pm~~
Well Purged Dry?	(Yes) No	Time Purged Dry:	1533 am/~~pm~~
Sample Date:	1 Mar 18	Time of Sampling:	1440 am/~~pm~~

Bottle List:	1L Raw, ~~500mL Nitric~~ 100mL Nitric

Field Measurements

Stabilization (3 consecutive) SEQ #	Time	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	Pumping Rate mL/min	mL Removed	Discription: Clarity, Color, Odor, Ect. clear, partly cloudy, cloudy
1	1440	8.42	3307	7.28	6.89	38.0	—	—	—	—	Pc Cloudy
2											
3											
4											
5											
6											
7											
8											
9											
10											

Stabilized: Yes (No) Total Volume Removed: _____ mL

Comments: Purged well 27Feb18, let it recharge until 1 Mar 18.
Only able to collect about 500mL and a 100mL bottle perserved with nitric after recharge
See field sheet from the 27 Feb 18. for purge notes and water level information.

Laboratories, Inc.
2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name:	Event:	Work Order Number:
OTP Coyote - Slag Pond CCR	Feb 2018	82-0405

Report To:	Otter Tail Power	**Carbon Copy:**	**Name of Sampler(s):**
Attn:	Josh Hollen	Attn:	Darren Niswaag
Address:	PO Box 496	Address:	
	Fergus Falls, MN 56538-0496		
phone:			
email:	jhollen@otpco.com		

Sample Information						Bottle Type							Field Parameters			Analysis
Lab Number	Sample ID	Date	Time	Sample Type	Appearance (Clear, Partly Cloudy, Cloudy)	1 liter	~~250mL Nitric~~ 100mL	500mL Nitric (filtered)	250mL Sulfuric	1 liter Nitric			Temp (°C)	Spec. Cond.	pH	Analysis Required
W306	Pond12	1March18	1440	W	cloudy	X	X						8.42	3307	7.28	OTP CCR Appendix 3

Comments: was only able to collect 500mL for 1L raw sample and 100mL for the 500mL nitric bottle.
#1March18 DN

Relinquished By:		Sample Condition:	
Name:	Date/Time	Location:	Temp (°C)
1 Dave Niswaag	1March18 1615	~~Log In~~ Walk In #2	0.3 TM562 / ~~TM588~~
2			

Received by:	
Name:	Date/Time
Emily Adam	1Mar18 1610

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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

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

Field Datasheet

Groundwater Assessment

Company: OTP Coyote
Event:
Sample ID: Pond 165
Sampling Personal: Darren Niemann

Weather Conditions: Temp: 70 °F Wind: S 8 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	~~No~~	
Well Labeled?	~~Yes~~	No	
Casing Straight?	~~Yes~~	No	
Grout Seal Intact?	Yes	No	~~Not Visible~~
Repairs Necessary:			

Casing Diameter:	2"	
Water Level Before Purge:	41.63	ft
Total Well Depth:	48.85	ft
Well Volume:	4.5	liters
Depth to Top of Pump:	45.43	ft
Water Level After Sample:		ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder		
Sampling Method:	Bladder		
Dedicated Equip?:	Yes	~~No~~	
Duplicate Sample?:	Yes	~~No~~	
Duplicate Sample ID:			

Control Settings		
Purge:	5	sec.
Recover:	55	sec.
PSI:	—	

Purge Date:	3 May 18	Time Purging Began:	1430 am/~~pm~~
Well Purged Dry?	Yes ~~No~~	Time Purged Dry:	am/pm
Sample Date:	3 May 18	Time of Sampling:	1555 am/~~pm~~

Bottle List:

Field Measurements

Stabilization (3 consecutive) SEQ #	Time	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	Pumping Rate mL/min	mL Removed	Discription: Clarity, Color, Odor, Ect. clear, partly cloudy, cloudy
1	1435	12.90	3312	6.72	1.81	72.9	55.0	42.05	100	500	Partly cloudy
2	1450	14.36	3310	6.73	1.56	67.8	51.2	42.22	100	1500	PC
3	1505	12.62	3305	6.74	1.86	66.9	32.6	42.39	100	1500	Clear
4	1520	13.09	3301	6.75	2.33	64.9	24.8	42.48	100	1500	Clear
5	1535	12.57	3281	6.76	2.34	64.7	19.7	42.56	100	1500	Clear
6	1540	12.68	3278	6.76	3.78	64.4	13.6	42.59	100	500	Clear
7	1545	12.94	3277	6.77	2.87	64.2	13.2	42.65	100	500	clear
8	1550	12.89	3280	6.78	2.93	64.2	12.4	42.68	100	500	clear
9	1555	12.65	3274	6.78	2.70	64.2	13.1	42.69	100	500	clear
10	1600										

Stabilized: ~~Yes~~ No Total Volume Removed: 8500 mL

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

Sample Identification	MVTL Laboratory #
Pond 16S	18-W871

I. RECEIPT

- 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.
  - 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.

SIGNED: Claudette Carroll DATE: 9 May 18

Claudette Carroll - MVTL Bismarck Laboratory Manager

MVTL

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Quality Control Report

Lab ID: 18-W871 **Project:** OTP Coyote-Slag Pond CCR **Work Order:** 201882-0914

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (≤)	Known Rec (%)	Known % Rec Limits	Method Blank
Boron - Total mg/l	0.40	108	80-120	2.00	18-W871	2.78	4.82	102	75-125	4.82	4.85	104	0.6	20	-	-	< 0.1
															-	-	< 0.1

Approved by: C. Carlo

9 May 18

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CERTIFICATE of ANALYSIS - CCR

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

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

Project Name: OTP Coyote-Slag Pond CCR

PO #: 48895

Sample Description: Pond 16S

Temp at Receipt: 4.3C ROI

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

cc

Approved by: Claudette K. Carroll 9 May 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 sample quantity
= Due to concentration of other analytes
+ = Due to internal standard response

CERTIFICATION: ND # ND-00016

MVTL **Laboratories, Inc.**
2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name:	Event:	Work Order Number:
OTP Coyote - Slag Pond CCR		82-0914
Report To: Otter Tail Power Attn: Josh Hollen Address: PO Box 496 Fergus Falls, MN 56538-0496 phone: email: jhollen@otpco.com	**Carbon Copy:** Attn: Address:	**Name of Sampler(s):** Darren Nieswaag

Sample Information						Bottle Type							Field Parameters			Analysis
Lab Number	Sample ID	Date	Time	Sample Type	Appearance (Clear, Partly Cloudy, Cloudy)	1 liter	500mL Nitric	500mL Nitric (filtered)	250mL Sulfuric	1 liter Nitric			Temp (°C)	Spec. Cond.	pH	Analysis Required
W871	Pond 16S	3/May/18	1555	GW	Clear		X						12.65	3274	6.78	Boron

Comments:

Relinquished By:		Sample Condition:	
Name:	Date/Time	Location:	Temp (°C)
1 Darren Nieswaag	3/May/18 1728	Log In ~~Walk In #2~~	RDI#3 (TM562) / TM588
2			

Received by:	
Name:	Date/Time
N Buchmann	4 May 18 0800

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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

I. 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.

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.
  - For some analytes, the reported results were elevated due to additional dilutions required to minimize the effects of sample matrix.

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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

- 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.

SIGNED: Claudette Carroll **DATE:** 28 Aug 18

Claudette Carroll - MVTL Bismarck Laboratory Manager

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Quality Control Report

Lab IDs: 18-W2520 to 18-W2524 **Project:** OTP Coyote - Slag Pond **Work Order:** 201882-2031

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (≤)	Known Rec (%)	Known % Rec Limits	Method Blank
Boron - Total mg/l	0.40	105	80-120	0.400	18-D2807	0.45	0.82	92	75-125	0.82	0.81	90	1.2	20	-	-	< 0.1
	0.40	108	80-120	0.400	18-M2004	0.82	1.25	108	75-125	1.25	1.27	112	1.6	20	-	-	< 0.1
				0.400	18-W2491	0.51	0.96	112	75-125	0.96	0.95	110	1.0	20	-	-	< 0.1
				2.00	18-W2524	< 0.5	2.45	122	75-125	2.45	2.41	120	1.6	20	-	-	
Calcium - Total mg/l	20.0	101	80-120	100	18D2882q	27.2	122	95	75-125	122	122	95	0.0	20	-	-	< 1
	20.0	102	80-120	100	18W2527q	170	262	92	75-125	262	258	88	1.5	20	-	-	< 1
															-	-	< 1
															-	-	< 1
Chloride mg/l	30.0	92	80-120	30.0	18-W2505	10.2	35.6	85	80-120	35.6	33.8	79	5.2	20	-	-	< 1
	30.0	91	80-120	30.0	18-W2527	7.7	35.0	91	80-120	35.0	34.3	89	2.0	20	-	-	< 1
	30.0	92	80-120	30.0	18-W2534	8.0	33.2	84	80-120	33.2	36.7	96	10.0	20	-	-	< 1
	30.0	90	80-120												-	-	< 1
Fluoride mg/l	0.50	102	90-110	0.500	18-W2527	0.20	0.71	102	80-120	0.71	0.70	100	1.4	20	-	-	< 0.1
				0.500	18-W2547	1.03	1.46	86	80-120	1.46	1.46	86	0.0	20	-	-	< 0.1
pH units	-	-	-	-	-	-	-	-	-	7.0	7.0	-	0.0	20	-	-	-
	-	-	-	-	-	-	-	-	-	7.1	7.2	-	1.4	20	-	-	-
Sulfate mg/l	100	101	80-120	100	18-W2520	< 5	110	110	80-120	110	106	106	3.7	20	-	-	< 5
	100	115	80-120	1000	18-W2527	1010	1900	89	80-120	1900	1890	88	0.5	20	-	-	< 5
Total Dissolved Solids mg/l	-	-	-	-	-	-	-	-	-	2030	2040	-	0.5	20	-	-	< 10
	-	-	-	-	-	-	-	-	-	2070	2060	-	0.5	20	-	-	< 10
	-	-	-	-	-	-	-	-	-	3090	3140	-	1.6	20	-	-	

Approved by: C. Carroll
28 Aug 18

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CERTIFICATE of ANALYSIS - CCR

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

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

Project Name: OTP Coyote - Slag Pond

PO #: 48895

Sample Description: FB Slag

Temp at Receipt: 1.5C

Event and Year: Aug 2018

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Aug 18	SVS
Lab, pH	* 5.9	s.u.	0.1	SM4500 H+ B	10 Aug 18 17:00	SVS
Fluoride	< 0.1	mg/l	0.10	SM4500-F-C	13 Aug 18 17:00	SVS
Sulfate	< 5	mg/l	5.00	ASTM D516-07	15 Aug 18 13:36	EV
Chloride	< 1	mg/l	1.0	SM4500-Cl-E	16 Aug 18 10:38	EV
Total Dissolved Solids	< 10	mg/l	10	I1750-85	13 Aug 18 12:07	SVS
Calcium - Total	< 1	mg/l	1.0	6010D	15 Aug 18 9:34	SZ
Boron - Total	< 0.1	mg/l	0.10	6010D	13 Aug 18 13:47	SZ

* Holding time exceeded

Approved by: Claudette K. Carroll CC 28 Aug 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 sample quantity
= Due to concentration of other analytes
+ = Due to internal standard response

CERTIFICATION: ND # ND-00016

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CERTIFICATE of ANALYSIS - CCR

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

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

Project Name: OTP Coyote - Slag Pond

PO #: 48895

Sample Description: Pond6

Temp at Receipt: 1.5C

Event and Year: Aug 2018

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Aug 18	SVS
Field pH	6.89	s.u.	0.1	SM 4500 H+ B	7 Aug 18 14:17	DJN
Lab, pH	* 7.3	s.u.	0.1	SM4500 H+ B	10 Aug 18 17:00	SVS
Field Temperature	15.4	Degrees C	0.1	SM 2550B	7 Aug 18 14:17	DJN
Field Conductivity	1764	umhos/cm	1	EPA 120.1	7 Aug 18 14:17	DJN
Fluoride	0.35	mg/l	0.10	SM4500-F-C	13 Aug 18 17:00	SVS
Sulfate	425	mg/l	5.00	ASTM D516-07	15 Aug 18 13:57	EV
Chloride	12.2	mg/l	1.0	SM4500-Cl-E	16 Aug 18 11:17	EV
Total Dissolved Solids	1170	mg/l	10	I1750-85	13 Aug 18 12:07	SVS
Calcium - Total	72.5	mg/l	1.0	6010D	15 Aug 18 9:34	SZ
Boron - Total	1.92	mg/l	0.10	6010D	13 Aug 18 13:47	SZ

* Holding time exceeded

Approved by: Claudette K. Carroll 28 Aug 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 sample quantity
= Due to concentration of other analytes
+ = Due to internal standard response

CERTIFICATION: ND # ND-00016

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CERTIFICATE of ANALYSIS - CCR

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

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

Project Name: OTP Coyote - Slag Pond

PO #: 48895

Sample Description: PondN3

Temp at Receipt: 1.5C

Event and Year: Aug 2018

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Aug 18	SVS
Field pH	6.59	s.u.	0.1	SM 4500 H+ B	7 Aug 18 15:35	DJN
Lab, pH	* 7.0	s.u.	0.1	SM4500 H+ B	10 Aug 18 17:00	SVS
Field Temperature	17.5	Degrees C	0.1	SM 2550B	7 Aug 18 15:35	DJN
Field Conductivity	5436	umhos/cm	1	EPA 120.1	7 Aug 18 15:35	DJN
Fluoride	0.28	mg/l	0.10	SM4500-F-C	13 Aug 18 17:00	SVS
Sulfate	3210	mg/l	5.00	ASTM D516-07	15 Aug 18 13:57	EV
Chloride	35.7	mg/l	1.0	SM4500-Cl-E	16 Aug 18 11:17	EV
Total Dissolved Solids	5320	mg/l	10	I1750-85	13 Aug 18 12:07	SVS
Calcium - Total	498	mg/l	1.0	6010D	15 Aug 18 9:34	SZ
Boron - Total	0.59	mg/l	0.10	6010D	13 Aug 18 13:47	SZ

* Holding time exceeded

Approved by: Claudette K. Carroll cc 28 Aug 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 sample quantity
= Due to concentration of other analytes
+ = Due to internal standard response

CERTIFICATION: ND # ND-00016

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MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

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

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

Project Name: OTP Coyote - Slag Pond

PO #: 48895

Sample Description: Pond16S

Temp at Receipt: 1.5C

Event and Year: Aug 2018

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Aug 18	SVS
Field pH	6.65	s.u.	0.1	SM 4500 H+ B	7 Aug 18 17:10	DJN
Lab, pH	* 7.1	s.u.	0.1	SM4500 H+ B	10 Aug 18 17:00	SVS
Field Temperature	15.3	Degrees C	0.1	SM 2550B	7 Aug 18 17:10	DJN
Field Conductivity	3360	umhos/cm	1	EPA 120.1	7 Aug 18 17:10	DJN
Fluoride	0.22	mg/l	0.10	SM4500-F-C	13 Aug 18 17:00	SVS
Sulfate	1490	mg/l	5.00	ASTM D516-07	15 Aug 18 13:57	EV
Chloride	23.7	mg/l	1.0	SM4500-Cl-E	16 Aug 18 11:17	EV
Total Dissolved Solids	2510	mg/l	10	I1750-85	13 Aug 18 12:07	SVS
Calcium - Total	189	mg/l	1.0	6010D	15 Aug 18 9:34	SZ
Boron - Total	2.67	mg/l	0.10	6010D	13 Aug 18 13:47	SZ

* Holding time exceeded

CC

Approved by: Claudette K. Carroll 28 Aug 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

CERTIFICATION: ND # ND-00016

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CERTIFICATE of ANALYSIS - CCR

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

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

Project Name: OTP Coyote - Slag Pond

PO #: 48895

Sample Description: MW2S

Temp at Receipt: 1.5C

Event and Year: Aug 2018

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Aug 18	SVS
Field pH	6.91	s.u.	0.1	SM 4500 H+ B	8 Aug 18 12:50	DJN
Lab, pH	* 7.4	s.u.	0.1	SM4500 H+ B	10 Aug 18 17:00	SVS
Field Temperature	15.4	Degrees C	0.1	SM 2550B	8 Aug 18 12:50	DJN
Field Conductivity	5185	umhos/cm	1	EPA 120.1	8 Aug 18 12:50	DJN
Fluoride	0.29	mg/l	0.10	SM4500-F-C	13 Aug 18 17:00	SVS
Sulfate	3190	mg/l	5.00	ASTM D516-07	15 Aug 18 13:57	EV
Chloride	23.8	mg/l	1.0	SM4500-Cl-E	16 Aug 18 11:17	EV
Total Dissolved Solids	5110	mg/l	10	I1750-85	13 Aug 18 12:07	SVS
Calcium - Total	560	mg/l	1.0	6010D	15 Aug 18 9:34	SZ
Boron - Total	< 0.5 @	mg/l	0.10	6010D	13 Aug 18 13:47	SZ

* Holding time exceeded

CC

Approved by: Claudette K. Carroll 28 Aug 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 sample quantity
= Due to concentration of other analytes
+ = Due to internal standard response

CERTIFICATION: ND # ND-00016

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: OTP Coyote

Event: Aug 2018

Sample ID: MW 6

Sampling Personal: Darren Nieswaag

Weather Conditions: Temp: 90 °F Wind: NW 5 Precip: (Sunny) / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	(No)	
Well Labeled?	(Yes)	No	
Casing Straight?	(Yes)	No	
Grout Seal Intact?	(Yes)	No	Not Visible
Repairs Necessary:	—		

Casing Diameter:	2"	
Water Level Before Purge:	13.61	ft
Total Well Depth:	18.83	ft
Well Volume:	3.3	liters
Depth to Top of Pump:	17.30	ft
Water Level After Sample:	13.71	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder		
Sampling Method:	Bladder		
Dedicated Equip?:	Yes	(No)	
Duplicate Sample?:	Yes	(No)	
Duplicate Sample ID:	—		

Control Settings		
Purge:	5	sec.
Recover:	55	sec.
PSI:		

Purge Date:	7 Aug 18	Time Purging Began:	1332 am/(pm)
Well Purged Dry?	Yes (No)	Time Purged Dry:	— ~~am/pm~~
Sample Date:	7 Aug 18	Time of Sampling:	1417 am/(pm)

Bottle List: 1L Raw, 500mL Nitric

Field Measurements

Stabilization (3 consecutive) SEQ #	Time	Temp (°C) ±5%	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	Pumping Rate mL/min	mL Removed	Discription: Clarity, Color, Odor, Ect. clear, partly cloudy, cloudy
1	1327	15.55	1729	6.81	0.21	14.1	89.3	~~84~~ 13.66	100	500	Partly cloudy
2	1352	15.18	1640	6.87	0.10	-9.1	6.42	13.73	100	1500	clear
3	1357	14.97	1661	6.87	0.08	-14.2	5.35	13.76	100	500	clear
4	1402	15.62	1679	6.88	0.08	-16.7	4.32	13.75	100	500	clear
5	1407	15.85	1699	6.88	0.08	-19.8	3.39	13.73	100	500	clear
6	1412	15.58	1736	6.89	0.08	-23.3	3.40	13.71	100	500	clear
7	1417	15.39	1764	6.89	0.07	-24.5	3.30	13.71	100	500	clear
8											
9											
10											

Stabilized: (Yes) No

Total Volume Removed: 4500 mL

Comments:

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: OTP Coyote

Event: Aug 2018

Sample ID: N3

Sampling Personal: Darren Nieuwsma

Weather Conditions: Temp: 91 °F Wind: W5 Precip: **Sunny / Partly Cloudy / Cloudy**

Well Information

Well Locked?	Yes	(No)	
Well Labeled?	(Yes)	No	
Casing Straight?	(Yes)	No	
Grout Seal Intact?	(Yes)	No	Not Visible
Repairs Necessary:	—		

Casing Diameter:	2"	
Water Level Before Purge:	13.22	ft
Total Well Depth:	37.04	ft
Well Volume:	14.7	liters
Depth to Top of Pump:	27.68	ft
Water Level After Sample:	15.77	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder		
Sampling Method:	Bladder		
Dedicated Equip?:	Yes	(No)	
Duplicate Sample?:	Yes	(No)	
Duplicate Sample ID:	—		

Control Settings		
Purge:	5	sec.
Recover:	55	sec.
PSI:		

Purge Date:	7Aug18	Time Purging Began:	1440 am/(pm)
Well Purged Dry?	Yes (No)	Time Purged Dry:	am/pm
Sample Date:	7Aug18	Time of Sampling:	1535 am/(pm)

Bottle List:	1L Raw, 500mL Nitric

Field Measurements

Stabilization (3 consecutive) SEQ #	Time	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	Pumping Rate mL/min	mL Removed	Discription: Clarity, Color, Odor, Ect. clear, partly cloudy, cloudy
1	1445	17.21	5457	6.65	6.03	24.5	22.1	13.84	100	500	clear
2	1500	17.66	5444	6.64	5.58	7.9	19.0	14.83	100	1000	Clear
3	1515	17.95	5454	6.63	4.85	5.7	48.3	15.42	100	1500	clr
4	1520	17.89	5445	6.61	4.64	4.8	87.6	15.46	100	500	~~clr~~ Partly cloudy
5	1525	17.75	5447	6.61	4.46	1.9	87.9	15.49	100	500	~~clr~~ PC
6	1530	17.65	5469	6.60	4.20	-1.0	91.1	15.56	100	500	PC
7	1535	17.47	5436	6.59	4.18	-0.3	89.2	15.60	100	500	PC
8								~~15.77~~ *			
9											
10											

Stabilized: (Yes) No

Total Volume Removed: 5500 mL

Comments:

* 7Aug18 BMA

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Field Datasheet

Groundwater Assessment

Company: OTP Coyote
Event: Aug 2018
Sample ID: Pond 12
Sampling Personal: Darren Niesvag

Weather Conditions: Temp: 90 °F Wind: WS Precip: **Sunny / Partly Cloudy / Cloudy**

Well Information

Well Locked?	Yes	No	
Well Labeled?	Yes	No	
Casing Straight?	Yes	No	
Grout Seal Intact?	Yes	No	Not Visible
Repairs Necessary:			

Casing Diameter:	2"	
Water Level Before Purge:	39.29	ft
Total Well Depth:	40.09	ft
Well Volume:	0.5	liters
Depth to Top of Pump:		ft
Water Level After Sample:		ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder	
Sampling Method:	Bladder	
Dedicated Equip?:	Yes	No
Duplicate Sample?:	Yes	No
Duplicate Sample ID:		

Control Settings		
Purge:		sec.
Recover:		sec.
PSI:		

Purge Date:	7Aug18	Time Purging Began:	1557 am/pm
Well Purged Dry?	Yes No	Time Purged Dry:	am/pm
Sample Date:		Time of Sampling:	am/pm

Bottle List: 1L Raw, 500mL Nitric

Field Measurements

Stabilization (3 consecutive)		Temp (°C)	Spec. Cond.	pH	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (ft)	Pumping Rate	mL Removed	Discription: Clarity, Color, Odor, Ect.
SEQ #	Time		±5%	±0.1	±10%	±20 mV	±10%	0.25 ft	mL/min		clear, partly cloudy, cloudy
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Stabilized: Yes No

Total Volume Removed: _____ mL

Comments:

Insufficient volume no Sample.

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Field Datasheet

Groundwater Assessment

Company: OTP Coyote
Event: Aug 2018
Sample ID: Pond 168
Sampling Personal: Darren Niemaas

Weather Conditions: Temp: 90 °F Wind: Light Precip: **Sunny / Partly Cloudy / Cloudy**

Well Information

Well Locked?	Yes	No	
Well Labeled?	Yes	No	
Casing Straight?	Yes	No	
Grout Seal Intact?	Yes	No	Not Visible
Repairs Necessary:	—		

Casing Diameter:	2"	
Water Level Before Purge:	40.94	ft
Total Well Depth:	48.83	ft
Well Volume:	4.9	liters
Depth to Top of Pump:	45.74	ft
Water Level After Sample:	42.11	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder
Sampling Method:	Bladder
Dedicated Equip?:	Yes (No)
Duplicate Sample?:	Yes No
Duplicate Sample ID:	—

Control Settings		
Purge:	5	sec.
Recover:	55	sec.
PSI:	—	

Purge Date:	7 Aug 18	Time Purging Began:	1605 am/pm
Well Purged Dry?	Yes (No)	Time Purged Dry:	am/pm
Sample Date:	7 Aug 18	Time of Sampling:	1710 am/pm

Bottle List:	1L Raw, 500mL Nitric

Field Measurements

Stabilization (3 consecutive) SEQ #	Time	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	Pumping Rate mL/min	mL Removed	Discription: Clarity, Color, Odor, Ect. clear, partly cloudy, cloudy
1	1610	18.77	3371	6.74	3.26	37.5	112	41.34	100	500	Partly cloudy
2	1625	15.52	3377	6.62	0.83	3.8	66.7	41.77	100	1500	PC
3	1640	16.45	3374	6.63	1.31	0.6	46.2	41.83	100	1500	clear
4	1655	15.10	3361	6.64	2.61	-6.4	34.9	41.86	100	1500	clear
5	1700	15.00	3358	6.64	2.58	-8.5	20.1	41.90	100	500	clear
6	1705	15.15	3360	6.64	2.54	-9.9	21.0	41.98	100	500	clear
7	1710	15.26	3360	6.65	2.57	-10.1	20.2	42.01	100	500	clear
8											
9											
10											

Stabilized: (Yes) No

Total Volume Removed: 6500 mL

Comments:

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

Field Datasheet

Groundwater Assessment

Company: OTP Coyote
Event: Aug 2018
Sample ID: MW 28
Sampling Personal: Darren Nitschke

Weather Conditions: Temp: 88 °F Wind: N 10 Precip: (Sunny) / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	(No)	
Well Labeled?	(Yes)	No	
Casing Straight?	(Yes)	No	
Grout Seal Intact?	Yes	No	(Not Visible)
Repairs Necessary:			

Casing Diameter:	2"	
Water Level Before Purge:	24.53	ft
Total Well Depth:	36.60	ft
Well Volume:	7.5	liters
Depth to Top of Pump:	34.25	ft
Water Level After Sample:	28.38	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	Bladder		
Sampling Method:	Bladder		
Dedicated Equip?:	Yes	(No)	
Duplicate Sample?:	Yes	(No)	
Duplicate Sample ID:	—		

Control Settings		
Purge:	5	sec.
Recover:	55	sec.
PSI:		

Purge Date:	8 Aug 18	Time Purging Began:	1150 (am)/pm
Well Purged Dry?	Yes (No)	Time Purged Dry:	—— am/pm
Sample Date:	9 Aug 18	Time of Sampling:	1250 am/(pm)

Bottle List: 1L Raw, 500mL Nitric

Field Measurements

Stabilization (3 consecutive) SEQ #	Time	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	Pumping Rate mL/min	mL Removed	Discription: Clarity, Color, Odor, Ect. clear, partly cloudy, cloudy
1	1155	15.76	5283	6.82	7.77	40.1	3.07	25.42	100	500	clear
2	1225	15.14	5264	6.87	4.24	63.8	2.81	27.07	100	3000	clear
3	1230	15.64	5233	6.89	7.84	66.8	4.98	27.38	100	500	clear
4	1235	15.50	5187	6.89	4.39	67.7	5.05	27.49	100	500	clear
5	1240	15.70	5176	6.89	4.27	69.4	3.52	27.52	100	500	clear
6	1245	15.45	5174	6.91	4.32	71.3	3.43	27.61	100	500	clear
7	1250	15.42	5185	6.91	4.47	72.7	3.55	27.73	100	500	clear
8											
9											
10											

Stabilized: (Yes) No

Total Volume Removed: 6000 mL

Comments:

Laboratories, Inc.
2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name:	Event:	Work Order Number:
OTP Coyote - Slag Pond CCR	Aug 2018 ~~May 2018~~ 9Aug18 ④	82-2031

Report To:	Otter Tail Power	**Carbon Copy:**	**Name of Sampler(s):**
Attn:	Josh Hollen	Attn:	Darren Nieswaag
Address:	PO Box 496 Fergus Falls, MN 56538-0496	Address:	
phone:			
email:	jhollen@otpco.com		

Sample Information						Bottle Type							Field Parameters			Analysis
Lab Number	Sample ID	Date	Time	Sample Type	Appearance (Clear, Partly Cloudy, Cloudy)	1 liter	500mL Nitric	500mL Nitric (filtered)	250mL Sulfuric	1 liter Nitric			Temp (°C)	Spec. Cond.	pH	Analysis Required
W2520	FB Slag	8Aug18	NA	W	clear	X	X						NA	NA	NA	
W2521	Pond6	7Aug18	1417	GW	clear	X	X						15.39	1764	6.89	
W2522	PondN3	7Aug18	1535	GW	Partly cloudy	X	X						17.47	5436	6.59	
~~W~~ 9Aug18 ④	~~Pond10~~	~~7Aug18~~	~~1730~~	GW	~~cloudy~~	~~X~~	~~X~~			~~4~~			~~14.71~~	~~4000~~	~~7.00~~	9Aug2018
* —	Pond12	7Aug18	1557	GW	—	~~X~~	~~X~~	Insufficient Volume								OTP CCR Appendix 3
W2523	Pond16S	7Aug18	1710	GW	clear	X	X						15.26	3360	6.65	
W2524	MW2S	8Aug18	1250	GW	clear	X	X						15.42	5185	6.91	

Comments: * 7Aug18 DN ④

Relinquished By:		Sample Condition:	
Name:	Date/Time	Location:	Temp (°C)
1 Darren	9Aug18 1520	~~Log In~~ Walk In #2	1.5 TM562 ~~TM588~~ TM805 9Aug18
2			

Received by:	
Name:	Date/Time
Tim	9 Aug 2018 1520

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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

Sample Identification	MVTL Laboratory #
Pond10	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.

All laboratory data has been approved by MVTL Laboratories.

SIGNED: Claudette Carroll **DATE:** 28 Aug 18

Claudette Carroll - MVTL Bismarck Laboratory Manager

MVTL

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Quality Control Report

Lab ID: 18-W2539 **Project:** OTP Coyote - Slag Pond **Work Order:** 201882-2035

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Antimony - Total mg/l	0.1000	96	80-120	0.400	18W2424q	< 0.001	0.3974	99	75-125	0.3974	0.3970	99	0.1	20	-	-	< 0.001
				0.400	18W2539q	< 0.001	0.3818	95	75-125	0.3818	0.4074	95	6.5	20	-	-	
				0.400	18-M2004	< 0.004	0.3806	95	75-125	0.4008	0.3916	102	2.3	20	-	-	
Arsenic - Total mg/l	0.1000	90	80-120	0.400	18W2424q	< 0.002	0.3860	96	75-125	0.3860	0.4008	100	3.8	20	-	-	< 0.002
				0.400	18W2539q	0.0062	0.3772	93	75-125	0.3772	0.4078	100	7.8	20	-	-	
Barium - Total mg/l	0.1000	103	80-120	0.400	18W2424q	0.0079	0.4226	104	75-125	0.4226	0.4208	103	0.4	20	-	-	< 0.002
				0.400	18W2539q	0.1780	0.6036	106	75-125	0.6036	0.6390	115	5.7	20	-	-	
				0.400	18M2004q	0.2630	0.6872	106	75-125						-	-	
				0.400	18M2044q	0.1433	0.5712	107	75-125	0.5712	0.5666	106	0.8	20	-	-	
				0.400	18M2046q	0.2538	0.6730	105	75-125						-	-	
				0.400	18M2048q	0.0600	0.4668	102	75-125						-	-	
				0.400	18M2050q	0.2854	0.7438	115	75-125						-	-	
				0.400	18M2052q	0.0639	0.4918	107	75-125						-	-	
				0.400	18M2054q	0.0729	0.4752	101	75-125						-	-	
Beryllium - Total mg/l	0.1000	102	80-120	0.400	18W2424q	< 0.0005	0.3992	100	75-125	0.3992	0.4114	103	3.0	20	-	-	< 0.0005
				0.400	18W2539q	< 0.0005	0.4048	101	75-125	0.4048	0.4454	100	9.6	20	-	-	
				0.400	18-M2004	< 0.002	0.4102	103	75-125	0.4266	0.4238	111	0.7	20	-	-	
Boron - Total mg/l	0.40	110	80-120	0.400	18-W2527	0.40	0.85	112	75-125	0.85	0.83	108	2.4	20	-	-	< 0.1
				0.400	18-W2539	2.33	2.68	88	75-125	2.68	2.73	100	1.8	20	-	-	< 0.1
Cadmium - Total mg/l	0.1000	94	80-120	0.400	18W2424q	< 0.0005	0.3800	95	75-125	0.3800	0.3830	96	0.8	20	-	-	< 0.0005
				0.400	18W2539q	< 0.0005	0.3698	92	75-125	0.3698	0.3906	98	5.5	20	-	-	
				0.400	18-M2004	< 0.002	0.3764	94	75-125	0.3764	0.3762	90	0.1	20	-	-	
				0.400	18-M2044	< 0.002	0.3620	90	75-125	0.3620	0.3616	94	0.1	20	-	-	
				0.400	18-M2046	< 0.002	0.3576	89	75-125						-	-	
				0.400	18-M2048	< 0.002	0.3694	92	75-125						-	-	
				0.400	18-M2050	< 0.002	0.3614	90	75-125						-	-	
				0.400	18-M2052	< 0.002	0.3506	88	75-125						-	-	
				0.400	18-M2054	< 0.002	0.3526	88	75-125						-	-	

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

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ACIL

Quality Control Report

Lab ID: 18-W2539 **Project:** OTP Coyote - Slag Pond **Work Order:** 201882-2035

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Calcium - Total mg/l	20.0	101	80-120	100	18W2583q	89.2	179	90	75-125	179	176	87	1.7	20	-	-	< 1
															-	-	< 1
Chloride mg/l	30.0	92	80-120	30.0	18-W2527	7.7	35.0	91	80-120	35.0	34.3	89	2.0	20	-	-	< 1
	30.0	90	80-120	30.0	18-W2534	8.0	33.2	84	80-120	33.2	36.7	96	10.0	20	-	-	< 1
Chromium - Total mg/l	0.1000	93	80-120	0.400	18W2424q	< 0.002	0.3578	89	75-125	0.3578	0.3730	93	4.2	20	-	-	< 0.002
				0.400	18W2539q	0.0056	0.3606	89	75-125	0.3606	0.3908	96	8.0	20	-	-	
				0.400	18-M2004	0.0180	0.3788	90	75-125	0.3788	0.3734	98	1.4	20	-	-	
				0.400	18-M2044	< 0.008	0.3952	99	75-125	0.3952	0.3920	89	0.8	20	-	-	
				0.400	18-M2046	0.0370	0.4206	96	75-125						-	-	
				0.400	18-M2048	0.0089	0.3548	86	75-125						-	-	
				0.400	18-M2050	< 0.008	0.3498	87	75-125						-	-	
				0.400	18-M2052	< 0.008	0.3784	95	75-125						-	-	
				0.400	18-M2054	0.0127	0.3762	91	75-125						-	-	
Cobalt - Total mg/l	0.1000	94	80-120	0.400	18W2424q	< 0.002	0.3640	91	75-125	0.3640	0.3818	95	4.8	20	-	-	< 0.002
				0.400	18W2539q	0.0056	0.3624	89	75-125	0.3624	0.3946	97	8.5	20	-	-	
				0.400	18-M2004	< 0.008	0.3622	91	75-125						-	-	
Fluoride mg/l	0.50	102	90-110	0.500	18-W2527	0.20	0.71	102	80-120	0.71	0.70	100	1.4	20	-	-	< 0.1
				0.500	18-W2547	1.03	1.46	86	80-120	1.46	1.46	86	0.0	20	-	-	< 0.1
Lead - Total mg/l	0.1000	100	80-120	0.400	18W2424q	< 0.0005	0.3828	96	75-125	0.3828	0.3836	96	0.2	20	-	-	< 0.0005
				0.400	18W2539q	0.0025	0.3816	95	75-125	0.3816	0.4056	101	6.1	20	-	-	
				0.400	18M2004q	< 0.002	0.3918	98	75-125						-	-	
				0.400	18M2044q	< 0.002	0.3836	96	75-125	0.3836	0.3844	96	0.2	20	-	-	
				0.400	18M2046q	< 0.002	0.3912	98	75-125						-	-	
				0.400	18M2048q	< 0.002	0.3980	100	75-125						-	-	
				0.400	18M2050q	< 0.002	0.3884	97	75-125						-	-	
				0.400	18M2052q	< 0.002	0.3792	95	75-125						-	-	
				0.400	18M2054q	< 0.002	0.3738	93	75-125						-	-	

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MEMBER
ACIL

Quality Control Report

Lab ID: 18-W2539 **Project:** OTP Coyote - Slag Pond **Work Order:** 201882-2035

Analyte	LCS Spike Amt	LCS Rec %	LCS % Rec Limits	Matrix Spike Amt	Matrix Spike ID	Matrix Spike Orig Result	Matrix Spike Result	Matrix Spike Rec %	Matrix Spike % Rec Limits	MSD/ Dup Orig Result	MSD/ Dup Result	MSD Rec %	MSD/ Dup RPD	MSD/ Dup RPD Limit (<)	Known Rec (%)	Known % Rec Limits	Method Blank
Lithium - Total mg/l	0.40	108	80-120	0.400	18-W2539	0.16	0.59	108	75-125	0.59	0.61	112	3.3	20	-	-	< 0.04
															-	-	< 0.04
Mercury - Total mg/l	0.0020	100	85-115	0.002	18-W2434	< 0.0002	0.0020	100	70-130	0.0020	0.0019	95	5.1	20	-	-	< 0.0002
				0.002	18-W2608	< 0.0002	0.0019	95	70-130	0.0019	0.0019	95	0.0	20	-	-	
				0.002	A41975	< 0.0002	0.0019	95	70-130	0.0019	0.0019	95	0.0	20	-	-	
Molybdenum - Total mg/l	0.1000	95	80-120	0.400	18W2424q	< 0.002	0.4048	101	75-125	0.4048	0.4050	101	0.0	20	-	-	< 0.002
				0.400	18W2539q	< 0.002	0.3906	98	75-125	0.3906	0.4156	104	6.2	20	-	-	
				0.400	18-M2004	0.2028	0.5844	95	75-125						-	-	
pH units	-	-	-	-	-	-	-	-	-	7.0	7.0	-	0.0	20	-	-	-
	-	-	-	-	-	-	-	-	-	7.1	7.2	-	1.4	20	-	-	-
Selenium - Total mg/l	0.1000	98	80-120	0.400	18W2424q	< 0.005	0.4076	102	75-125	0.4076	0.4144	102	1.7	20	-	-	< 0.005
				0.400	18W2539q	0.0051	0.4220	104	75-125	0.4220	0.4584	113	8.3	20	-	-	
				0.400	18M2004q	< 0.02	0.4232	106	75-125						-	-	
				0.400	18M2044q	< 0.02	0.4152	104	75-125	0.4152	0.4222	107	1.7	20	-	-	
				0.400	18M2046q	< 0.02	0.4256	106	75-125	0.4256	0.4184	106	1.7	20	-	-	
				0.400	18M2048q	< 0.02	0.4184	105	75-125						-	-	
				0.400	18M2050q	< 0.02	0.4128	103	75-125						-	-	
				0.400	18M2052q	< 0.02	0.4326	108	75-125						-	-	
				0.400	18M2054q	< 0.02	0.4420	110	75-125						-	-	
Sulfate mg/l	100	108	80-120	500	18-W2534	926	1390	93	80-120	1390	1400	95	0.7	20	-	-	< 5
Thallium - Total mg/l	0.1000	103	80-120	0.400	18-W2539	< 0.0005	0.4090	102	75-125	0.4090	0.4264	107	4.2	20	-	-	< 0.0005
Total Dissolved Solids mg/l	-	-	-	-	-	-	-	-	-	2030	2040	-	0.5	20	-	-	< 10
	-	-	-	-	-	-	-	-	-	2070	2060	-	0.5	20	-	-	< 10
	-	-	-	-	-	-	-	-	-	3090	3140	-	1.6	20	-	-	

Approved by: C. Carroll

28 Aug 18

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CERTIFICATE of ANALYSIS - CCR

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

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

Project Name: OTP Coyote - Slag Pond

PO #: 48895

Sample Description: Pond10

Temp at Receipt: 1.5C

Event and Year: Aug 2018

	As Received Result		Method RL	Method Reference	Date Analyzed	Analyst
Metal Digestion				EPA 200.2	9 Aug 18	SVS
Field pH	7.00	s.u.	0.1	SM 4500 H+ B	7 Aug 18 17:30	DJN
Lab, pH	* 7.4	s.u.	0.1	SM4500 H+ B	10 Aug 18 17:00	SVS
Field Appearance	Cloudy		NA	SM 2110	7 Aug 18 17:30	DJN
Field Temperature	14.7	Degrees C	0.1	SM 2550B	7 Aug 18 17:30	DJN
Field Conductivity	4000	umhos/cm	1	EPA 120.1	7 Aug 18 17:30	DJN
Fluoride	0.50	mg/l	0.10	SM4500-F-C	13 Aug 18 17:00	SVS
Sulfate	1950	mg/l	5.00	ASTM D516-07	15 Aug 18 14:18	EV
Chloride	38.9	mg/l	1.0	SM4500-Cl-E	16 Aug 18 11:17	EV
Mercury - Total	< 0.0002	mg/l	0.0002	EPA 245.1	16 Aug 18 11:59	EMS
Total Dissolved Solids	3090	mg/l	10	I1750-85	13 Aug 18 12:07	SVS
Calcium - Total	359	mg/l	1.0	6010D	15 Aug 18 13:34	SZ
Lithium - Total	0.16	mg/l	0.04	6010D	20 Aug 18 13:22	SZ
Boron - Total	2.33	mg/l	0.10	6010D	13 Aug 18 14:47	SZ
Antimony - Total	< 0.001	mg/l	0.0010	6020B	16 Aug 18 17:28	BB
Arsenic - Total	0.0062	mg/l	0.0020	6020B	16 Aug 18 17:28	BB
Barium - Total	0.1780	mg/l	0.0020	6020B	18 Aug 18 15:15	BB
Beryllium - Total	< 0.0005	mg/l	0.0005	6020B	16 Aug 18 17:28	BB
Cadmium - Total	< 0.0005	mg/l	0.0005	6020B	16 Aug 18 17:28	BB
Chromium - Total	0.0056	mg/l	0.0020	6020B	16 Aug 18 17:28	BB
Cobalt - Total	0.0056	mg/l	0.0020	6020B	16 Aug 18 17:28	BB
Lead - Total	0.0025	mg/l	0.0005	6020B	18 Aug 18 15:15	BB
Molybdenum - Total	< 0.002	mg/l	0.0020	6020B	16 Aug 18 17:28	BB
Selenium - Total	0.0051	mg/l	0.0050	6020B	18 Aug 18 15:15	BB
Thallium - Total	< 0.0005	mg/l	0.0005	6020B	21 Aug 18 17:09	CC

* Holding time exceeded

Approved by: Claudette K. Carroll 28 Aug 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 sample quantity
= Due to concentration of other analytes
+ = Due to internal standard response

CERTIFICATION: ND # ND-00016

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: OTP Coyote

Event: Aug 2018

Sample ID: Pond10

Sampling Personal: Darren Nicholas

Weather Conditions: Temp: 90 °F Wind: W 5 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	~~No~~	
Well Labeled?	~~Yes~~	No	
Casing Straight?	~~Yes~~	No	
Grout Seal Intact?	~~Yes~~	No	Not Visible
Repairs Necessary:	—		

Casing Diameter:	2"	
Water Level Before Purge:	18.81	ft
Total Well Depth:	22.16	ft
Well Volume:	2.1	liters
Depth to Top of Pump:	—	ft
Water Level After Sample:	—	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	~~Bladder~~	Bailer	
Sampling Method:	~~Bladder~~	Bailer	
Dedicated Equip?:	Yes	~~No~~	
Duplicate Sample?:	Yes	~~No~~	
Duplicate Sample ID:	—		

Control Settings		
Purge:		sec.
Recover:		sec.
PSI:		
Pumping Rate:		mL/min

Purge Date:	7Aug18	Time Purging Began:	1320 am/~~pm~~
Well Purged Dry?	Yes No	Time Purged Dry:	am/pm
Sample Date:	7Aug18	Time of Sampling:	1730 am/~~pm~~

Bottle List: (1L Raw) (500mL Nitric) (~~4~~-1L Nitric)

Field Measurements

Stabilization (3 consecutive) SEQ #	Time	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect. clear, partly cloudy, cloudy
1	1323	12.77	3922	6.93	6.07	38.6	252	—	2.1	Cloudy
2										
3										
4										
5										
6										
7										
8										
9										
10	1730	14.71	4000	7.00	7.05	61.2	652	~	recharge	cloudy

Stabilized: Yes ~~No~~ Total Volume Removed: 2.1 mL

Comments: 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.

~~Collected 1L Raw at:~~ Date/Time ~~8Aug18~~ 7Aug18 ON (A) 7Aug18 1730

Collected 500mL Nitric at: Date/Time 8Aug18 0845

Collected 1L Nitrics at: 0845 Date/Time 2 8Aug18

Collected 1L Nitrics 8Aug18 ON (A) at: ~~0940~~ 0610 Date/Time 2 8Aug18

Had to bail the well to get enough water to fill the samples.

Laboratories, Inc.
2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name:	Event:	Work Order Number:
OTP Coyote - Slag Pond CCR	Aug 2018	82.2035

Report To:	Otter Tail Power	**Carbon Copy:**	**Name of Sampler(s):**
Attn:	Josh Hollen	Attn:	Darren Nieswaag
Address:	PO Box 496 Fergus Falls, MN 56538-0496	Address:	
phone:			
email:	jhollen@otpco.com		

Sample Information						Bottle Type							Field Parameters			Analysis
Lab Number	Sample ID	Date	Time	Sample Type	Appearance (Clear, Partly Cloudy, Cloudy)	1 liter	500mL Nitric	500mL Nitric (filtered)	250mL Sulfuric	1 liter Nitric			Temp (°C)	Spec. Cond.	pH	Analysis Required
W2539	Pond10	7Aug18	1730	GW	cloudy	X	X						14.71	4000	7.00	OTP List 1

Comments:

Relinquished By:		Sample Condition:	
Name:	Date/Time	Location:	Temp (°C)
1 Darren Nieswaag	9Aug18 1601	~~Log In~~ Walk In #2	1.5 TM562 / ~~TM588~~ TM805 9Aug18 (Mg)
2			

Received by:	
Name:	Date/Time
	9 Aug 2018 1601

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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

Sample Identification	MVTL Laboratory #	IML Laboratory #
Pond10	18-W2540	S1808230-001

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 laboratory data has been approved by MVTL Laboratories.

SIGNED: Claudette Carroll **DATE:** 14 Sep 18

Claudette Carroll - MVTL Bismarck Laboratory Manager

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MEMBER ACIL

CERTIFICATE of ANALYSIS - CCR

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

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

Project Name: OTP Coyote - Slag Pond

PO #: 48895

Sample Description: Pond10

Temp at Receipt: 1.5C

Event and Year: Aug 2018

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

Approved by: Claudette K. Carroll CC 14Sep18

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

CERTIFICATION: ND # ND-00016

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

Your Environmental Monitoring Partner

Date: 9/13/2018

CLIENT: MVTL Laboratories, Inc.
Project: 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

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

Your Environmental Monitoring Partner

Sample Analysis Report

Company: MVTL Laboratories, Inc.
2616 E Broadway Ave.
Bismarck, ND 58501

Date Reported 9/13/2018
Report ID S1808230001

ProjectName: 201882-2036
Lab ID: S1808230-001
ClientSample ID: 18-W2540 Pond 10
COC: 201882-2036
PWS ID:
Comments

WorkOrder: S1808230
CollectionDate: 8/7/2018 5:30:00 PM
DateReceived: 8/14/2018 1:17:00 PM
FieldSampler:
Matrix: Water

Analyses	Result	Units	Qual	RL	Method	Date Analyzed/Init	
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.

RL - Reporting Limit

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
L	Analyzed by another laboratory
ND	Not Detected at the Reporting Limit
S	Spike Recovery outside accepted recovery limits
X	Matrix Effect
C	Calculated Value
G	Analyzed at IML Gillette laboratory
J	Analyte detected below quantitation limits
M	Value exceeds Monthly Ave or MCL or is less than LCL
O	Outside the Range of Dilutions
U	Analysis reported under the reporting limit

Reviewed by: _____
Wade Nieuwsma, Assistant Laboratory Manager

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

Your Environmental Monitoring Partner

ANALYTICAL QC SUMMARY REPORT

CLIENT: MVTL Laboratories, Inc.
Work Order: S1808230
Project: 201882-2036

Date: 9/13/2018
Report ID: S1808230001

Radium 228 by Ga/Tech Sample Type **MBLK** Units: pCi/L

MB-524 (09/09/18 09:24) RunNo: 161107 PrepDate: 08/27/18 0:00 BatchID 15029

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Total Radium 228	ND	1					

Radium 228 by Ga/Tech Sample Type **LCS** Units: pCi/L

LCS-524 (09/09/18 12:27) RunNo: 161107 PrepDate: 08/27/18 0:00 BatchID 15029

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Total Radium 228	37	1	39		94.5	65.9 - 132	

Radium 228 by Ga/Tech Sample Type **MS** Units: pCi/L

MS-524 (09/09/18 18:33) RunNo: 161107 PrepDate: 08/27/18 0:00 BatchID 15029

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Total Radium 228	36	1	39	ND	91.7	50 - 139	

Radium 228 by Ga/Tech Sample Type **MSD** Units: pCi/L

MSD-524 (09/09/18 23:37) RunNo: 161107 PrepDate: 08/27/18 0:00 BatchID 15029

Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Total Radium 228	34	1	36	3.95	88.2	20	

Radium 226 in Water - Sample Type **MBLK** Units: pCi/L

MB-1894 (09/04/18 17:26) RunNo: 160865 PrepDate: 08/23/18 0:00 BatchID 14991

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Radium 226	ND	0.2					

Radium 226 in Water - Sample Type **LCS** Units: pCi/L

LCS-1894 (09/04/18 17:26) RunNo: 160865 PrepDate: 08/23/18 0:00 BatchID 14991

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Radium 226	4.9	0.2	5.98		82.7	67.1 - 122	

Radium 226 in Water - Sample Type **MS** Units: pCi/L

MS-1894 (09/04/18 17:26) RunNo: 160865 PrepDate: 08/23/18 0:00 BatchID 14991

Analyte	Result	RL	Spike	Ref Samp	%REC	% Rec Limits	Qual
Radium 226	4.8	0.2	5.98	ND	79.6	65 - 131	

Radium 226 in Water - Sample Type **MSD** Units: pCi/L

MSD-1894 (09/04/18 17:26) RunNo: 160865 PrepDate: 08/23/18 0:00 BatchID 14991

Analyte	Result	RL	Conc	%RPD	%REC	% RPD Limits	Qual
Radium 226	5.4	0.2	ND		90.2		

Qualifiers:

B	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

MVTL

LABORATORIES, Inc.
2616 E Broadway Ave
Bismarck, ND 58501

Phone: (701) 258-9720
Toll Free: (800) 279-6885 Fax: (701) 258-9724

Chain of Custody Record

201882-2036

Company Name and Address:	Account #:	Phone #: 701-258-9720
MVTL 2616 E Broadway Bismarck, ND 58501	Contact: Claudette	Fax #: For faxed report check ☐
	Name of Sampler:	E-mail: ccarroll@mvtl.com For e-mail report check box ☐
Billing Address (indicate if different from above):	Quote Number:	Date Submitted: 10-Aug-18
PO Box 249 New Ulm, MN 56073	Project Name/Number:	Purchase Order #: BL6080

Sample Information						Bottle Type						Analysis
S18082301 IML Lab Number	MVTL Lab Number	Client Sample ID	Sample Type	Date Sampled	Time Sampled	Untreated	1000 ml HNO3	VOC Vials Umpreserved	Glass Jar	Other		Analysis Required
01	18-W2540	Pond10	GW	07-Aug-18	1730		4					Ra226 & Ra228

Comments: All results must be reported as a numerical value.

Transferred by:	Date:	Time:	Sample Condition:	Received by:	Date:		Temp:
Nathan Buchmann	10-Aug-18	1700		Kathy Boyd	8.14.18	13:17	21.0 °C
2.							

MVTL

2616 E. Broadway Ave, Bismarck, ND

Phone: (701) 258-9720

Field Datasheet

Groundwater Assessment

Company: OTP Coyote

Event: Aug 2018

Sample ID: Pond10

Sampling Personal: Darren Nicholas

Weather Conditions: Temp: 90 °F Wind: W 5 Precip: Sunny / Partly Cloudy / Cloudy

Well Information

Well Locked?	Yes	~~No~~	
Well Labeled?	~~Yes~~	No	
Casing Straight?	~~Yes~~	No	
Grout Seal Intact?	~~Yes~~	No	Not Visible
Repairs Necessary:	—		

Casing Diameter:	2"	
Water Level Before Purge:	18.81	ft
Total Well Depth:	22.16	ft
Well Volume:	2.1	liters
Depth to Top of Pump:	—	ft
Water Level After Sample:	—	ft
Measurement Method:	Electric Water Level Indicator	

Sampling Information

Purging Method:	~~Bladder~~	Bailer	
Sampling Method:	~~Bladder~~	Bailer	
Dedicated Equip?:	Yes	~~No~~	
Duplicate Sample?:	Yes	~~No~~	
Duplicate Sample ID:	—		

Control Settings		
Purge:		sec.
Recover:		sec.
PSI:		
Pumping Rate:		mL/min

Purge Date:	7Aug18		Time Purging Began:	1320 am/~~pm~~
Well Purged Dry?	Yes	No	Time Purged Dry:	am/pm
Sample Date:	7Aug18		Time of Sampling:	1730 am/~~pm~~

Bottle List: ~~1L Raw~~, 500mL Nitric, ~~4-1L Nitric~~

Field Measurements

Stabilization (3 consecutive) SEQ #	Time	Temp (°C)	Spec. Cond. ±5%	pH ±0.1	DO (mg/L) ±10%	ORP (mV) ±20 mV	Turbidity (NTU) ±10%	Water Level (ft) 0.25 ft	mL Removed	Discription: Clarity, Color, Odor, Ect. clear, partly cloudy, cloudy
1	1323	12.77	3922	6.93	6.07	38.6	252	—	2.1	Cloudy
2										
3										
4										
5										
6										
7										
8										
9										
10	1730	14.71	4000	7.00	7.05	61.2	652	—	recharge	cloudy

Stabilized: Yes ~~No~~ Total Volume Removed: 2.1 mL

Comments: 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.

~~Collected 1L Raw at:~~ Date/Time ~~8Aug18~~ 7Aug18 ON (B) Collected 1L Raw at 1730

Collected 500mL Nitric at: Date/Time 8Aug18 0845

Collected 1L Nitrics at: 0845 Date/Time 2 8Aug18

Collected 1L Nitrics ~~8Aug18 at: 0610~~ 8Aug18 ON (B) Date/Time 2 8Aug18

Had to bail the well to get enough water to fill the samples.

MVTL **Laboratories, Inc.**
2616 E. Broadway
Bismarck, ND 58501
Phone (701) 258-9720

Chain of Custody Record

Project Name: OTP Coyote - Slag Pond CCR	**Event:** Aug 2018	**Work Order Number:** 82-2036
Report To: Otter Tail Power Attn: Josh Hollen Address: PO Box 496 Fergus Falls, MN 56538-0496 phone: email: jhollen@otpco.com	**Carbon Copy:** Attn: Address:	**Name of Sampler(s):** Darren Nieswaag

Sample Information						Bottle Type							Field Parameters			Analysis
Lab Number	Sample ID	Date	Time	Sample Type	Appearance (Clear, Partly Cloudy, Cloudy)	1 liter	500mL Nitric	500mL Nitric (filtered)	250mL Sulfuric	1 liter Nitric			Temp (°C)	Spec. Cond.	pH	Analysis Required
W2540	Pond10	7Aug18	1730	GW	cloudy					4			14.71	4000	7.80	Rad 226 & Rad 228

Comments:

Relinquished By:		Sample Condition:	
Name:	Date/Time	Location:	Temp (°C)
1 Darren Nieswaag	9 Aug 18 1601	~~Log In~~ Walk In #2	1.5 TM562 / ~~TM588~~ TM805
2			

Received by:	
Name:	Date/Time
	9 Aug 2018 1601

Appendix B

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

resourceful. naturally.
engineering and environmental consultants

BARR

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
Date: September 9, 2018
Project: 34291075 Coyote Station CCR

1.0 Introduction

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)).

1.2 Statistically Significant Increases

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).

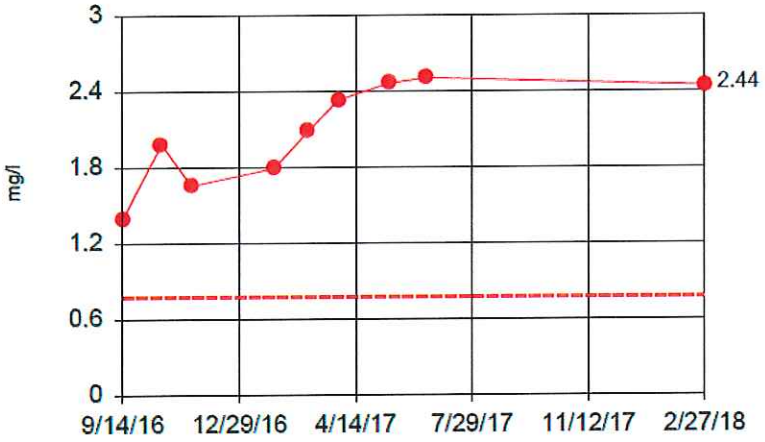


Figure 2 POND 16S Boron Data with Interwell Prediction Limit (0.77 mg/L)

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.

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).

- 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

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.

2.6 Natural variation (in groundwater quality)

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

3.0 Certification

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

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.

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.

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)*

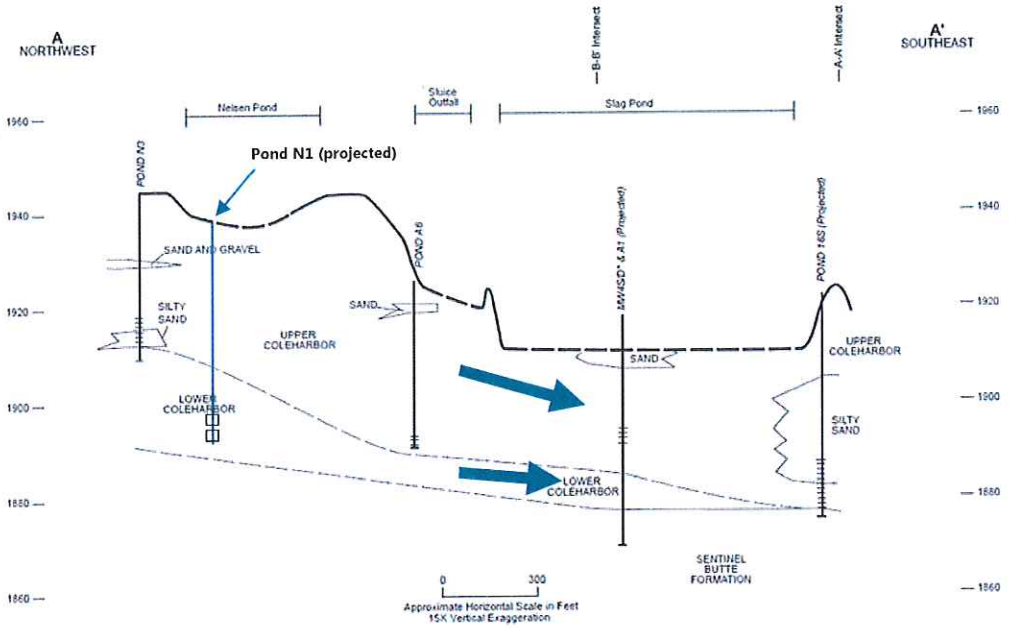


Figure A.1 Cross section through Site along groundwater flow gradient showing convergence of flow from upper and lower portions of the Coleharbor Formation near POND 16S

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.

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).

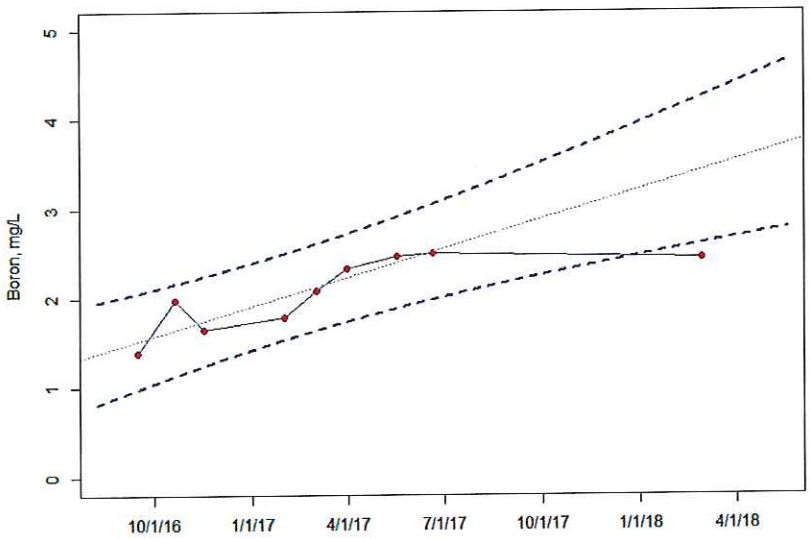


Figure A.2 POND 16S Boron baseline trend line with 95% prediction interval

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.

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).

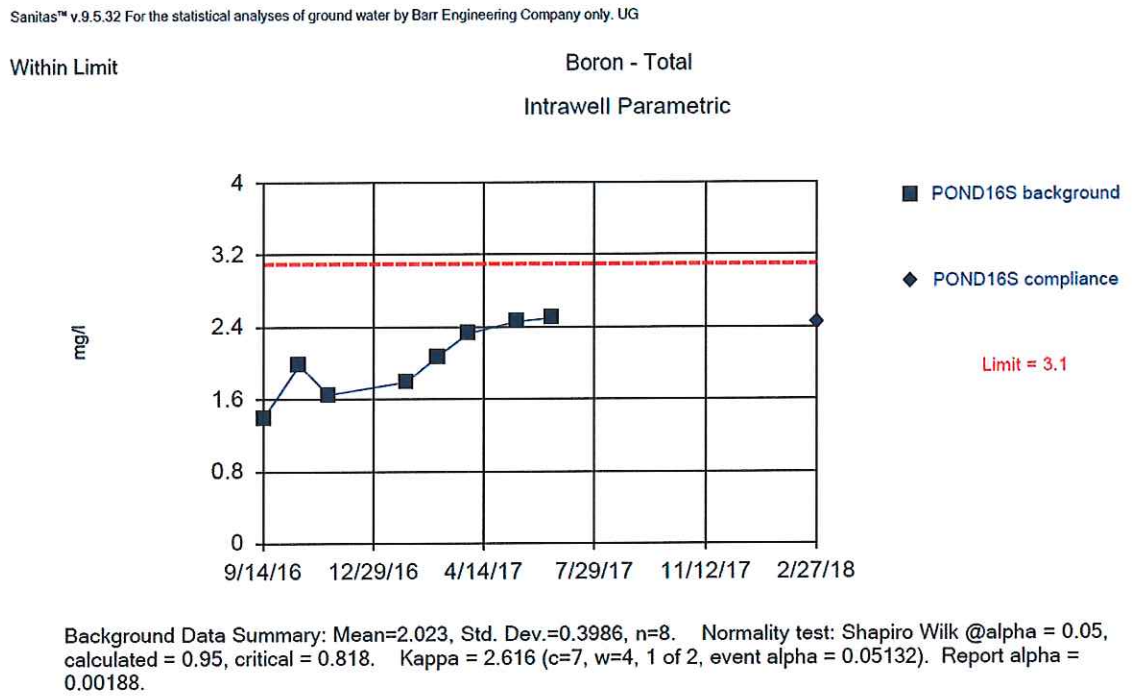


Figure A.3 Intrawell prediction limit for POND 16S

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

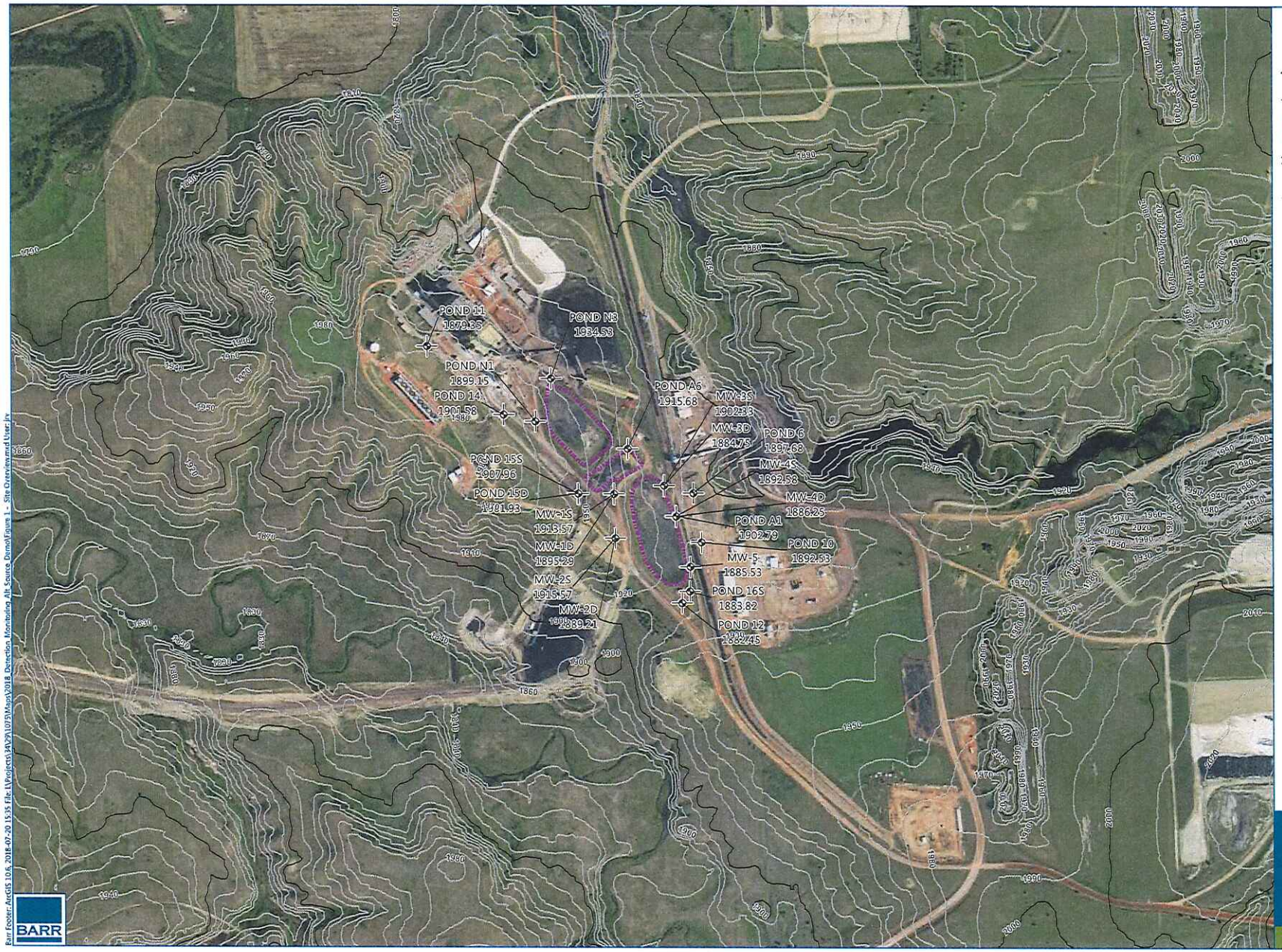
The analysis summarized in this memorandum supports a demonstration that the boron SSI determined for POND 16S from the February 27, 2018, sampling event resulted from a source other than the CCR Unit, based on the statistical methods that did not adequately account for natural variation or the mixing 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.

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.



Monitoring Wel Location

100-Foot Contour

10-Foot Contour

Slag Pond Area

1105.12 Groundwater Elevation (ft. MSL)

Note:
* Monitoring wells not included in groundwater contouring

Imagery Source: USDA-FSA-AFPO NAIP 2017

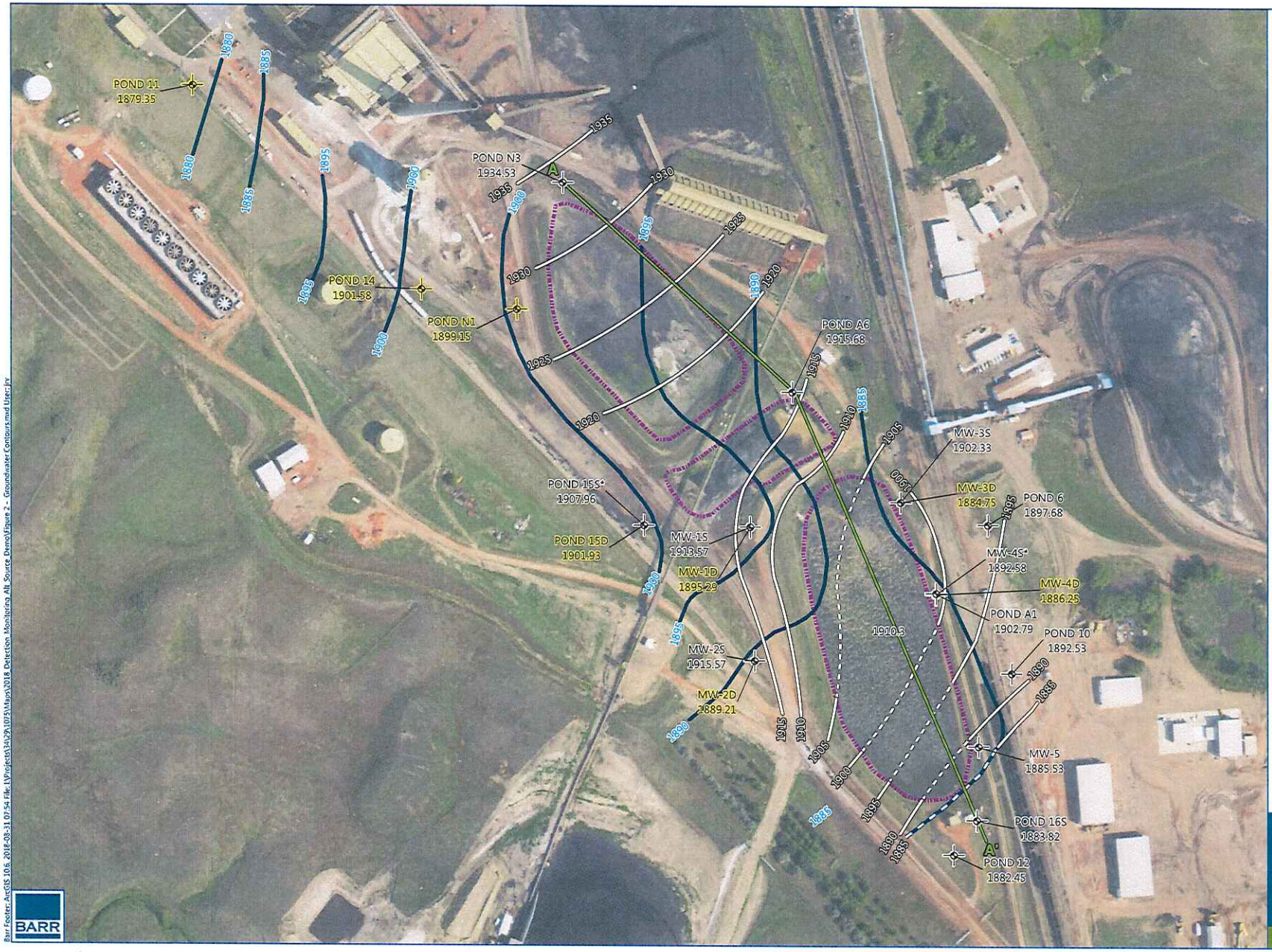
0 375 750
Feet

SITE OVERVIEW
SLAG POND AREA
July 12, 2018
Coyote Station
Beulah, ND
Otter Tail Power Company

FIGURE 1

BARR

Barr Footer: ArcGIS 10.6, 2018-07-20 15:35 File: L:\Projects\LA\23\1075\Maps\2018_Detection_Monitoring_Alt_Source_Demo\Figure 1 - Site Overview.mxd User: jrx



Shallow Monitoring Wel Location

Deep Monitoring Wel Location

100-Foot Surface

10-Foot Surface

Shallow Groundwater Contour (ft MSL)

Deep Groundwater Contour (ft MSL)

Slag Pond Area

1105.12 Groundwater Elevation (ft. MSL)

Note:
* Monitoring wells not included in groundwater contouring

Imagery Source: USDA-FSA-APFO NAIP 2017

0 125 250
Feet

GROUNDWATER CONTOURS
SLAG POND AREA
July 12, 2018
Coyote Station
Beulah, ND
Otter Tail Power Company

FIGURE 3

BARR

Barr Footer: ArcGIS 10.6, 2018-08-31 07:54 File: L:\Projects\34\29\1075\Maps\2018 Detection Monitoring Alt Source Demo\Figure 2 - Groundwater Contours.mxd User: jry