2019 Annual Groundwater Monitoring and Corrective Action Report

SCPC Surface Impoundment, Sioux Energy Center, St. Charles County, Missouri, USA

Submitted to:

Ameren Missouri

1901 Chouteau Avenue, St. Louis, Missouri 63103

Submitted by:

Golder Associates Inc.

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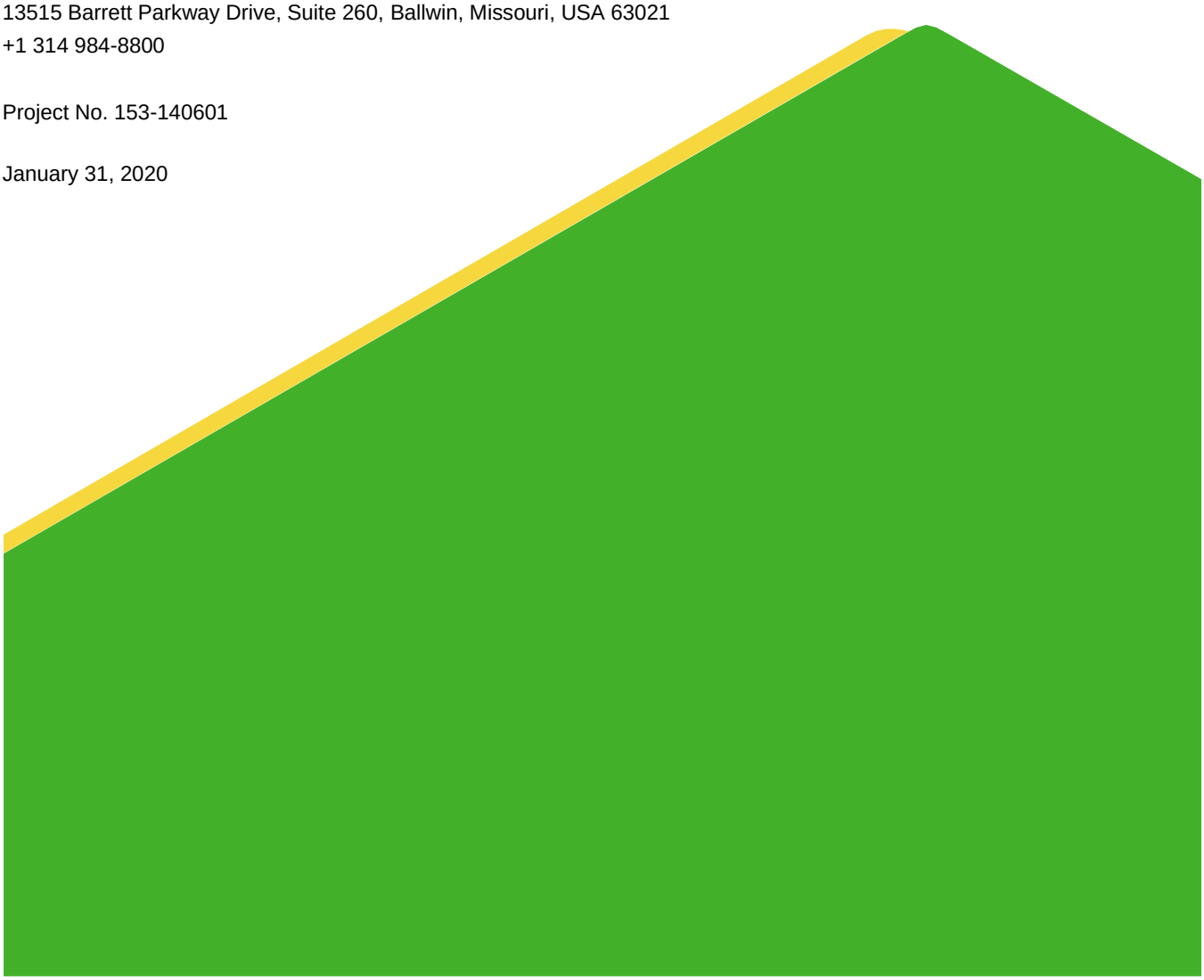
Project No. 153-140601

January 31, 2020



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1.0 INTRODUCTION

This annual report was developed to meet the requirements of United States Environmental Protection Agency (USEPA) 40 CFR Part 257 “Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule” (the CCR Rule). The CCR Rule requires owners or operators of existing CCR units to produce an Annual Groundwater Monitoring and Corrective Action Report (Annual Report) each year (§§ 257.90(e)). Ameren Missouri (Ameren) has determined that the Utility Waste Landfill (UWL) SCPC Surface Impoundment at the Sioux Energy Center (SEC) is subject to the requirements of the CCR Rule. This Annual Report for the SCPC describes CCR Rule groundwater monitoring activities from January 1, 2019 through December 31, 2019.

2.0 INSTALLATION OR DECOMMISSIONING OF MONITORING WELLS

In accordance with the CCR Rule, a groundwater monitoring system has been installed to monitor the SCPC. The groundwater monitoring system consists of eight (8) groundwater monitoring wells screened in the uppermost aquifer and is displayed in **Figure 1**. No new monitoring wells were installed or decommissioned in 2019 as a part of the CCR Rule monitoring program for the SCPC. For more information on the groundwater monitoring network, details are provided in the 2017 Annual Groundwater Monitoring Report for the SCPC.

3.0 GROUNDWATER SAMPLING RESULTS AND DISCUSSION

The following sections review the sampling events completed for the SCPC CCR Unit in 2019. **Table 1** below provides a summary of the groundwater samples collected in 2019 including the number of samples, the date of sample collection, and the monitoring program.

Table 1 – Summary of Groundwater Sampling Dates

Sampling Event	Groundwater Monitoring Wells								Monitoring Program
	BMW-1S	BMW-3S	UG-1A	UG-2	DG-1	DG-2	DG-3	DG-4	
	Date of Sample Collection								
January 2019 Verification Sampling	-	-	-	-	1/8/2019	1/8/2019	1/8/2019	-	Detection
August 2019 Detection Monitoring Sampling	8/2/2019	8/2/2019	8/19/2019	8/19/2019	8/19/2019	8/19/2019	8/19/2019	8/19/2019	Detection
October 2019 Verification Sampling	-	-	10/2/2019	10/2/2019	-	-	10/2/2019	-	Detection
November 2019 Detection Monitoring Sampling	11/13/2019	11/13/2019	11/14/2019	11/14/2019	11/14/2019	11/14/2019	11/14/2019	11/15/2019	Detection
Total Number of Samples Collected	2	2	3	3	3	3	4	2	NA

Notes:
1.) Detection Monitoring Events tested for Appendix III Parameters.
2.) Verification Sampling Events tested for Appendix III Parameters with initial exceedances.
3.) "-" No sample collected.
4.) NA - Not applicable.

3.1 Detection Monitoring Program

A Detection Monitoring event was completed November 12-13, 2018. Verification Sampling and the Statistical Analysis to evaluate for Statistically Significant Increases (SSIs) for the November 2018 event were not completed until 2019 and are, therefore, included in this report. Detections of Appendix III analytes triggered a verification sampling event, which was completed on January 8, 2019 and did not verify any SSIs. **Table 2** summarizes the results of the statistical analysis of the November 2018 Detection Monitoring event and laboratory analytical data are provided in **Appendix A**.

A Detection Monitoring sampling event was scheduled for May 2019, however due to flooding the event was completed August 2-19, 2019, and testing was completed for all Appendix III analytes. Statistical analysis of the data determined that there were SSIs. **Table 3** summarizes the results of the statistical analysis of the August 2019 Detection Monitoring event and laboratory analytical data are provided in **Appendix A**.

As outlined in section 257.94(e)(2) of the CCR Rule, the owner or operator may demonstrate that a source other than the CCR Unit has caused an SSI and that the apparent SSI was the result of an alternative source or resulted from errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. An Alternative Source Demonstration (ASD) was completed for these SSIs and is provided in **Appendix B**. This ASD demonstrates that SSIs are not caused by the SCPC CCR Unit and the SCPC CCR Unit remains in Detection Monitoring.

As outlined in the Statistical Analysis Plan for this site, updates to the statistical limits are completed once four (4) to eight (8) new sample results are available. After the statistical analysis of the August 2019 sampling event, the statistical limits used to determine an SSI were updated according to the Statistical Analysis Plan. These updated limits will be used for November 2019 and subsequent statistical analyses.

A Detection Monitoring event was completed November 13-15, 2019, and testing was performed for all Appendix III analytes. Statistical analyses to evaluate for SSIs in the November 2019 data were not completed in 2019 and the results will be provided in the 2020 Annual Report. **Table 4** summarizes the results of the November 2019 Detection Monitoring event and laboratory analytical data are provided in **Appendix A**.

3.2 Groundwater Elevation, Flow Rate and Direction

To meet the requirements of §257.93(c), water level measurements were taken at all monitoring wells prior to the start of groundwater purging and sampling. Static water levels were measured within a 24-hour period in each monitoring well using an electronic water level indicator.

Groundwater elevations were used to generate potentiometric surface maps found in **Appendix C**. As shown on the potentiometric surface maps, groundwater flow direction within the uppermost aquifer is dynamic and influenced by seasonal changes in the water level in the adjacent Mississippi and Missouri Rivers, since the alluvial aquifer is hydraulically connected to these water bodies. Groundwater in the alluvial aquifer will generally flow from the higher of the two rivers toward the lower elevation river. The SCPA Surface Impoundment and Poeling Lake also locally affect water levels and flow directions. Water flows into and out of the alluvial aquifer as a result of fluctuating river water levels that produce “bank recharge” and “bank discharge” conditions. At this facility, groundwater can flow north and south toward the Mississippi and Missouri Rivers, depending on river levels.

Groundwater flow direction and hydraulic gradient were estimated for the alluvial aquifer wells at the SEC using commercially available software. Results from this assessment indicate that while groundwater flow direction is

variable, the overall net groundwater flow at the SEC was toward the northeast but ranged from north to south. Horizontal gradients calculated by the program range from 0.0001 to 0.001 feet/foot with an estimated net annual groundwater velocity of approximately four (4) feet per year.

4.0 STATUS OF THE GROUNDWATER MONITORING PROGRAM

The SCPC remains in Detection Monitoring. Section 5.0 provides a discussion of the activities planned for 2020.

4.1 Sampling Issues

Detection Monitoring for the SEC was planned for May 2019. However, from approximately March to July 2019, some of the monitoring wells at the SEC were under water due flooding of the Mississippi and Missouri Rivers. This caused a delay in the planned sampling dates for the SCPC. On July 15-17, 2019, Golder performed post-flood monitoring well inspections at the SEC and found that at the SCPC BMW-1S, BMW-3S, DG-4 and UG-1A had been impacted by the flood. On July 23, 2019, Golder re-developed BMW-1S and BMW-3S to remove floodwater impacts to the wells prior to any future groundwater elevation measurements or groundwater samples being collected. After successful re-development, BMW-1S and BMW-3S were returned to service. Gredell Engineering Resources re-developed wells used for the UWL permitting at the SEC August 12-16, 2019. After successful re-development DG-4 and UG-1A were returned to service.

No other notable sampling issues were encountered in 2019.

5.0 ACTIVITIES PLANNED FOR 2020

Detection Monitoring is scheduled to continue on a semi-annual basis in the second and fourth quarters of 2020. Statistical analysis of the November 2019 Detection Monitoring data will be completed in 2020 and included in the 2020 Annual Report.

Tables

Table 2
November 2018 Detection Monitoring Results
SCPC Surface Impoundment
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS											
		BMW-1S	BMW-3S	Prediction Limit UG-1A	UG-1A	Prediction Limit UG-2	UG-2	Prediction Limit DG-1	DG-1	Prediction Limit DG-2	DG-2	Prediction Limit DG-3	DG-3	Prediction Limit DG-4	DG-4
November 2018 Detection Monitoring Event															
DATE	NA	11/12/2018	11/12/2018	NA	11/13/2018	NA	11/13/2018	NA	11/13/2018	NA	11/13/2018	NA	11/13/2018	NA	11/13/2018
pH	SU	7.46	7.49	6.294-7.616	7.00	6.031-7.969	6.76	6.759-7.323	6.11	6.73-7.482	6.20	6.156-7.702	6.12	6.291-7.62	7.05
BORON, TOTAL	µg/L	72.9 J	61.5 J	362.5	145	234.6	145	122.5	125	119.3	114	115.1	108	DQR	73.2 J
CALCIUM, TOTAL	µg/L	157,000	124,000	164,715	116,000	133,251	105,000	146,584	129,000	142,779	122,000	159,563	137,000	147,361	121,000
CHLORIDE, TOTAL	mg/L	6.7	10.1	131.6	65.4	125.3	24.4	9.962	8.6	9.817	6.9	16.08	9.1	115.1	80.2
FLUORIDE, TOTAL	mg/L	0.34	0.36	0.3822	ND	0.24	ND	0.3844	ND	0.4365	ND	0.4619	ND	0.37	ND
SULFATE, TOTAL	mg/L	28.8	25.6	103.2	65.9	101.6	17.7	66.1	27.1	47.44	29.0	61.41	64.7	57.15	39.3
TOTAL DISSOLVED SOLIDS	mg/L	556	436	818.8	549	613.7	607 J	569.1	511	521.6	470	580	545	698.9	611
January 2019 Verification Sampling															
DATE	NA								1/8/2019		1/8/2019		1/8/2019		
pH	SU								6.97		7.00		7.14		
BORON, TOTAL	µg/L								99.7 J						
CALCIUM, TOTAL	µg/L														
CHLORIDE, TOTAL	mg/L														
FLUORIDE, TOTAL	mg/L														
SULFATE, TOTAL	mg/L												29.7		
TOTAL DISSOLVED SOLIDS	mg/L														

NOTES:
1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect. Values displayed as ND.
4. NA - Not applicable.
5. Prediction Limits calculated using Sanitas Software.
6. If all background values are less than the Practical Quantitation Limit (PQL) then the Double Quantification Rule (DQR) is used.
7. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).
8. Values highlighted in green indicate an initial exceedance above the prediction limit that was not confirmed by Verification Sampling (not an SSI).
9. Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.

Prepared By: RJF
Checked By: KAB
Reviewed By: CMR

Table 3
August 2019 Detection Monitoring Results
SCPC Surface Impoundment
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS											
		BMW-1S	BMW-3S	Prediction Limit UG-1A	UG-1A	Prediction Limit UG-2	UG-2	Prediction Limit DG-1	DG-1	Prediction Limit DG-2	DG-2	Prediction Limit DG-3	DG-3	Prediction Limit DG-4	DG-4
August 2019 Detection Monitoring Event															
DATE	NA	8/2/2019	8/2/2019	NA	8/19/2019	NA	8/19/2019	NA	8/19/2019	NA	8/19/2019	NA	8/19/2019	NA	8/19/2019
pH	SU	6.9	7.5	6.294-7.616	6.55	6.031-7.969	6.65	6.759-7.323	6.77	6.73-7.482	6.83	6.156-7.702	6.76	6.291-7.62	6.64
BORON, TOTAL	µg/L	ND	ND	362.5	270	234.6	144	122.5	106	119.3	104	115.1	95.1 J	DQR	61.1 J
CALCIUM, TOTAL	µg/L	149,000	122,000	164,715	177,000	133,251	116,000	146,584	135,000	142,779	133,000	159,563	148,000	147,361	136,000
CHLORIDE, TOTAL	mg/L	8.8	10.6	131.6	145	125.3	30.0	9.962	6.2	9.817	8.2	16.08	4.8	115.1	103.0
FLUORIDE, TOTAL	mg/L	0.31	0.35	0.3822	0.28	0.24	0.25	0.3844	0.34	0.4365	0.38	0.4619	0.37	0.37	0.32
SULFATE, TOTAL	mg/L	34.1	25.3	103.2	57.7	101.6	45.2	66.1	41.7	47.44	37.1	61.41	49.5	57.15	31.5
TOTAL DISSOLVED SOLIDS	mg/L	548	452	818.8	785	613.7	519	569.1	503	521.6	511	580	624	698.9	671
October 2019 Verification Sampling Event															
DATE	NA				10/2/2019		10/2/2019						10/2/2019		
pH	SU				6.82		6.83						6.82		
BORON, TOTAL	µg/L														
CALCIUM, TOTAL	µg/L				166,600										
CHLORIDE, TOTAL	mg/L				140										
FLUORIDE, TOTAL	mg/L						0.30								
SULFATE, TOTAL	mg/L														
TOTAL DISSOLVED SOLIDS	mg/L												569		

NOTES:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. ND - Constituent was analyzed for, but was not detected above the Method Detection Limit (MDL) and is considered a non-detect. Values displayed as ND.
4. NA - Not applicable.
5. Prediction Limits calculated using Sanitas Software.
6. If all background values are less than the Practical Quantitation Limit (PQL) then the Double Quantification Rule (DQR) is used.
7. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).
8. Values highlighted in green indicate an initial exceedance above the prediction limit that was not confirmed by Verification Sampling (not an SSI).
9. Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.

Prepared By: RJF
Checked By: KAB
Reviewed By: CMR

Table 4
November 2019 Detection Monitoring Results
SCPC Surface Impoundment
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS					
		BMW-1S	BMW-3S	UG-1A	UG-2	DG-1	DG-2	DG-3	DG-4
November 2019 Detection Monitoring Event									
DATE	NA	11/13/2019	11/13/2019	11/14/2019	11/14/2019	11/14/2019	11/14/2019	11/14/2019	11/15/2019
pH	SU	6.88	7.13	6.85	7.09	7.06	6.61	6.88	6.97
BORON, TOTAL	µg/L	118	80.1 J	239	144	111	100	93.1 J	71.0 J
CALCIUM, TOTAL	µg/L	143,000 J	102,000	166,000	115,000	135,000	133,000	144,000	138,000
CHLORIDE, TOTAL	mg/L	6.4	7.6	118	27.8	6.0	7.4	5.4	96.9 J
FLUORIDE, TOTAL	mg/L	0.28	0.23	0.29	0.24	0.33	0.39	0.42	0.30
SULFATE, TOTAL	mg/L	26.5	34.4	53	43.8	38.4	37.8	51.1	33.9
TOTAL DISSOLVED SOLIDS	mg/L	551	418	739	480	524	512	576	628

NOTES:

1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. NA - Not applicable.

Prepared By: TJG
Checked By: KAB
Reviewed By: CMR

Figures

KEY MAP

LEGEND

- Sioux Energy Center Property Boundary
- UWL Perimeter Fence
- SCPC - WFGD Disposal Area
- Water Recycle Pond

Groundwater Monitoring Wells Used for SCPC CCR Rule Monitoring

- SCPC Monitoring Well
- Background Monitoring Well

0 1,000 2,000 3,000

Feet

NOTE(S)

1.) ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE.
2.) UWL - UTILITY WASTE LANDFILL.
3.) WFGD - WET FLUE GAS DESULFURIZATION.

REFERENCE(S)

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2,401 FEET.

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
SITE LOCATION AERIAL MAP AND MONITORING WELL LOCATIONS

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-15
DESIGNED	JSI
PREPARED	RJF
REVIEWED	EMS
APPROVED	CMR

PROJECT NO.	CONTROL	REV.	FIGURE
153140601	1240	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

PATH: G:\Projects\150 Projects\153140\6 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\900 - FIGURES-DRAWINGS\PRODUCTION\2019 Annual Report\Figure 1 - SCPC_v2.mxd PRINTED ON: 2020-01-24 AT 10:47:32 AM

APPENDIX A

Laboratory Analytical Data

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

January 10, 2019

Mark Haddock
Golder Associates
820 S. Main St
Suite 100
Saint Charles, MO 63301

RE: Project: SCPC GW SAMPLING
Pace Project No.: 60291371

Dear Mark Haddock:
Enclosed are the analytical results for sample(s) received by the laboratory on January 09, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Jamie Church
jamie.church@pacelabs.com
314-838-7223
Project Manager

Enclosures

cc: Ryan Feldmann, Golder
Jeffrey Ingram, Golder Associates
Eric Schneider, Golder Associates

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: SCPC GW SAMPLING
Pace Project No.: 60291371

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Certification Number: 10090
Arkansas Drinking Water
WY STR Certification #: 2456.01
Arkansas Certification #: 18-016-0
Arkansas Drinking Water
Illinois Certification #: 004455
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116 / E10426
Louisiana Certification #: 03055
Nevada Certification #: KS000212018-1
Oklahoma Certification #: 9205/9935
Texas Certification #: T104704407-18-11
Utah Certification #: KS000212018-8
Kansas Field Laboratory Accreditation: # E-92587
Missouri Certification: 10070
Missouri Certification Number: 10090

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: SCPC GW SAMPLING
Pace Project No.: 60291371

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60291371001	**S-D6-1**	Water	01/08/19 09:45	01/09/19 03:00
60291371002	**S-D6-3**	Water	01/08/19 09:50	01/09/19 03:00

Pace Analytical Services, LLC
9608 Loiret Blvd.
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SAMPLE ANALYTE COUNT

Project: SCPC GW SAMPLING
Pace Project No.: 60291371

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60291371001	**S-D6-1**	EPA 200.7	CTR	1	PASI-K
60291371002	**S-D6-3**	EPA 300.0	MGS	1	PASI-K

Pace Analytical Services, LLC
9608 Loiret Blvd.
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(913)599-5665

ANALYTICAL RESULTS

Project: SCPC GW SAMPLING
Pace Project No.: 60291371

Sample: S-D6-1 **Lab ID: 60291371001** Collected: 01/08/19 09:45 Received: 01/09/19 03:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**99.7J**	ug/L	100	12.5	1	01/09/19 15:16	01/10/19 10:42	7440-42-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: SCPC GW SAMPLING
Pace Project No.: 60291371

Sample: S-D6-3 **Lab ID: 60291371002** Collected: 01/08/19 09:50 Received: 01/09/19 03:00 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Sulfate	**29.7**	mg/L	5.0	1.2	5		01/10/19 11:31	14808-79-8	M1

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: SCPC GW SAMPLING
Pace Project No.: 60291371

QC Batch: 563906 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60291371001

METHOD BLANK: 2313489 Matrix: Water
Associated Lab Samples: 60291371001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<12.5	100	12.5	01/10/19 10:39	

LABORATORY CONTROL SAMPLE: 2313490

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	944	94	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2313491 2313492

Parameter	Units	60291374003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	382	1000	1000	1350	1330	97	95	70-130	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: SCPC GW SAMPLING
Pace Project No.: 60291371

QC Batch: 564071
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60291371002

METHOD BLANK: 2314235 Matrix: Water
Associated Lab Samples: 60291371002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	<0.24	1.0	0.24	01/10/19 09:48	

LABORATORY CONTROL SAMPLE: 2314236

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2314237 2314238

Parameter	Units	60291371002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	29.7	25	25	57.6	53.6	112	96	90-110	7	15	M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
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QUALIFIERS

Project: SCPC GW SAMPLING
Pace Project No.: 60291371

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: SCPC GW SAMPLING
Pace Project No.: 60291371

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60291371001	**S-D6-1**	EPA 200.7	563906	EPA 200.7	563987
60291371002	**S-D6-3**	EPA 300.0	564071		

JLS

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO#: 60291371

60291371

Client Name: Golder Associates

Courier: FedEx ☐ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☑ Client ☐ Other ☐

Tracking #: _____ Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

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

Thermometer Used: T-301 Type of Ice: ~~Wet~~ Blue None

Cooler Temperature (°C): As-read 0.9 Corr. Factor 0.0 Corrected 0.9

Date and initials of person examining contents: 1/9/19 BK

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☑Yes ☐No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☑No ☐N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☑No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☑No	
Trip Blank present:	☐Yes ☐No ☑N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jann Chunk Date: 1/9/19

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
www.pacelabs.com

Section A Required Client Information:

Company:	Golder Associates
Address:	820 South Main Street, Suite 100
	St Charles, MO 63301
Email To:	maddock@golder.com
Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	Mark Haddock (mhaddock@golder.com)
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	SCPL GW Sampling
Project Number:	153i406.0003

Section C Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285

REGULATORY AGENCY

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

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Boron	Calcium	Chloride	Fluoride	Sulfate	TDS					Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N	N						
1	S-DG-1	WT	G			1/8/19	0945		2	1		1							✓				✓		BD-24 ↓		BD-3N ↓			60291371 001
2	S-DG-3	WT	G			⊥	0950		⊥	⊥		⊥												✓		↓		↓			002
3		WT	G																											
4		WT	G																											
5		WT	G																											
6		WT	G																											
7		WT	G																											
8		WT	G																											
9		WT	G																											
10		WT	G																											
11		WT	G																											
12		WT	G																											

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	[signature] / Golder	1/08/19		[signature] / Pace	1/9/19	0800	0.9	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 1/08/19

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

MEMORANDUM

DATE January 10, 2019 **Project No.** 1531406

TO Project File
Golder Associates

CC

FROM Tommy Goodwin **EMAIL tgoodwin@golder.com**

DATA VALIDATION SUMMARY: AMEREN – SIOUX ENERGY CENTER – VERIFICATION SAMPLING – DATA PACKAGE 60291371

The following is a summary of instances where quality control criteria in the functional guidelines were not met and data qualification was required:

- When analytes exceeded the recovery criteria for MS/MSD of a sample, the sample result was not qualified on MS/MSD data alone.
- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).

Golder Associates Inc.
13515 Barrett Parkway Drive, Suite 260,
Ballwin, Missouri, USA 63021

T: +1 314 984-8800 F: +1 314 984-8770

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren - SCPC - VS - Jan 2019
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406
Validation Date: ~~6029137~~ (1) 1/10/19

Laboratory: Pace Analytical
SDG #: 60291371
Analytical Method (type and no.): Metals (200.7&200.8), Hg (7470), Alk (SM 2320B), TDS (SM 2540C), Fe (SM 3500-Fe B#4), Anions (300.0), P (365.4), Ra (903.1&904.0) (2) Anions (300.0)
Matrix: ☐ Air ☐ Soil/Sed. ☒ Water ☐ Waste ☐ _____
Sample Names S-D6-1, S-D6-3

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	Grab
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Cond, Turb, Temp, DO, ORP, Q, DTW
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies: _____

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	☒	☐	☐	
b) Was the COC signed by both field and laboratory personnel?	☒	☐	☐	
c) Were samples received in good condition?	☒	☐	☐	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	☐	☐	☒	
b) Were hold times met for sample analysis?	☐	☐	☐	
c) Were the correct preservatives used?	☒	☐	☐	
d) Was the correct method used?	☒	☐	☐	
e) Were appropriate reporting limits achieved?	☒	☐	☐	
f) Were any sample dilutions noted?	☒	☐	☐	
g) Were any matrix problems noted?	☐	☐	☐	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	**YES**	**NO**	**NA**	**COMMENTS**
a) Were analytes detected in the method blank(s)?	☐	☑	☐	
b) Were analytes detected in the field blank(s)?	☐	☐	☑	
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

Laboratory Control Sample (LCS)	**YES**	**NO**	**NA**	**COMMENTS**
a) Was a LCS analyzed once per SDG?	☒	☐	☐	
b) Were the proper analytes included in the LCS?	☒	☐	☐	
c) Was the LCS accuracy criteria met?	☑	☐	☐	

Duplicates	**YES**	**NO**	**NA**	**COMMENTS**
a) Were field duplicates collected (note original and duplicate sample names)?				Dup-1@ N/A
	☐	☑	☐	FB-1@ N/A
b) Were field dup. precision criteria met (note RPD)?	☐	☐	☑	
c) Were lab duplicates analyzed (note original and duplicate samples)?				
	☒	☐	☐	
d) Were lab dup. precision criteria met (note RPD)?	☑	☐	☐	

Blind Standards	**YES**	**NO**	**NA**	**COMMENTS**
a) Was a blind standard used (indicate name, analytes included and concentrations)?	☐	☐	☒	
b) Was the %D within control limits?	☐	☐	☒	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	**YES**	**NO**	**NA**	**COMMENTS**
a) Was MS accuracy criteria met?	☐	☑	☐	SO_4^{2-}
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
b) Was MSD accuracy criteria met?	☑	☐	☐	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
c) Were MS/MSD precision criteria met?	☑	☐	☐	

Comments/Notes:

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
None				

Signature: ______________________ Date: 1/10/19

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

October 17, 2019

Jeffrey Ingram
Golder Associates
13515 Barrett Parkway Drive
Suite 260
Ballwin, MO 63021

RE: Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Dear Jeffrey Ingram:
Enclosed are the analytical results for sample(s) received by the laboratory between August 03, 2019 and August 20, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Jamie Church
jamie.church@pacelabs.com
314-838-7223
Project Manager

Enclosures

cc: Ryan Feldmann, Golder
Mark Haddock, Golder Associates
Eric Schneider, Golder Associates

Pace Analytical Services, LLC
9608 Loiret Blvd.
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(913)599-5665

CERTIFICATIONS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Inorganic Drinking Water Certification #: 10090
Arkansas Drinking Water
Arkansas Certification #: 19-016-0
Arkansas Drinking Water
Illinois Certification #: 004455
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212018-1
Oklahoma Certification #: 9205/9935
Florida: Cert E871149 SEKS WET
Texas Certification #: T104704407-18-11
Utah Certification #: KS000212018-8
Illinois Certification #: 004592
Kansas Field Laboratory Accreditation: # E-92587
Missouri SEKS Micro Certification: 10070

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60312389001	**S-UG-1A**	Water	08/19/19 09:35	08/20/19 02:45
60312389002	**S-UG-2**	Water	08/19/19 09:20	08/20/19 02:45
60312389003	**S-DG-1**	Water	08/19/19 10:30	08/20/19 02:45
60312389004	**S-DG-2**	Water	08/19/19 11:15	08/20/19 02:45
60312389005	**S-DG-3**	Water	08/19/19 12:05	08/20/19 02:45
60312389006	**S-DG-4**	Water	08/19/19 11:20	08/20/19 02:45
60312389007	**S-SCPC-DUP-1**	Water	08/19/19 08:00	08/20/19 02:45
60312389008	**S-SCPC-FB-1**	Water	08/19/19 09:12	08/20/19 02:45
60310790002	**S-BMW-1S**	Water	08/01/19 10:55	08/03/19 02:50
60310790003	**S-BMW-3S**	Water	08/01/19 11:45	08/03/19 02:50

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60312389001	**S-UG-1A**	EPA 200.7	EMR	7	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60312389002	**S-UG-2**	EPA 200.7	EMR	7	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60312389003	**S-DG-1**	EPA 200.7	EMR	7	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60312389004	**S-DG-2**	EPA 200.7	EMR	7	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60312389005	**S-DG-3**	EPA 200.7	EMR	7	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60312389006	**S-DG-4**	EPA 200.7	EMR	7	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60312389007	**S-SCPC-DUP-1**	EPA 200.7	EMR	7	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60312389008	**S-SCPC-FB-1**	EPA 200.7	EMR	7	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310790002	**S-BMW-1S**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K
60310790003	**S-BMW-3S**	EPA 200.7	HKC	7	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2320B	MJK	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	JDS	3	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Sample: S-UG-1A **Lab ID: 60312389001** Collected: 08/19/19 09:35 Received: 08/20/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**270**	ug/L	100	10.7	1	08/22/19 08:30	08/22/19 18:43	7440-42-8	
Calcium	**177000**	ug/L	200	50.0	1	08/22/19 08:30	08/22/19 18:43	7440-70-2	
Iron	**<14.0**	ug/L	50.0	14.0	1	08/22/19 08:30	08/22/19 18:43	7439-89-6	
Magnesium	**42000**	ug/L	50.0	13.0	1	08/22/19 08:30	08/22/19 18:43	7439-95-4	
Manganese	**1080**	ug/L	5.0	2.1	1	08/22/19 08:30	08/22/19 18:43	7439-96-5	
Potassium	**9530**	ug/L	500	79.0	1	08/22/19 08:30	08/22/19 18:43	7440-09-7	
Sodium	**39100**	ug/L	500	144	1	08/22/19 08:30	08/22/19 18:43	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**437**	mg/L	20.0	6.5	1		09/02/19 13:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**785**	mg/L	10.0	10.0	1		08/26/19 13:50		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**145**	mg/L	20.0	4.4	20		09/04/19 11:11	16887-00-6	
Fluoride	**0.28**	mg/L	0.20	0.085	1		09/03/19 23:38	16984-48-8	
Sulfate	**57.7**	mg/L	5.0	1.2	5		09/03/19 23:53	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Sample: S-UG-2 **Lab ID: 60312389002** Collected: 08/19/19 09:20 Received: 08/20/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**144**	ug/L	100	10.7	1	08/22/19 08:30	08/22/19 18:45	7440-42-8	
Calcium	**116000**	ug/L	200	50.0	1	08/22/19 08:30	08/22/19 18:45	7440-70-2	
Iron	**<14.0**	ug/L	50.0	14.0	1	08/22/19 08:30	08/22/19 18:45	7439-89-6	
Magnesium	**24600**	ug/L	50.0	13.0	1	08/22/19 08:30	08/22/19 18:45	7439-95-4	
Manganese	**285**	ug/L	5.0	2.1	1	08/22/19 08:30	08/22/19 18:45	7439-96-5	
Potassium	**4700**	ug/L	500	79.0	1	08/22/19 08:30	08/22/19 18:45	7440-09-7	
Sodium	**30400**	ug/L	500	144	1	08/22/19 08:30	08/22/19 18:45	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**362**	mg/L	20.0	6.5	1		09/02/19 13:36		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**519**	mg/L	10.0	10.0	1		08/26/19 13:50		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**30.0**	mg/L	5.0	1.1	5		09/04/19 00:23	16887-00-6	
Fluoride	**0.25**	mg/L	0.20	0.085	1		09/04/19 00:08	16984-48-8	
Sulfate	**45.2**	mg/L	5.0	1.2	5		09/04/19 00:23	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Sample: S-DG-1 **Lab ID: 60312389003** Collected: 08/19/19 10:30 Received: 08/20/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**106**	ug/L	100	10.7	1	08/22/19 08:30	08/22/19 18:52	7440-42-8	
Calcium	**135000**	ug/L	200	50.0	1	08/22/19 08:30	08/22/19 18:52	7440-70-2	
Iron	**1230**	ug/L	50.0	14.0	1	08/22/19 08:30	08/22/19 18:52	7439-89-6	
Magnesium	**32300**	ug/L	50.0	13.0	1	08/22/19 08:30	08/22/19 18:52	7439-95-4	
Manganese	**275**	ug/L	5.0	2.1	1	08/22/19 08:30	08/22/19 18:52	7439-96-5	
Potassium	**4010**	ug/L	500	79.0	1	08/22/19 08:30	08/22/19 18:52	7440-09-7	
Sodium	**4230**	ug/L	500	144	1	08/22/19 08:30	08/22/19 18:52	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**411**	mg/L	20.0	6.5	1		09/02/19 13:42		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**503**	mg/L	10.0	10.0	1		08/26/19 13:50		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**6.2**	mg/L	1.0	0.22	1		09/04/19 01:08	16887-00-6	
Fluoride	**0.34**	mg/L	0.20	0.085	1		09/04/19 01:08	16984-48-8	
Sulfate	**41.7**	mg/L	5.0	1.2	5		09/04/19 01:23	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Sample: S-DG-2 **Lab ID: 60312389004** Collected: 08/19/19 11:15 Received: 08/20/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**104**	ug/L	100	10.7	1	08/22/19 08:30	08/22/19 18:54	7440-42-8	
Calcium	**133000**	ug/L	200	50.0	1	08/22/19 08:30	08/22/19 18:54	7440-70-2	
Iron	**691**	ug/L	50.0	14.0	1	08/22/19 08:30	08/22/19 18:54	7439-89-6	
Magnesium	**33300**	ug/L	50.0	13.0	1	08/22/19 08:30	08/22/19 18:54	7439-95-4	
Manganese	**693**	ug/L	5.0	2.1	1	08/22/19 08:30	08/22/19 18:54	7439-96-5	
Potassium	**5140**	ug/L	500	79.0	1	08/22/19 08:30	08/22/19 18:54	7440-09-7	
Sodium	**4760**	ug/L	500	144	1	08/22/19 08:30	08/22/19 18:54	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**425**	mg/L	20.0	6.5	1		09/02/19 13:48		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**511**	mg/L	10.0	10.0	1		08/26/19 15:06		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8.2**	mg/L	1.0	0.22	1		09/04/19 01:38	16887-00-6	
Fluoride	**0.38**	mg/L	0.20	0.085	1		09/04/19 01:38	16984-48-8	
Sulfate	**37.1**	mg/L	5.0	1.2	5		09/04/19 01:52	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Sample: S-DG-3 **Lab ID: 60312389005** Collected: 08/19/19 12:05 Received: 08/20/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**95.1J**	ug/L	100	10.7	1	08/22/19 08:30	08/22/19 18:56	7440-42-8	
Calcium	**148000**	ug/L	200	50.0	1	08/22/19 08:30	08/22/19 18:56	7440-70-2	
Iron	**480**	ug/L	50.0	14.0	1	08/22/19 08:30	08/22/19 18:56	7439-89-6	
Magnesium	**39100**	ug/L	50.0	13.0	1	08/22/19 08:30	08/22/19 18:56	7439-95-4	
Manganese	**722**	ug/L	5.0	2.1	1	08/22/19 08:30	08/22/19 18:56	7439-96-5	
Potassium	**6470**	ug/L	500	79.0	1	08/22/19 08:30	08/22/19 18:56	7440-09-7	
Sodium	**4680**	ug/L	500	144	1	08/22/19 08:30	08/22/19 18:56	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**450**	mg/L	20.0	6.5	1		09/02/19 13:54		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**624**	mg/L	10.0	10.0	1		08/26/19 15:06		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4.8**	mg/L	1.0	0.22	1		09/04/19 02:07	16887-00-6	
Fluoride	**0.37**	mg/L	0.20	0.085	1		09/04/19 02:07	16984-48-8	
Sulfate	**49.5**	mg/L	5.0	1.2	5		09/04/19 02:22	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Sample: S-DG-4 **Lab ID: 60312389006** Collected: 08/19/19 11:20 Received: 08/20/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**61.1J**	ug/L	100	10.7	1	08/22/19 08:30	08/22/19 18:59	7440-42-8	
Calcium	**136000**	ug/L	200	50.0	1	08/22/19 08:30	08/22/19 18:59	7440-70-2	
Iron	**115**	ug/L	50.0	14.0	1	08/22/19 08:30	08/22/19 18:59	7439-89-6	
Magnesium	**39500**	ug/L	50.0	13.0	1	08/22/19 08:30	08/22/19 18:59	7439-95-4	
Manganese	**499**	ug/L	5.0	2.1	1	08/22/19 08:30	08/22/19 18:59	7439-96-5	
Potassium	**7570**	ug/L	500	79.0	1	08/22/19 08:30	08/22/19 18:59	7440-09-7	
Sodium	**44600**	ug/L	500	144	1	08/22/19 08:30	08/22/19 18:59	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**403**	mg/L	20.0	6.5	1		09/02/19 14:09		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**671**	mg/L	10.0	10.0	1		08/26/19 15:06		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**103**	mg/L	10.0	2.2	10		09/04/19 14:21	16887-00-6	
Fluoride	**0.32**	mg/L	0.20	0.085	1		09/04/19 02:37	16984-48-8	
Sulfate	**31.5**	mg/L	5.0	1.2	5		09/04/19 03:22	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Sample: S-SCPC-DUP-1 **Lab ID: 60312389007** Collected: 08/19/19 08:00 Received: 08/20/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**96.4J**	ug/L	100	10.7	1	08/22/19 08:30	08/22/19 19:05	7440-42-8	
Calcium	**149000**	ug/L	200	50.0	1	08/22/19 08:30	08/22/19 19:05	7440-70-2	
Iron	**544**	ug/L	50.0	14.0	1	08/22/19 08:30	08/22/19 19:05	7439-89-6	
Magnesium	**39100**	ug/L	50.0	13.0	1	08/22/19 08:30	08/22/19 19:05	7439-95-4	
Manganese	**734**	ug/L	5.0	2.1	1	08/22/19 08:30	08/22/19 19:05	7439-96-5	
Potassium	**6560**	ug/L	500	79.0	1	08/22/19 08:30	08/22/19 19:05	7440-09-7	
Sodium	**4740**	ug/L	500	144	1	08/22/19 08:30	08/22/19 19:05	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**438**	mg/L	20.0	6.5	1		09/02/19 14:21		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**597**	mg/L	10.0	10.0	1		08/26/19 15:06		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4.8**	mg/L	1.0	0.22	1		09/04/19 04:37	16887-00-6	
Fluoride	**0.37**	mg/L	0.20	0.085	1		09/04/19 04:37	16984-48-8	
Sulfate	**50.1**	mg/L	5.0	1.2	5		09/04/19 04:52	14808-79-8	

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Sample: S-SCPC-FB-1 **Lab ID: 60312389008** Collected: 08/19/19 09:12 Received: 08/20/19 02:45 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**<10.7**	ug/L	100	10.7	1	08/22/19 08:30	08/22/19 19:07	7440-42-8	
Calcium	**51.9J**	ug/L	200	50.0	1	08/22/19 08:30	08/22/19 19:07	7440-70-2	B
Iron	**<14.0**	ug/L	50.0	14.0	1	08/22/19 08:30	08/22/19 19:07	7439-89-6	
Magnesium	**14.1J**	ug/L	50.0	13.0	1	08/22/19 08:30	08/22/19 19:07	7439-95-4	
Manganese	**<2.1**	ug/L	5.0	2.1	1	08/22/19 08:30	08/22/19 19:07	7439-96-5	
Potassium	**<79.0**	ug/L	500	79.0	1	08/22/19 08:30	08/22/19 19:07	7440-09-7	
Sodium	**<144**	ug/L	500	144	1	08/22/19 08:30	08/22/19 19:07	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<6.5**	mg/L	20.0	6.5	1		09/02/19 14:25		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**16.0**	mg/L	5.0	5.0	1		08/26/19 15:06		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.22**	mg/L	1.0	0.22	1		09/04/19 05:07	16887-00-6	
Fluoride	**<0.085**	mg/L	0.20	0.085	1		09/04/19 05:07	16984-48-8	
Sulfate	**<0.23**	mg/L	1.0	0.23	1		09/04/19 05:07	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Sample: S-BMW-1S **Lab ID: 60310790002** Collected: 08/01/19 10:55 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**70.8J**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 12:51	7440-42-8	B
Calcium	**149000**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 16:36	7440-70-2	
Iron	**<14.0**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 16:36	7439-89-6	
Magnesium	**28400**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 16:36	7439-95-4	
Manganese	**472**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 16:36	7439-96-5	
Potassium	**383J**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 16:36	7440-09-7	
Sodium	**5350**	ug/L	500	144	1	08/07/19 14:31	08/08/19 16:36	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**432**	mg/L	20.0	6.5	1		08/15/19 11:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**548**	mg/L	10.0	10.0	1		08/07/19 13:13		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**8.8**	mg/L	1.0	0.22	1		08/15/19 04:53	16887-00-6	
Fluoride	**0.31**	mg/L	0.20	0.085	1		08/15/19 04:53	16984-48-8	
Sulfate	**34.1**	mg/L	2.0	0.46	2		08/15/19 05:44	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Sample: S-BMW-3S **Lab ID: 60310790003** Collected: 08/01/19 11:45 Received: 08/03/19 02:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**73.9J**	ug/L	100	10.7	1	08/07/19 14:31	08/09/19 12:53	7440-42-8	B
Calcium	**122000**	ug/L	200	50.0	1	08/07/19 14:31	08/08/19 16:38	7440-70-2	
Iron	**44.3J**	ug/L	50.0	14.0	1	08/07/19 14:31	08/08/19 16:38	7439-89-6	
Magnesium	**22400**	ug/L	50.0	13.0	1	08/07/19 14:31	08/08/19 16:38	7439-95-4	
Manganese	**298**	ug/L	5.0	2.1	1	08/07/19 14:31	08/08/19 16:38	7439-96-5	
Potassium	**648**	ug/L	500	79.0	1	08/07/19 14:31	08/08/19 16:38	7440-09-7	
Sodium	**5280**	ug/L	500	144	1	08/07/19 14:31	08/08/19 16:38	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**358**	mg/L	20.0	6.5	1		08/15/19 11:25		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**452**	mg/L	10.0	10.0	1		08/07/19 13:14		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**10.6**	mg/L	1.0	0.22	1		08/15/19 06:01	16887-00-6	
Fluoride	**0.35**	mg/L	0.20	0.085	1		08/15/19 06:01	16984-48-8	
Sulfate	**25.3**	mg/L	2.0	0.46	2		08/15/19 06:17	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

QC Batch: 601714 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60310790002, 60310790003

METHOD BLANK: 2461467 Matrix: Water
Associated Lab Samples: 60310790002, 60310790003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	11.8J	100	10.7	08/09/19 12:44	
Calcium	ug/L	<50.0	200	50.0	08/08/19 16:31	
Iron	ug/L	<14.0	50.0	14.0	08/08/19 16:31	
Magnesium	ug/L	<13.0	50.0	13.0	08/08/19 16:31	
Manganese	ug/L	<2.1	5.0	2.1	08/08/19 16:31	
Potassium	ug/L	<79.0	500	79.0	08/08/19 16:31	
Sodium	ug/L	<144	500	144	08/08/19 16:31	

LABORATORY CONTROL SAMPLE: 2461468

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	987	99	85-115	
Calcium	ug/L	10000	9780	98	85-115	
Iron	ug/L	10000	9860	99	85-115	
Magnesium	ug/L	10000	9530	95	85-115	
Manganese	ug/L	1000	988	99	85-115	
Potassium	ug/L	10000	9940	99	85-115	
Sodium	ug/L	10000	10300	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2461469 2461470

Parameter	Units	60310791001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	217	1000	1000	1230	1210	101	100	70-130	1	20	
Calcium	ug/L	58100	10000	10000	70000	68700	119	106	70-130	2	20	
Iron	ug/L	1010	10000	10000	10700	10800	97	97	70-130	1	20	
Magnesium	ug/L	16700	10000	10000	26800	26400	101	97	70-130	1	20	
Manganese	ug/L	113	1000	1000	1100	1100	98	99	70-130	0	20	
Potassium	ug/L	4210	10000	10000	14400	14300	102	101	70-130	0	20	
Sodium	ug/L	14000	10000	10000	24700	24300	107	103	70-130	2	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2461471 2461472

Parameter	Units	60310791002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	12400	1000	1000	13200	13600	84	116	70-130	2	20	
Calcium	ug/L	171000	10000	10000	180000	184000	94	127	70-130	2	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2461471 2461472

Parameter	Units	60310791002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	416	10000	10000	10100	10200	97	98	70-130	0	20	
Magnesium	ug/L	5320	10000	10000	14500	14700	92	94	70-130	1	20	
Manganese	ug/L	168	1000	1000	1140	1160	97	99	70-130	1	20	
Potassium	ug/L	22900	10000	10000	33000	33600	101	107	70-130	2	20	
Sodium	ug/L	46500	10000	10000	56500	57800	100	113	70-130	2	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

QC Batch: 604815 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60312389001, 60312389002, 60312389003, 60312389004, 60312389005, 60312389006, 60312389007, 60312389008

METHOD BLANK: 2472448 Matrix: Water
Associated Lab Samples: 60312389001, 60312389002, 60312389003, 60312389004, 60312389005, 60312389006, 60312389007, 60312389008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<10.7	100	10.7	08/22/19 18:41	
Calcium	ug/L	50.1J	200	50.0	08/22/19 18:41	
Iron	ug/L	<14.0	50.0	14.0	08/22/19 18:41	
Magnesium	ug/L	<13.0	50.0	13.0	08/22/19 18:41	
Manganese	ug/L	<2.1	5.0	2.1	08/22/19 18:41	
Potassium	ug/L	<79.0	500	79.0	08/22/19 18:41	
Sodium	ug/L	<144	500	144	08/22/19 18:41	

LABORATORY CONTROL SAMPLE: 2472449

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	980	98	85-115	
Calcium	ug/L	10000	10400	104	85-115	
Iron	ug/L	10000	10200	102	85-115	
Magnesium	ug/L	10000	10200	102	85-115	
Manganese	ug/L	1000	1030	103	85-115	
Potassium	ug/L	10000	9760	98	85-115	
Sodium	ug/L	10000	9830	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2472450 2472451

Parameter	Units	60312389006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	61.1J	1000	1000	1060	1070	100	101	70-130	2	20	
Calcium	ug/L	136000	10000	10000	146000	148000	98	121	70-130	2	20	
Iron	ug/L	115	10000	10000	9830	10000	97	99	70-130	2	20	
Magnesium	ug/L	39500	10000	10000	49400	49900	100	104	70-130	1	20	
Manganese	ug/L	499	1000	1000	1490	1520	99	102	70-130	2	20	
Potassium	ug/L	7570	10000	10000	17100	17400	95	98	70-130	2	20	
Sodium	ug/L	44600	10000	10000	54600	55100	100	106	70-130	1	20	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

QC Batch: 603364 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60310790002, 60310790003

METHOD BLANK: 2467297 Matrix: Water
Associated Lab Samples: 60310790002, 60310790003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<6.5	20.0	6.5	08/15/19 10:55	

LABORATORY CONTROL SAMPLE: 2467298

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	486	97	90-110	

SAMPLE DUPLICATE: 2467299

Parameter	Units	60310412023 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	277	296	7	10	

SAMPLE DUPLICATE: 2467300

Parameter	Units	60310791002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	186	187	0	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

QC Batch: 606629 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60312389001, 60312389002, 60312389003, 60312389004, 60312389005, 60312389006, 60312389007, 60312389008

METHOD BLANK: 2479208 Matrix: Water
Associated Lab Samples: 60312389001, 60312389002, 60312389003, 60312389004, 60312389005, 60312389006, 60312389007, 60312389008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<6.5	20.0	6.5	09/02/19 11:48	

LABORATORY CONTROL SAMPLE: 2479209

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	487	97	90-110	

SAMPLE DUPLICATE: 2479210

Parameter	Units	60312275001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	96.5	154	46	10	D6

SAMPLE DUPLICATE: 2479211

Parameter	Units	60312389006 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	403	404	0	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

QC Batch: 601524 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60310790002, 60310790003

METHOD BLANK: 2460999 Matrix: Water
Associated Lab Samples: 60310790002, 60310790003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/07/19 13:10	

LABORATORY CONTROL SAMPLE: 2461000

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	982	98	80-120	

SAMPLE DUPLICATE: 2461001

Parameter	Units	60310791002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	822	809	2	10	

SAMPLE DUPLICATE: 2461002

Parameter	Units	60310412023 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	545	600	10	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

QC Batch: 605419 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60312389001, 60312389002, 60312389003

METHOD BLANK: 2475117 Matrix: Water
Associated Lab Samples: 60312389001, 60312389002, 60312389003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/26/19 13:47	

LABORATORY CONTROL SAMPLE: 2475118

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	997	100	80-120	

SAMPLE DUPLICATE: 2475119

Parameter	Units	60312240001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	861	857	0	10	

SAMPLE DUPLICATE: 2475120

Parameter	Units	60312291003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	433	415	4	10	

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REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

QC Batch: 605420 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60312389004, 60312389005, 60312389006, 60312389007, 60312389008

METHOD BLANK: 2475121 Matrix: Water
Associated Lab Samples: 60312389004, 60312389005, 60312389006, 60312389007, 60312389008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	08/26/19 15:05	

LABORATORY CONTROL SAMPLE: 2475122

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1020	102	80-120	

SAMPLE DUPLICATE: 2475123

Parameter	Units	60312389006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	671	705	5	10	

SAMPLE DUPLICATE: 2475124

Parameter	Units	60312546001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	3010	2780	8	10	

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REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

QC Batch: 603127 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60310790002, 60310790003

METHOD BLANK: 2466421 Matrix: Water
Associated Lab Samples: 60310790002, 60310790003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	08/14/19 11:57	
Fluoride	mg/L	<0.085	0.20	0.085	08/14/19 11:57	
Sulfate	mg/L	<0.23	1.0	0.23	08/14/19 11:57	

LABORATORY CONTROL SAMPLE: 2466422

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Fluoride	mg/L	2.5	2.4	97	90-110	
Sulfate	mg/L	5	4.7	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2466423 2466424

Parameter	Units	60310412023 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	25.5	25	25	50.0	49.4	98	96	80-120	1	15	
Fluoride	mg/L	2.1	2.5	2.5	4.6	4.7	101	102	80-120	1	15	
Sulfate	mg/L	96.6	25	25	122	120	100	94	80-120	1	15	E

MATRIX SPIKE SAMPLE: 2466425

Parameter	Units	60310952001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	46500	50000	99400	106	80-120	
Fluoride	mg/L	ND	25000	24700	99	80-120	
Sulfate	mg/L	21700	50000	73700	104	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

QC Batch: 607014 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60312389001, 60312389002, 60312389003, 60312389004, 60312389005, 60312389006, 60312389007, 60312389008

METHOD BLANK: 2480852 Matrix: Water
Associated Lab Samples: 60312389001, 60312389002, 60312389003, 60312389004, 60312389005, 60312389006, 60312389007, 60312389008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	09/03/19 19:09	
Fluoride	mg/L	<0.085	0.20	0.085	09/03/19 19:09	
Sulfate	mg/L	<0.23	1.0	0.23	09/03/19 19:09	

LABORATORY CONTROL SAMPLE: 2480853

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	93	90-110	
Fluoride	mg/L	2.5	2.4	97	90-110	
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE SAMPLE: 2480854

Parameter	Units	60312388004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L		50	134	109	80-120	H5
Fluoride	mg/L		25	25.1	96	80-120	H5
Sulfate	mg/L		50	193	110	80-120	H5

MATRIX SPIKE SAMPLE: 2480855

Parameter	Units	60312389006 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	<0.85	2.5	2.8	101	80-120	
Sulfate	mg/L	31.5	25	58.6	109	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

QC Batch: 607229 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60312389001, 60312389006

METHOD BLANK: 2481446 Matrix: Water
Associated Lab Samples: 60312389001, 60312389006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	09/04/19 09:29	

LABORATORY CONTROL SAMPLE: 2481447

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2481448 2481449

Parameter	Units	60312389006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	103	50	50	160	154	114	101	80-120	4	15	

MATRIX SPIKE SAMPLE: 2481452

Parameter	Units	60312725002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	3140	2500	5760	105	80-120	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
D6	The precision between the sample and sample duplicate exceeded laboratory control limits.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H5	Reanalysis conducted in excess of EPA method holding time. Results confirm original analysis performed in hold time.

Pace Analytical Services, LLC
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR
Pace Project No.: 60312389

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60310790002	**S-BMW-1S**	EPA 200.7	601714	EPA 200.7	601738
60310790003	**S-BMW-3S**	EPA 200.7	601714	EPA 200.7	601738
60312389001	**S-UG-1A**	EPA 200.7	604815	EPA 200.7	604890
60312389002	**S-UG-2**	EPA 200.7	604815	EPA 200.7	604890
60312389003	**S-DG-1**	EPA 200.7	604815	EPA 200.7	604890
60312389004	**S-DG-2**	EPA 200.7	604815	EPA 200.7	604890
60312389005	**S-DG-3**	EPA 200.7	604815	EPA 200.7	604890
60312389006	**S-DG-4**	EPA 200.7	604815	EPA 200.7	604890
60312389007	**S-SCPC-DUP-1**	EPA 200.7	604815	EPA 200.7	604890
60312389008	**S-SCPC-FB-1**	EPA 200.7	604815	EPA 200.7	604890
60310790002	**S-BMW-1S**	SM 2320B	603364		
60310790003	**S-BMW-3S**	SM 2320B	603364		
60312389001	**S-UG-1A**	SM 2320B	606629		
60312389002	**S-UG-2**	SM 2320B	606629		
60312389003	**S-DG-1**	SM 2320B	606629		
60312389004	**S-DG-2**	SM 2320B	606629		
60312389005	**S-DG-3**	SM 2320B	606629		
60312389006	**S-DG-4**	SM 2320B	606629		
60312389007	**S-SCPC-DUP-1**	SM 2320B	606629		
60312389008	**S-SCPC-FB-1**	SM 2320B	606629		
60310790002	**S-BMW-1S**	SM 2540C	601524		
60310790003	**S-BMW-3S**	SM 2540C	601524		
60312389001	**S-UG-1A**	SM 2540C	605419		
60312389002	**S-UG-2**	SM 2540C	605419		
60312389003	**S-DG-1**	SM 2540C	605419		
60312389004	**S-DG-2**	SM 2540C	605420		
60312389005	**S-DG-3**	SM 2540C	605420		
60312389006	**S-DG-4**	SM 2540C	605420		
60312389007	**S-SCPC-DUP-1**	SM 2540C	605420		
60312389008	**S-SCPC-FB-1**	SM 2540C	605420		
60310790002	**S-BMW-1S**	EPA 300.0	603127		
60310790003	**S-BMW-3S**	EPA 300.0	603127		
60312389001	**S-UG-1A**	EPA 300.0	607014		
60312389001	**S-UG-1A**	EPA 300.0	607229		
60312389002	**S-UG-2**	EPA 300.0	607014		
60312389003	**S-DG-1**	EPA 300.0	607014		
60312389004	**S-DG-2**	EPA 300.0	607014		
60312389005	**S-DG-3**	EPA 300.0	607014		
60312389006	**S-DG-4**	EPA 300.0	607014		
60312389006	**S-DG-4**	EPA 300.0	607229		
60312389007	**S-SCPC-DUP-1**	EPA 300.0	607014		
60312389008	**S-SCPC-FB-1**	EPA 300.0	607014		

REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

WO# : 60312389

60312389

Client Name: Golder Associates

Courier: FedEx ☐ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☑ Client ☐ Other ☐

Tracking #: _____ Pace Shipping Label Used? Yes ☐ No ☐

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☐ Other ☐ ZIPLOC

Thermometer Used: T295 **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): As-read 1.4, 0.4 4.3 Corr. Factor 0.2 Corrected 1.2, 0.2, 4.1

Date and initials of person examining contents: WS 8/20/19

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO3, H2SO4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☑N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jami Church 8/21/19 Date:

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: of

Section A Required Client Information:

Company:	Golder Associates
Address:	13515 Barrett Parkway Drive, Ste 260
	Ballwin, MO 63021
Email To:	jeffrey_ingram@golder.com
Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	Jeffrey Ingram
Copy To:	Ryan Feldmann/Eric Schneider
Purchase Order No.:	
Project Name:	Ameren Sioux Energy Center
Project Number:	153-1406-01.0003C (COC#7)

Section C Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER

UST RCRA OTHER

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N		60312389
1	S-UG-1A	WT	G	8/19/14	0935				3	2		1						Analysis Test	1	1	1	1	BP2U	BP3U	BP3N	001
2	S-UG-2	WT	G		720																				002
3	S-DG-1	WT	G		1030																				003
4	S-DG-2	WT	G		1115																				004
5	S-DG-3	WT	G		1205																				005
6	S-DG-4	WT	G		1120																				006
7	S-SCPC-DUP-1	WT	G		—																				
8	S-SCPC-FB-1	WT	G		0912																				
9	S-BMW-1S	WT	G																						
10	S-BMW-3S	WT	G		—																				
11	S-DG-4-MS	WT	G		1125				3	2		1							1	1		1				
12	S-DG-4-MSD	WT	G		1125				3	2		1							1	1		1				

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
*EPA 200.7: B, Ca, Fe, Mg, Mn, K, Na	JCH Ingram/Golder	8/19/14	1345	Angela Mcm	8/19/14	15:50
	Angela Mcm	8/19/14	13:51	Patton Brown/Pace	8/20/14	0245

SAMPLE CONDITIONS

Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
1.2	Y	Y	Y
0.2			
4.1			

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: JH Ingram

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 8/19/14

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Sample Condition Upon Receipt

WO# : 60310790

60310790

Client Name: Golder

Courier: FedEx ☐ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☑ Client ☐ Other ☐

Tracking #: _____ Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

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

Thermometer Used: T-294 **Type of Ice:** Wet ☑ Blue None

Cooler Temperature (°C): **As-read** 1.5, 2.0 **Corr. Factor** -1.0 **Corrected** 0.5, 1.0

Date and initials of person examining contents: 8/13/19

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	No volume for analysis total phosphorus.
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO3, H2SO4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☑N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jasmi Church Date: 8/8/19

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
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Page: 1 of 1

Section A — Required Client Information:

Company:	Golder Associates
Address:	13515 Barrett Parkway Drive, Ste 260
	Ballwin, MO 63021
Email To:	jeffrey_ingram@golder.com
Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B — Required Project Information:

Report To:	Jeffrey Ingram
Copy To:	Ryan Feldmann/Eric Schneider
Purchase Order No.:	
Project Name:	Ameren Sioux Energy Center
Project Number:	153-1406-01.0003B (COC#6)

Section C — Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER
UST | RCRA | OTHER _____

Site Location STATE: MO

Section D — Required Client Information

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

Valid Matrix Codes

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N		
1	S-LMW-1S	WT	G	8/1/19	1500				5	2		3							1	1	1	1	1		10310790 001
2	S-LMW-2S	WT	G																						
3	S-LMW-3S	WT	G																						
4	S-LMW-4S	WT	G																						
5	S-LWM-5S	WT	G																						
6	S-LWM-6S	WT	G																						
7	S-LMW-7S	WT	G																						
8	S-LMW-8S	WT	G																						
9	S-LMW-9S	WT	G																						
10	S-BMW-1S	WT	G	8/1/19	1055				5	2		3							1	1	1	1	1		002
11	S-BMW-3S	WT	G	↓	1145				5	2		3							1	1	1	1	1		003
12	S-LMW-DUP-1	WT	G																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
*EPA 200.7: B, Ca, Fe, Mg, Mn, K, Na	Golder	8/2/19	1635		8/3/19	0250

SAMPLE CONDITIONS			
Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
1.5 2.0	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Ryan Feldmann

SIGNATURE of SAMPLER: [signature]

DATE Signed (MM/DD/YY): 8/2/19

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Sample Condition Upon Receipt

WO#: 60310790

60310790

Client Name: Golder Assoc.

Courier: FedEx ☐ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☒ Client ☐ Other ☐

Tracking #: _____ Pace Shipping Label Used? Yes ☐ No ☒

Custody Seal on Cooler/Box Present: Yes ☒ No ☐ Seals intact: Yes ☒ No ☐

Packing Material: Bubble Wrap ☐ Bubble Bags ☐ Foam ☐ None ☐ Other ☒ cpIC

Thermometer Used: T100 **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): As-read 0.2 Corr. Factor +0.0 Corrected 0.2,

Date and initials of person examining contents: 8.7.19 ML

Temperature should be above freezing to 6°C 0.6, 1.0, 0.3 0.6, 1.0, 0.3

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished:	☒Yes ☐No ☐N/A	
Samples arrived within holding time:	☒Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☒No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☒No ☐N/A	
Sufficient volume:	☒Yes ☐No ☐N/A	
Correct containers used:	☒Yes ☐No ☐N/A	
Pace containers used:	☒Yes ☐No ☐N/A	
Containers intact:	☒Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☒N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☒N/A	
Sample labels match COC: Date / time / ID / analyses	☒Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☒No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☒Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☒N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☒N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☒N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☒N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jami Church Date: 8/8/19

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 2

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Golder Associates	Report To:	Jeffrey Ingram	Attention:	
Address:	13515 Barrett Parkway Drive, Ste 260	Copy To:	Ryan Feldmann/Eric Schneider	Company Name:	
	Ballwin, MO 63021			Address:	
Email To:	jeffrey_ingram@golder.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren Sioux Energy Center	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153-1406-01.0003B (COC#6)	Pace Profile #:	9285

REGULATORY AGENCY

NPDES (GROUND WATER) DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Requested Analysis Filtered (Y/N): Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	~~Total Phosphorus~~	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N			40310790
1	S-LMW-1S	WT	G																							
2	S-LMW-2S	WT	G			8/6/19	1030		3	2		1							✓	✓	✓	✓	BP2U, BP3N, BP3U			001
3	S-LMW-3S	WT	G			8/5/19	1620		3	2		1							✓	✓	✓	✓				005
4	S-LMW-4S	WT	G			8/5/19	1450		3	2		1							✓	✓	✓	✓				006
5	S-LWM-5S	WT	G			8/5/19	1030		9	2		3							✓	✓	✓	✓	3BP2U, 3BP3N, 3BP3U			007
6	S-LWM-6S	WT	G			8/5/19	1135		3	2		1							✓	✓	✓	✓	BP2U, BP3N, BP3U			008
7	S-LMW-7S	WT	G			8/5/19	1255		3	2		1							✓	✓	✓	✓				009
8	S-LMW-8S	WT	G			8/6/19	0925		3	2		1							✓	✓	✓	✓				010
9	S-LMW-9S	WT	G																							
10	S-BMW-1S	WT	G																							
11	S-BMW-3S	WT	G																							
12	S-LMW-DUP-1	WT	G			8/5/19	—		3	2		1							✓	✓	✓	✓	BP2U, BP3N, BP3U			011

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca, Fe, Mg, Mn, K, Na	Lucas Swindle/Golder	8/6/19	1700	[illegible] /Ves	8-7-19	0255	0.2	Y	Y	Y
							0.6			
							1.0			
							0.3			

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Lucas Swindle

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 8/6/19

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CHAIN-OF-CUSTODY / Analytical Request Document

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Section A Required Client Information:

Company:	Golder Associates
Address:	13515 Barrett Parkway Drive, Ste 260
	Ballwin, MO 63021
Email To:	jeffrey_ingram@golder.com
Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	Jeffrey Ingram
Copy To:	Ryan Feldmann/Eric Schneider
Purchase Order No.:	
Project Name:	Ameren Sioux Energy Center
Project Number:	153-1406-01.0003B (COC #6)

Section C Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285

REGULATORY AGENCY

NPDES GROUND WATER DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Total Phosphorus								Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N	N								
1	S-LMW-DUP-2	WT	G			8/6/19	—		3	2		1							/	/	/	/	DP2U, DP3N								012
2	S-LMW-FB-1	WT	G			8/5/19	1408		3	2		1							/	/	/	/									013
3	S-LMW-FB-2	WT	G			8/6/19	0812		3	2		1							/	/	/	/									014
4		WT	G																											
5		WT	G																											
6		WT	G																											
7		WT	G																											
8		WT	G																											
9		WT	G																											
10		WT	G																											
11		WT	G																											
12		WT	G																											

L803D790

Pace Project No./ Lab I.D.

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS		
*EPA 200.7: B, Ca, Fe, Mg, Mn, K, Na	Golder	8/6/19	1700		8.7.19	0255	7.0	Y	Y	Y
							0.6			
							1.0			
							0.3			

SAMPLER NAME AND SIGNATURE			
PRINT Name of SAMPLER:	Lucas Swindle		
SIGNATURE of SAMPLER:		DATE Signed (MM/DD/YY):	8/6/19

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

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Sample Condition Upon Receipt

WO# : 60310790

60310790

Client Name: Golder

Courier: FedEx ☐ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☑ Client ☐ Other ☐

Tracking #: _____ Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

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

Thermometer Used: T-294 **Type of Ice:** Wet ☑ Blue None

Cooler Temperature (°C): **As-read** 2.2 **Corr. Factor** 1.0 **Corrected** 1.2

Date and initials of person examining contents: 8/10/19

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☑N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jamie Church 8/13/19 Date: _____

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CHAIN-OF-CUSTODY / Analytical Request Document

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Page: of

2013245

Section A Required Client Information:

Company:	Golder Associates
Address:	13515 Barrett Parkway Dr. Ste 260 Ballwin, MO 63021
Email To:	jeffrey_ingram@golder.com
Phone:	636-724-9191
Fax:	636-724-9323
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	Jeffrey Ingram
Copy To:	Ryan Feldmann / Eric Schneider
Purchase Order No.:	
Project Name:	Ameren Sioux Energy Center
Project Number:	153-140601.0003B

Section C Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285

REGULATORY AGENCY

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

Site Location STATE: _____

Section D Required Client Information

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

Matrix Codes (MATRIX / CODE): Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Tissue TS; Other OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test ↓ Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity									Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																			N	N	N	N									
1	S-LMW-95	WT	G			8/9/19	0935		3	2		1							/	/	/	/									60310790
2																															
3																															
4																															
5																															
6																															
7																															
8																															
9																															
10																															
11																															
12																															

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
*EPA 200.7: Al, B, Ca, Fe, Mg,	Golder	8/9/19	1311		8/9/19	1317				
Mn, K, Na		8/9/19	1700		8/10/19	0945	1,2	Y	Y	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Lucas Swindle

SIGNATURE of SAMPLER: _____ DATE Signed (MM/DD/YY): 8/9/19

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

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

F-ALL-Q-020rev.07, 15-May-2007

MEMORANDUM

DATE October 17, 2019 **Project No.** 1531406

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Tommy Goodwin **EMAIL Tommy_Goodwin@golder.com**

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCPC – DATA PACKAGE 60312389

The following is a summary of instances where quality control criteria in the functional guidelines were not met and data qualification was required:

- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).
- When a compound was detected in a blank (i.e. method, field), and the blank comparison criterion was not met, associated sample results were qualified as estimates (J) or non-detects (U).

Golder Associates Inc.
13515 Barrett Parkway Drive, Suite 260,
Ballwin, Missouri, USA 63021

T: +1 314 984-8800 F: +1 314 984-8770

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Manager: J Ingram
Project Name: Ameren - Sioux - SCPC
Project Number: 1531406
Reviewer: T Goodwin
Validation Date: 10/17/2019

Laboratory: Pace Analytical - KS
SDG #: 60312389
Analytical Method (type and no.): EPA 200.7 (Metals); SM 2320B (Alk); SM 2540C (TDS); EPA 300.0 (Anions)
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐ _____
Sample Names S-UG-1A, S-UG-2, S-DG-1, S-DG-2, S-DG-3, S-DG-4, S-SCPC-DUP-1, S-SCPC-FB-1, S-BMW-1S, S-BMW-3S

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	8/1 and 8/19/2019
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Sp.Cond, ORP, Temp, DO, Turb
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies: _____

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	☒	☐	☐	
b) Was the COC signed by both field and laboratory personnel?	☒	☐	☐	
c) Were samples received in good condition?	☒	☐	☐	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	☒	☐	☐	
b) Were hold times met for sample analysis?	☒	☐	☐	
c) Were the correct preservatives used?	☒	☐	☐	
d) Was the correct method used?	☒	☐	☐	
e) Were appropriate reporting limits achieved?	☒	☐	☐	
f) Were any sample dilutions noted?	☒	☐	☐	See Notes
g) Were any matrix problems noted?	☐	☒	☐	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	☒	☐	☐	See Notes
b) Were analytes detected in the field blank(s)?	☒	☐	☐	See Notes
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	☒	☐	☐	
b) Were the proper analytes included in the LCS?	☒	☐	☐	
c) Was the LCS accuracy criteria met?	☒	☐	☐	

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?				DUP-1 @ S-DG-3
	☒	☐	☐	FB-1 @ S-UG-2
b) Were field dup. precision criteria met (note RPD)?	☒	☐	☐	See Notes
c) Were lab duplicates analyzed (note original and duplicate samples)?				
	☒	☐	☐	-89006: Alk, TDS
d) Were lab dup. precision criteria met (note RPD)?	☒	☐	☐	See Notes

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	☐	☒	☐	
b) Was the %D within control limits?	☐	☐	☒	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	☒	☐	☐	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
b) Was MSD accuracy criteria met?	☒	☐	☐	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
c) Were MS/MSD precision criteria met?	☒	☐	☐	

Comments/Notes:

MB: -90002-03: B (11.8); -89001-08: Ca (50.1)

FB-1: Ca (51.9), Mg (14.1), TDS (16.0)

Max analyzed Field Duplicate RPD: 4.4% (Limit: 20%)

Max analyzed Lab Duplicate RPD: 5% (Limit: 10%)

Dilution: Chloride and Sulfate were diluted in several samples; no qualification is necessary.

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-SCPC-FB-1	Calcium (Ca)	200	U	Analyte Detected in Method Blank (MB); PQL>Result>MDL
S-BMW-1S	Boron (B)	100	U	"
S-BMW-3S	"	100	U	"

Signature: Tommy Johnson

Date: 10/17/2019

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

October 17, 2019

Jeffrey Ingram
Golder Associates
13515 Barrett Parkway Drive
Suite 260
Ballwin, MO 63021

RE: Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60317027

Dear Jeffrey Ingram:
Enclosed are the analytical results for sample(s) received by the laboratory on October 04, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Jamie Church
jamie.church@pacelabs.com
314-838-7223
Project Manager

Enclosures

cc: Ryan Feldmann, Golder
Mark Haddock, Golder Associates
Eric Schneider, Golder Associates

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

CERTIFICATIONS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60317027

Kansas Certification IDs

9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Inorganic Drinking Water Certification #: 10090
Arkansas Drinking Water
Arkansas Certification #: 19-016-0
Arkansas Drinking Water
Illinois Certification #: 004455
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212018-1
Oklahoma Certification #: 9205/9935
Florida: Cert E871149 SEKS WET
Texas Certification #: T104704407-18-11
Utah Certification #: KS000212018-8
Illinois Certification #: 004592
Kansas Field Laboratory Accreditation: # E-92587
Missouri SEKS Micro Certification: 10070

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60317027

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60317027001	**S-UG1A**	Water	10/02/19 12:45	10/04/19 02:55
60317027002	**S-SCPC-DUP-1**	Water	10/02/19 12:45	10/04/19 02:55
60317027003	**S-UG-2**	Water	10/02/19 11:15	10/04/19 02:55
60317027004	**SCPC-FB-1**	Water	10/02/19 11:25	10/04/19 02:55
60317027005	**S-DG-3**	Water	10/02/19 12:45	10/04/19 02:55

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60317027

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60317027001	**S-UG1A**	EPA 200.7	LRS	1	PASI-K
		EPA 300.0	MGS	1	PASI-K
60317027002	**S-SCPC-DUP-1**	EPA 200.7	LRS	1	PASI-K
		EPA 300.0	MGS	1	PASI-K
60317027003	**S-UG-2**	EPA 300.0	MGS	1	PASI-K
60317027004	**SCPC-FB-1**	EPA 200.7	LRS	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	MGS	2	PASI-K
60317027005	**S-DG-3**	SM 2540C	MAP	1	PASI-K

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Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60317027

Sample: S-UG1A **Lab ID: 60317027001** Collected: 10/02/19 12:45 Received: 10/04/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**166000**	ug/L	200	50.0	1	10/11/19 14:00	10/14/19 14:54	7440-70-2	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**140**	mg/L	10.0	2.2	10		10/16/19 11:02	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60317027

Sample: S-SCPC-DUP-1 **Lab ID: 60317027002** Collected: 10/02/19 12:45 Received: 10/04/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**164000**	ug/L	200	50.0	1	10/11/19 14:00	10/14/19 15:02	7440-70-2	
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**139**	mg/L	10.0	2.2	10		10/16/19 11:19	16887-00-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60317027

Sample: S-UG-2 **Lab ID: 60317027003** Collected: 10/02/19 11:15 Received: 10/04/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Fluoride	**0.30**	mg/L	0.20	0.085	1		10/15/19 18:36	16984-48-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60317027

Sample: SCPC-FB-1 **Lab ID: 60317027004** Collected: 10/02/19 11:25 Received: 10/04/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Calcium	**<50.0**	ug/L	200	50.0	1	10/11/19 14:00	10/14/19 15:04	7440-70-2	
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<5.0**	mg/L	5.0	5.0	1		10/08/19 15:19		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.22**	mg/L	1.0	0.22	1		10/15/19 18:53	16887-00-6	
Fluoride	**<0.085**	mg/L	0.20	0.085	1		10/15/19 18:53	16984-48-8	

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60317027

Sample: S-DG-3 **Lab ID: 60317027005** Collected: 10/02/19 12:45 Received: 10/04/19 02:55 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**569**	mg/L	10.0	10.0	1		10/08/19 15:20		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60317027

QC Batch: 615188 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60317027001, 60317027002, 60317027004

METHOD BLANK: 2511571 Matrix: Water
Associated Lab Samples: 60317027001, 60317027002, 60317027004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Calcium	ug/L	<50.0	200	50.0	10/14/19 14:47	

LABORATORY CONTROL SAMPLE: 2511572

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	10000	10100	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2511573 2511574

Parameter	Units	60317027001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	166000	10000	10000	176000	176000	99	92	70-130	0	20	

MATRIX SPIKE SAMPLE: 2511575

Parameter	Units	60317068001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	138000	10000	145000	69	70-130	M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60317027

QC Batch: 614091 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60317027004, 60317027005

METHOD BLANK: 2507725 Matrix: Water
Associated Lab Samples: 60317027004, 60317027005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	10/08/19 15:18	

LABORATORY CONTROL SAMPLE: 2507726

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	982	98	80-120	

SAMPLE DUPLICATE: 2507728

Parameter	Units	60317050012 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	47100	45400	4	10	

SAMPLE DUPLICATE: 2507743

Parameter	Units	60317050008 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	947	957	1	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60317027

QC Batch: 614196 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60317027001, 60317027002, 60317027003, 60317027004

METHOD BLANK: 2508100 Matrix: Water
Associated Lab Samples: 60317027001, 60317027002, 60317027003, 60317027004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	10/15/19 15:08	
Fluoride	mg/L	<0.085	0.20	0.085	10/15/19 15:08	

LABORATORY CONTROL SAMPLE: 2508101

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.6	92	90-110	
Fluoride	mg/L	2.5	2.4	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2508102 2508103

Parameter	Units	60317026001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	22.1	10	10	34.2	32.5	121	105	80-120	5	15	M1
Fluoride	mg/L	0.26	2.5	2.5	2.8	2.9	103	106	80-120	3	15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

QUALIFIERS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60317027

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60317027

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60317027001	**S-UG1A**	EPA 200.7	615188	EPA 200.7	615295
60317027002	**S-SCPC-DUP-1**	EPA 200.7	615188	EPA 200.7	615295
60317027004	**SCPC-FB-1**	EPA 200.7	615188	EPA 200.7	615295
60317027004	**SCPC-FB-1**	SM 2540C	614091		
60317027005	**S-DG-3**	SM 2540C	614091		
60317027001	**S-UG1A**	EPA 300.0	614196		
60317027002	**S-SCPC-DUP-1**	EPA 300.0	614196		
60317027003	**S-UG-2**	EPA 300.0	614196		
60317027004	**SCPC-FB-1**	EPA 300.0	614196		

Pace Analytical
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Sample Condition Upon Receipt

WO# : 60317027

60317027

Client Name: Golder Associates

Courier: FedEx ☐ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☑ Client ☐ Other ☐

Tracking #: _____ Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

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

Thermometer Used: T-301 **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): As-read 0.1 Corr. Factor +0.0 Corrected 0.1

Date and initials of person examining contents: 10.4.19 HS

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☑No ☐N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jami Church Date: 10/8/19

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A Required Client Information:

Company:	Golder Associates
Address:	13515 Barrett Parkway Drive, Ste 260
	Ballwin, MO 63021
Email To:	jeffrey_ingram@golder.com
Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	Jeffrey Ingram
Copy To:	Ryan Feldmann/Eric Schneider
Purchase Order No.:	
Project Name:	Ameren SCPC
Project Number:	153140601.0003

Section C Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285

REGULATORY AGENCY

NPDES | GROUND WATER | DRINKING WATER
UST | RCRA | OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	200.7 Boron	200.7 Calcium	Chloride	Fluoride	Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		N	N	N	N	N	N			
1	S-UG1A	WT	G			10/2/19	1245		2	1		1							1	1						60317027 001
2	S-SCPC-DUP-1	WT	G				-		2	1		1							1	1						002
3	S-UG-2	WT	G				1115		1	1											1					003
4	SCPC-FB-1	WT	G				1125		2	1		1							1	1	1		1			004
5	S-DG-3	WT	G				~~1100~~ 1245		1	1													1			005
6		WT	G																							
7		WT	G																							
8		WT	G																							
9		WT	G																							
10		WT	G																							
11		WT	G																						✓	
12		WT	G																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	Annie Muehlpfordt/Golder	~~10/2/19~~ 10/3/19	1333	Angela McMan	10/3/19	13:35				
	Angela McManus	10/3/19	13:36	E Brackett/Pace	10/4/19	0255	0.1	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Annie Muehlpfordt

SIGNATURE of SAMPLER: Annie Muehlpfordt DATE Signed (MM/DD/YY): 10/2/19

MEMORANDUM

DATE November 12, 2019 **Project No.** 1531406

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Tommy Goodwin **EMAIL Tommy_Goodwin@golder.com**

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCPC – VERIFICATION SAMPLING - DATA PACKAGE 60317027

The following is a summary of instances where quality control criteria in the functional guidelines were not met and data qualification was required:

- None.

Golder Associates Inc.
13515 Barrett Parkway Drive, Suite 260,
Ballwin, Missouri, USA 63021

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QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Name: Ameren - Sioux - SCPC
Reviewer: T Goodwin

Project Manager: J Ingram
Project Number: 1531406
Validation Date: 11/12/2019

Laboratory: Pace Analytical - KS
SDG #: 60317027
Analytical Method (type and no.): EPA 200.7 (Metals); SM 2540C (TDS); EPA 300.0 (Anions)
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐
Sample Names S-UG-1A, S-SCPC-DUP-1, S-UG-2, SCPC-FB-1, S-DG-3

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	x			10/2/2019
b) Sampling team indicated?	x			
c) Sample location noted?	x			
d) Sample depth indicated (Soils)?			x	
e) Sample type indicated (grab/composite)?	x			
f) Field QC noted?	x			
g) Field parameters collected (note types)?	x			pH, Sp.Cond, ORP, Temp, DO, Turb
h) Field Calibration within control limits?	x			
i) Notations of unacceptable field conditions/performances from field logs or field notes?		x		
j) Does the laboratory narrative indicate deficiencies?			x	

Note Deficiencies:

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	x			
b) Was the COC signed by both field and laboratory personnel?	x			
c) Were samples received in good condition?	x			

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	x			
b) Were hold times met for sample analysis?	x			
c) Were the correct preservatives used?	x			
d) Was the correct method used?	x			
e) Were appropriate reporting limits achieved?	x			
f) Were any sample dilutions noted?	x			See Notes
g) Were any matrix problems noted?		x		

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	☐	☒	☐	
b) Were analytes detected in the field blank(s)?	☐	☒	☐	
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	☒	☐	☐	
b) Were the proper analytes included in the LCS?	☒	☐	☐	
c) Was the LCS accuracy criteria met?	☒	☐	☐	

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?				DUP-1 @ S-UG1A
	☒	☐	☐	FB-1 @ S-UG-2
b) Were field dup. precision criteria met (note RPD)?	☒	☐	☐	See Notes
c) Were lab duplicates analyzed (note original and duplicate samples)?				
	☐	☒	☐	
d) Were lab dup. precision criteria met (note RPD)?	☐	☐	☒	

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	☐	☒	☐	
b) Was the %D within control limits?	☐	☐	☒	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	☒	☐	☐	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
b) Was MSD accuracy criteria met?	☒	☐	☐	
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
c) Were MS/MSD precision criteria met?	☒	☐	☐	

Comments/Notes:

Max Field Duplicate RPD: 1.2% (Limit: 20%)

Dilution: Chloride diluted in some samples; no qualification is necessary.

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
None				

Signature: Tommy J Good Jr Date: 11/12/2019

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December 09, 2019

Jeffrey Ingram
Golder Associates
13515 Barrett Parkway Drive
Suite 260
Ballwin, MO 63021

RE: Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Dear Jeffrey Ingram:
Enclosed are the analytical results for sample(s) received by the laboratory on November 16, 2019. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Jamie Church
jamie.church@pacelabs.com
314-838-7223
Project Manager

Enclosures

cc: Ryan Feldmann, Golder
Tommy Goodwin, Golder Associates
Mark Haddock, Golder Associates
Eric Schneider, Golder Associates

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CERTIFICATIONS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Pace Analytical Services Kansas
9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Inorganic Drinking Water Certification #: 10090
Arkansas Drinking Water
Arkansas Certification #: 19-016-0
Arkansas Drinking Water
Illinois Certification #: 004455
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212020-2
Oklahoma Certification #: 9205/9935
Florida: Cert E871149 SEKS WET
Texas Certification #: T104704407-19-12
Utah Certification #: KS000212018-8
Illinois Certification #: 004592
Kansas Field Laboratory Accreditation: # E-92587
Missouri SEKS Micro Certification: 10070

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SAMPLE SUMMARY

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60321518001	**S-UG-1A**	Water	11/14/19 09:20	11/16/19 02:35
60321518002	**S-UG-2**	Water	11/14/19 16:03	11/16/19 02:35
60321518003	**S-DG-1**	Water	11/14/19 10:36	11/16/19 02:35
60321518004	**S-DG-2**	Water	11/14/19 12:15	11/16/19 02:35
60321518005	**S-DG-3**	Water	11/14/19 14:13	11/16/19 02:35
60321518006	**S-DG-4**	Water	11/15/19 09:50	11/16/19 02:35
60321518007	**S-SCPC-DUP-1**	Water	11/14/19 09:50	11/16/19 02:35
60321518008	**S-SCPC-FB-1**	Water	11/14/19 09:50	11/16/19 02:35
60321513010	**S-BMW-1S**	Water	11/15/19 14:43	11/16/19 02:35
60321513011	**S-BMW-3S**	Water	11/15/19 12:18	11/16/19 02:35

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60321518001	**S-UG-1A**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321518002	**S-UG-2**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321518003	**S-DG-1**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321518004	**S-DG-2**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CNB, MJK	3	PASI-K
60321518005	**S-DG-3**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60321518006	**S-DG-4**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60321518007	**S-SCPC-DUP-1**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60321518008	**S-SCPC-FB-1**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	MGS	3	PASI-K
60321513010	**S-BMW-1S**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K
60321513011	**S-BMW-3S**	EPA 200.7	HKC	7	PASI-K

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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2320B	AJS2	1	PASI-K
		SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	3	PASI-K

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Sample: S-UG-1A **Lab ID: 60321518001** Collected: 11/14/19 09:20 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**239**	ug/L	100	10.7	1	11/27/19 07:57	11/27/19 13:28	7440-42-8	
Calcium	**166000**	ug/L	200	50.0	1	11/27/19 07:57	11/27/19 13:28	7440-70-2	
Iron	**<14.0**	ug/L	50.0	14.0	1	11/27/19 07:57	11/27/19 13:28	7439-89-6	
Magnesium	**39800**	ug/L	50.0	13.0	1	11/27/19 07:57	11/27/19 13:28	7439-95-4	
Manganese	**465**	ug/L	5.0	2.1	1	11/27/19 07:57	11/27/19 13:28	7439-96-5	
Potassium	**9530**	ug/L	500	79.0	1	11/27/19 07:57	11/27/19 13:28	7440-09-7	
Sodium	**37900**	ug/L	500	144	1	11/27/19 07:57	11/27/19 13:28	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**430**	mg/L	20.0	6.5	1		11/22/19 17:59		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**739**	mg/L	10.0	10.0	1		11/21/19 16:04		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**118**	mg/L	10.0	2.2	10		11/27/19 22:15	16887-00-6	
Fluoride	**0.29**	mg/L	0.20	0.085	1		11/27/19 21:59	16984-48-8	
Sulfate	**53.0**	mg/L	10.0	2.3	10		11/27/19 22:15	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Sample: S-UG-2 **Lab ID: 60321518002** Collected: 11/14/19 16:03 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**144**	ug/L	100	10.7	1	11/27/19 07:57	11/27/19 13:30	7440-42-8	
Calcium	**115000**	ug/L	200	50.0	1	11/27/19 07:57	11/27/19 13:30	7440-70-2	
Iron	**<14.0**	ug/L	50.0	14.0	1	11/27/19 07:57	11/27/19 13:30	7439-89-6	
Magnesium	**24100**	ug/L	50.0	13.0	1	11/27/19 07:57	11/27/19 13:30	7439-95-4	
Manganese	**196**	ug/L	5.0	2.1	1	11/27/19 07:57	11/27/19 13:30	7439-96-5	
Potassium	**5090**	ug/L	500	79.0	1	11/27/19 07:57	11/27/19 13:30	7440-09-7	
Sodium	**32500**	ug/L	500	144	1	11/27/19 07:57	11/27/19 13:30	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**355**	mg/L	20.0	6.5	1		11/22/19 18:05		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**480**	mg/L	10.0	10.0	1		11/21/19 16:04		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**27.8**	mg/L	5.0	1.1	5		11/27/19 22:47	16887-00-6	
Fluoride	**0.24**	mg/L	0.20	0.085	1		11/27/19 22:31	16984-48-8	
Sulfate	**43.8**	mg/L	5.0	1.2	5		11/27/19 22:47	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Sample: S-DG-1 **Lab ID: 60321518003** Collected: 11/14/19 10:36 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**111**	ug/L	100	10.7	1	11/27/19 07:57	11/27/19 13:33	7440-42-8	
Calcium	**135000**	ug/L	200	50.0	1	11/27/19 07:57	11/27/19 13:33	7440-70-2	
Iron	**386**	ug/L	50.0	14.0	1	11/27/19 07:57	11/27/19 13:33	7439-89-6	
Magnesium	**31200**	ug/L	50.0	13.0	1	11/27/19 07:57	11/27/19 13:33	7439-95-4	
Manganese	**297**	ug/L	5.0	2.1	1	11/27/19 07:57	11/27/19 13:33	7439-96-5	
Potassium	**4480**	ug/L	500	79.0	1	11/27/19 07:57	11/27/19 13:33	7440-09-7	
Sodium	**4440**	ug/L	500	144	1	11/27/19 07:57	11/27/19 13:33	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**409**	mg/L	20.0	6.5	1		11/22/19 18:11		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**524**	mg/L	10.0	10.0	1		11/21/19 16:04		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**6.0**	mg/L	1.0	0.22	1		11/27/19 23:03	16887-00-6	
Fluoride	**0.33**	mg/L	0.20	0.085	1		11/27/19 23:03	16984-48-8	
Sulfate	**38.4**	mg/L	5.0	1.2	5		11/27/19 23:19	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Sample: S-DG-2 **Lab ID: 60321518004** Collected: 11/14/19 12:15 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**100**	ug/L	100	10.7	1	11/27/19 07:57	11/27/19 13:35	7440-42-8	
Calcium	**133000**	ug/L	200	50.0	1	11/27/19 07:57	11/27/19 13:35	7440-70-2	
Iron	**82.0**	ug/L	50.0	14.0	1	11/27/19 07:57	11/27/19 13:35	7439-89-6	
Magnesium	**31300**	ug/L	50.0	13.0	1	11/27/19 07:57	11/27/19 13:35	7439-95-4	
Manganese	**464**	ug/L	5.0	2.1	1	11/27/19 07:57	11/27/19 13:35	7439-96-5	
Potassium	**5780**	ug/L	500	79.0	1	11/27/19 07:57	11/27/19 13:35	7440-09-7	
Sodium	**4800**	ug/L	500	144	1	11/27/19 07:57	11/27/19 13:35	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**403**	mg/L	20.0	6.5	1		11/22/19 18:17		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**512**	mg/L	10.0	10.0	1		11/21/19 16:04		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**7.4**	mg/L	1.0	0.22	1		11/27/19 23:35	16887-00-6	
Fluoride	**0.39**	mg/L	0.20	0.085	1		11/27/19 23:35	16984-48-8	
Sulfate	**37.8**	mg/L	5.0	1.2	5		12/03/19 13:38	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Sample: S-DG-3 **Lab ID: 60321518005** Collected: 11/14/19 14:13 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**93.1J**	ug/L	100	10.7	1	11/27/19 07:57	11/27/19 13:38	7440-42-8	
Calcium	**144000**	ug/L	200	50.0	1	11/27/19 07:57	11/27/19 13:38	7440-70-2	
Iron	**171**	ug/L	50.0	14.0	1	11/27/19 07:57	11/27/19 13:38	7439-89-6	
Magnesium	**38100**	ug/L	50.0	13.0	1	11/27/19 07:57	11/27/19 13:38	7439-95-4	
Manganese	**700**	ug/L	5.0	2.1	1	11/27/19 07:57	11/27/19 13:38	7439-96-5	
Potassium	**6700**	ug/L	500	79.0	1	11/27/19 07:57	11/27/19 13:38	7440-09-7	
Sodium	**4780**	ug/L	500	144	1	11/27/19 07:57	11/27/19 13:38	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**447**	mg/L	20.0	6.5	1		11/22/19 18:24		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**576**	mg/L	10.0	10.0	1		11/21/19 16:04		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**5.4**	mg/L	1.0	0.22	1		12/02/19 11:10	16887-00-6	
Fluoride	**0.42**	mg/L	0.20	0.085	1		12/02/19 11:10	16984-48-8	
Sulfate	**51.1**	mg/L	5.0	1.2	5		12/02/19 11:59	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Sample: S-DG-4 **Lab ID: 60321518006** Collected: 11/15/19 09:50 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**71.0J**	ug/L	100	10.7	1	11/27/19 07:57	11/27/19 13:40	7440-42-8	
Calcium	**138000**	ug/L	200	50.0	1	11/27/19 07:57	11/27/19 13:40	7440-70-2	
Iron	**14.5J**	ug/L	50.0	14.0	1	11/27/19 07:57	11/27/19 13:40	7439-89-6	
Magnesium	**38900**	ug/L	50.0	13.0	1	11/27/19 07:57	11/27/19 13:40	7439-95-4	
Manganese	**138**	ug/L	5.0	2.1	1	11/27/19 07:57	11/27/19 13:40	7439-96-5	
Potassium	**7580**	ug/L	500	79.0	1	11/27/19 07:57	11/27/19 13:40	7440-09-7	
Sodium	**40300**	ug/L	500	144	1	11/27/19 07:57	11/27/19 13:40	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**381**	mg/L	20.0	6.5	1		11/25/19 16:17		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**628**	mg/L	10.0	10.0	1		11/22/19 11:15		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**96.9**	mg/L	5.0	1.1	5		12/02/19 10:45	16887-00-6	M1
Fluoride	**0.30**	mg/L	0.20	0.085	1		12/02/19 09:58	16984-48-8	
Sulfate	**33.9**	mg/L	5.0	1.2	5		12/02/19 10:45	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Sample: S-SCPC-DUP-1 **Lab ID: 60321518007** Collected: 11/14/19 09:50 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**98.6J**	ug/L	100	10.7	1	11/27/19 07:57	11/27/19 13:53	7440-42-8	
Calcium	**132000**	ug/L	200	50.0	1	11/27/19 07:57	11/27/19 13:53	7440-70-2	
Iron	**76.8**	ug/L	50.0	14.0	1	11/27/19 07:57	11/27/19 13:53	7439-89-6	
Magnesium	**30800**	ug/L	50.0	13.0	1	11/27/19 07:57	11/27/19 13:53	7439-95-4	
Manganese	**460**	ug/L	5.0	2.1	1	11/27/19 07:57	11/27/19 13:53	7439-96-5	
Potassium	**5720**	ug/L	500	79.0	1	11/27/19 07:57	11/27/19 13:53	7440-09-7	
Sodium	**4670**	ug/L	500	144	1	11/27/19 07:57	11/27/19 13:53	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**409**	mg/L	20.0	6.5	1		11/22/19 18:40		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**489**	mg/L	10.0	10.0	1		11/21/19 16:05		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**7.6**	mg/L	1.0	0.22	1		12/02/19 12:16	16887-00-6	
Fluoride	**0.42**	mg/L	0.20	0.085	1		12/02/19 12:16	16984-48-8	
Sulfate	**36.6**	mg/L	5.0	1.2	5		12/02/19 12:33	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Sample: S-SCPC-FB-1 **Lab ID: 60321518008** Collected: 11/14/19 09:50 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**<10.7**	ug/L	100	10.7	1	11/27/19 07:57	11/27/19 13:55	7440-42-8	
Calcium	**<50.0**	ug/L	200	50.0	1	11/27/19 07:57	11/27/19 13:55	7440-70-2	
Iron	**<14.0**	ug/L	50.0	14.0	1	11/27/19 07:57	11/27/19 13:55	7439-89-6	
Magnesium	**<13.0**	ug/L	50.0	13.0	1	11/27/19 07:57	11/27/19 13:55	7439-95-4	
Manganese	**<2.1**	ug/L	5.0	2.1	1	11/27/19 07:57	11/27/19 13:55	7439-96-5	
Potassium	**<79.0**	ug/L	500	79.0	1	11/27/19 07:57	11/27/19 13:55	7440-09-7	
Sodium	**<144**	ug/L	500	144	1	11/27/19 07:57	11/27/19 13:55	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**<6.5**	mg/L	20.0	6.5	1		11/22/19 18:44		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**5.0**	mg/L	5.0	5.0	1		11/21/19 16:05		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**0.45J**	mg/L	1.0	0.22	1		12/02/19 12:50	16887-00-6	
Fluoride	**<0.085**	mg/L	0.20	0.085	1		12/02/19 12:50	16984-48-8	
Sulfate	**<0.23**	mg/L	1.0	0.23	1		12/02/19 12:50	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Sample: S-BMW-1S **Lab ID: 60321513010** Collected: 11/15/19 14:43 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**118**	ug/L	100	10.7	1	11/26/19 09:12	11/26/19 18:13	7440-42-8	
Calcium	**143000**	ug/L	200	50.0	1	11/26/19 09:12	11/26/19 18:13	7440-70-2	M1
Iron	**<14.0**	ug/L	50.0	14.0	1	11/26/19 09:12	11/26/19 18:13	7439-89-6	
Magnesium	**29700**	ug/L	50.0	13.0	1	11/26/19 09:12	11/26/19 18:13	7439-95-4	
Manganese	**426**	ug/L	5.0	2.1	1	11/26/19 09:12	11/26/19 18:13	7439-96-5	
Potassium	**424J**	ug/L	500	79.0	1	11/26/19 09:12	11/26/19 18:13	7440-09-7	
Sodium	**5360**	ug/L	500	144	1	11/26/19 09:12	11/26/19 18:13	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**428**	mg/L	20.0	6.5	1		11/25/19 15:41		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**551**	mg/L	10.0	10.0	1		11/22/19 08:54		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**6.4**	mg/L	1.0	0.22	1		11/27/19 19:32	16887-00-6	
Fluoride	**0.28**	mg/L	0.20	0.085	1		11/27/19 19:32	16984-48-8	
Sulfate	**26.5**	mg/L	2.0	0.46	2		11/30/19 01:38	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Sample: S-BMW-3S **Lab ID: 60321513011** Collected: 11/15/19 12:18 Received: 11/16/19 02:35 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7								
Boron	**80.1J**	ug/L	100	10.7	1	11/26/19 09:12	11/26/19 18:17	7440-42-8	
Calcium	**102000**	ug/L	200	50.0	1	11/26/19 09:12	11/26/19 18:17	7440-70-2	
Iron	**6800**	ug/L	50.0	14.0	1	11/26/19 09:12	11/26/19 18:17	7439-89-6	
Magnesium	**25600**	ug/L	50.0	13.0	1	11/26/19 09:12	11/26/19 18:17	7439-95-4	
Manganese	**519**	ug/L	5.0	2.1	1	11/26/19 09:12	11/26/19 18:17	7439-96-5	
Potassium	**3840**	ug/L	500	79.0	1	11/26/19 09:12	11/26/19 18:17	7440-09-7	
Sodium	**6610**	ug/L	500	144	1	11/26/19 09:12	11/26/19 18:17	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B								
Alkalinity, Total as CaCO3	**342**	mg/L	20.0	6.5	1		11/25/19 15:52		
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**418**	mg/L	5.0	5.0	1		11/22/19 08:54		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**7.6**	mg/L	1.0	0.22	1		11/27/19 21:07	16887-00-6	
Fluoride	**0.23**	mg/L	0.20	0.085	1		11/27/19 21:07	16984-48-8	
Sulfate	**34.4**	mg/L	2.0	0.46	2		11/27/19 21:23	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

QC Batch: 624736 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60321513010, 60321513011

METHOD BLANK: 2547231 Matrix: Water
Associated Lab Samples: 60321513010, 60321513011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<10.7	100	10.7	11/26/19 17:42	
Calcium	ug/L	<50.0	200	50.0	11/26/19 17:42	
Iron	ug/L	21.5J	50.0	14.0	11/26/19 17:42	
Magnesium	ug/L	<13.0	50.0	13.0	11/26/19 17:42	
Manganese	ug/L	<2.1	5.0	2.1	11/26/19 17:42	
Potassium	ug/L	<79.0	500	79.0	11/26/19 17:42	
Sodium	ug/L	<144	500	144	11/26/19 17:42	

LABORATORY CONTROL SAMPLE: 2547232

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	1030	103	85-115	
Calcium	ug/L	10000	9320	93	85-115	
Iron	ug/L	10000	9140	91	85-115	
Magnesium	ug/L	10000	9890	99	85-115	
Manganese	ug/L	1000	1000	100	85-115	
Potassium	ug/L	10000	9900	99	85-115	
Sodium	ug/L	10000	9950	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2547233 2547234

Parameter	Units	60321513002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	11200	1000	1000	12600	12700	132	144	70-130	1	20	M1
Calcium	ug/L	170000	10000	10000	182000	184000	127	140	70-130	1	20	M1
Iron	ug/L	69.8	10000	10000	9170	9330	91	93	70-130	2	20	
Magnesium	ug/L	29800	10000	10000	40000	40200	102	104	70-130	0	20	
Manganese	ug/L	404	1000	1000	1410	1430	101	102	70-130	1	20	
Potassium	ug/L	7710	10000	10000	17900	18000	102	103	70-130	1	20	
Sodium	ug/L	67100	10000	10000	78300	78700	112	116	70-130	1	20	

MATRIX SPIKE SAMPLE: 2547235

Parameter	Units	60321513010 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	118	1000	1140	102	70-130	
Calcium	ug/L	143000	10000	146000	26	70-130	M1
Iron	ug/L	<14.0	10000	8880	89	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

MATRIX SPIKE SAMPLE: 2547235

Parameter	Units	60321513010 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Magnesium	ug/L	29700	10000	38000	83	70-130	
Manganese	ug/L	426	1000	1400	97	70-130	
Potassium	ug/L	424J	10000	10200	98	70-130	
Sodium	ug/L	5360	10000	14900	96	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

QC Batch: 625027 Analysis Method: EPA 200.7
QC Batch Method: EPA 200.7 Analysis Description: 200.7 Metals, Total
Associated Lab Samples: 60321518001, 60321518002, 60321518003, 60321518004, 60321518005, 60321518006, 60321518007, 60321518008

METHOD BLANK: 2548362 Matrix: Water
Associated Lab Samples: 60321518001, 60321518002, 60321518003, 60321518004, 60321518005, 60321518006, 60321518007, 60321518008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<10.7	100	10.7	11/27/19 13:25	
Calcium	ug/L	<50.0	200	50.0	11/27/19 13:25	
Iron	ug/L	<14.0	50.0	14.0	11/27/19 13:25	
Magnesium	ug/L	<13.0	50.0	13.0	11/27/19 13:25	
Manganese	ug/L	<2.1	5.0	2.1	11/27/19 13:25	
Potassium	ug/L	<79.0	500	79.0	11/27/19 13:25	
Sodium	ug/L	<144	500	144	11/27/19 13:25	

LABORATORY CONTROL SAMPLE: 2548363

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	1020	102	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Iron	ug/L	10000	9980	100	85-115	
Magnesium	ug/L	10000	10000	100	85-115	
Manganese	ug/L	1000	1020	102	85-115	
Potassium	ug/L	10000	10000	100	85-115	
Sodium	ug/L	10000	10100	101	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2548364 2548365

Parameter	Units	60321518006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	71.0J	1000	1000	1120	1140	104	107	70-130	2	20	
Calcium	ug/L	138000	10000	10000	146000	150000	76	112	70-130	2	20	
Iron	ug/L	14.5J	10000	10000	9800	9990	98	100	70-130	2	20	
Magnesium	ug/L	38900	10000	10000	48800	49600	99	107	70-130	2	20	
Manganese	ug/L	138	1000	1000	1140	1160	101	103	70-130	2	20	
Potassium	ug/L	7580	10000	10000	17600	17900	100	103	70-130	2	20	
Sodium	ug/L	40300	10000	10000	49400	50300	91	100	70-130	2	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

QC Batch: 624293 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60321518001, 60321518002, 60321518003, 60321518004, 60321518005, 60321518007, 60321518008

METHOD BLANK: 2545462 Matrix: Water
Associated Lab Samples: 60321518001, 60321518002, 60321518003, 60321518004, 60321518005, 60321518007, 60321518008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<6.5	20.0	6.5	11/22/19 16:12	

LABORATORY CONTROL SAMPLE: 2545463

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	510	102	90-110	

SAMPLE DUPLICATE: 2545464

Parameter	Units	60321303002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	1500	1510	0	10	

SAMPLE DUPLICATE: 2545466

Parameter	Units	60321516004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	360	355	1	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

QC Batch: 624580 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Associated Lab Samples: 60321513010, 60321513011, 60321518006

METHOD BLANK: 2546893 Matrix: Water
Associated Lab Samples: 60321513010, 60321513011, 60321518006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<6.5	20.0	6.5	11/25/19 15:29	

LABORATORY CONTROL SAMPLE: 2546894

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	488	98	90-110	

SAMPLE DUPLICATE: 2546895

Parameter	Units	60321513010 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	428	429	0	10	

SAMPLE DUPLICATE: 2546897

Parameter	Units	60321518006 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	381	406	6	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

QC Batch: 624015 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60321518001, 60321518002, 60321518003, 60321518004, 60321518005, 60321518007, 60321518008

METHOD BLANK: 2544577 Matrix: Water
Associated Lab Samples: 60321518001, 60321518002, 60321518003, 60321518004, 60321518005, 60321518007, 60321518008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/21/19 16:08	

LABORATORY CONTROL SAMPLE: 2544578

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1010	101	80-120	

SAMPLE DUPLICATE: 2544579

Parameter	Units	60321516004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	721	724	0	10	

SAMPLE DUPLICATE: 2544580

Parameter	Units	60321518004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	512	521	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

QC Batch: 624081 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60321513010, 60321513011

METHOD BLANK: 2544812 Matrix: Water
Associated Lab Samples: 60321513010, 60321513011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/22/19 08:51	

LABORATORY CONTROL SAMPLE: 2544813

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	990	99	80-120	

SAMPLE DUPLICATE: 2544814

Parameter	Units	60321433002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2440	2470	1	10	

SAMPLE DUPLICATE: 2544815

Parameter	Units	60321513002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	927	959	3	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

QC Batch: 624082 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60321518006

METHOD BLANK: 2544816 Matrix: Water
Associated Lab Samples: 60321518006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/22/19 11:13	

LABORATORY CONTROL SAMPLE: 2544817

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	964	96	80-120	

SAMPLE DUPLICATE: 2544818

Parameter	Units	60321513012 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	779	854	9	10	

SAMPLE DUPLICATE: 2544819

Parameter	Units	60321518006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	628	643	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

QC Batch: 625047 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60321513010, 60321513011

METHOD BLANK: 2548479 Matrix: Water
Associated Lab Samples: 60321513010, 60321513011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	11/27/19 10:18	
Fluoride	mg/L	<0.085	0.20	0.085	11/27/19 10:18	
Sulfate	mg/L	<0.23	1.0	0.23	11/27/19 10:18	

METHOD BLANK: 2550027 Matrix: Water
Associated Lab Samples: 60321513010, 60321513011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	11/29/19 20:37	
Fluoride	mg/L	<0.085	0.20	0.085	11/29/19 20:37	
Sulfate	mg/L	<0.23	1.0	0.23	11/29/19 20:37	

METHOD BLANK: 2550207 Matrix: Water
Associated Lab Samples: 60321513010, 60321513011

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	12/02/19 09:31	
Fluoride	mg/L	<0.085	0.20	0.085	12/02/19 09:31	
Sulfate	mg/L	<0.23	1.0	0.23	12/02/19 09:31	

LABORATORY CONTROL SAMPLE: 2548480

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.5	99	90-110	
Sulfate	mg/L	5	4.5	90	90-110	

LABORATORY CONTROL SAMPLE: 2550028

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.4	95	90-110	
Sulfate	mg/L	5	4.9	99	90-110	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

LABORATORY CONTROL SAMPLE: 2550208

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	99	90-110	
Fluoride	mg/L	2.5	2.5	99	90-110	
Sulfate	mg/L	5	4.9	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2548481 2548482

Parameter	Units	60321513002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	102	100	100	218	210	116	108	80-120	4	15	
Fluoride	mg/L	0.31	2.5	2.5	3.1	3.1	110	112	80-120	1	15	
Sulfate	mg/L	317	250	250	568	565	100	99	80-120	0	15	

MATRIX SPIKE SAMPLE: 2548483

Parameter	Units	60321513010 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	6.4	5	11.6	103	80-120	
Fluoride	mg/L	0.28	2.5	3.0	110	80-120	
Sulfate	mg/L	26.5	10	37.2	107	80-120	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

QC Batch: 625048 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60321518001, 60321518002, 60321518003, 60321518004, 60321518005, 60321518007, 60321518008

METHOD BLANK: 2548493 Matrix: Water
Associated Lab Samples: 60321518001, 60321518002, 60321518003, 60321518004, 60321518005, 60321518007, 60321518008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	11/27/19 10:45	
Fluoride	mg/L	<0.085	0.20	0.085	11/27/19 10:45	
Sulfate	mg/L	<0.23	1.0	0.23	11/27/19 10:45	

METHOD BLANK: 2550023 Matrix: Water
Associated Lab Samples: 60321518001, 60321518002, 60321518003, 60321518004, 60321518005, 60321518007, 60321518008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	12/02/19 09:31	
Fluoride	mg/L	<0.085	0.20	0.085	12/02/19 09:31	
Sulfate	mg/L	<0.23	1.0	0.23	12/02/19 09:31	

METHOD BLANK: 2551117 Matrix: Water
Associated Lab Samples: 60321518001, 60321518002, 60321518003, 60321518004, 60321518005, 60321518007, 60321518008

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	12/03/19 09:27	
Fluoride	mg/L	<0.085	0.20	0.085	12/03/19 09:27	
Sulfate	mg/L	<0.23	1.0	0.23	12/03/19 09:27	

LABORATORY CONTROL SAMPLE: 2548494

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Fluoride	mg/L	2.5	2.7	108	90-110	
Sulfate	mg/L	5	4.7	94	90-110	

LABORATORY CONTROL SAMPLE: 2550024

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	99	90-110	
Fluoride	mg/L	2.5	2.5	99	90-110	
Sulfate	mg/L	5	4.9	99	90-110	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

LABORATORY CONTROL SAMPLE: 2551118

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.1	101	90-110	
Fluoride	mg/L	2.5	2.6	104	90-110	
Sulfate	mg/L	5	5.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2548495 2548496

Parameter	Units	60321515006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	12.5	5	5	17.9	17.8	108	107	80-120	0	15	
Fluoride	mg/L	0.45	2.5	2.5	3.1	3.1	105	104	80-120	0	15	
Sulfate	mg/L	71.8	25	25	102	102	123	119	80-120	1	15	E,M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2548497 2548498

Parameter	Units	60321516004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	83.5	25	25	113	112	117	116	80-120	0	15	E
Fluoride	mg/L	0.33	2.5	2.5	3.0	2.9	105	104	80-120	1	15	
Sulfate	mg/L	185	100	100	229	251	44	65	80-120	9	15	M1

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

QC Batch: 625468 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60321518006

METHOD BLANK: 2550404 Matrix: Water
Associated Lab Samples: 60321518006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	12/02/19 09:11	
Fluoride	mg/L	<0.085	0.20	0.085	12/02/19 09:11	
Sulfate	mg/L	<0.23	1.0	0.23	12/02/19 09:11	

METHOD BLANK: 2551173 Matrix: Water
Associated Lab Samples: 60321518006

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.22	1.0	0.22	12/03/19 11:31	
Fluoride	mg/L	<0.085	0.20	0.085	12/03/19 11:31	
Sulfate	mg/L	<0.23	1.0	0.23	12/03/19 11:31	

LABORATORY CONTROL SAMPLE: 2550405

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	95	90-110	
Fluoride	mg/L	2.5	2.3	94	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

LABORATORY CONTROL SAMPLE: 2551174

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	96	90-110	
Fluoride	mg/L	2.5	2.3	93	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2550406 2550407

Parameter	Units	60321518006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	96.9	25	25	124	128	109	123	80-120	3	15	E,M1
Fluoride	mg/L	0.30	2.5	2.5	2.7	2.7	95	95	80-120	0	15	
Sulfate	mg/L	33.9	25	25	58.4	59.3	98	102	80-120	2	15	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2550408 2550409

Parameter	Units	60321509010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	2.7	5	5	7.4	7.5	93	95	80-120	1	15	
Fluoride	mg/L	2.0	2.5	2.5	4.4	4.5	95	98	80-120	1	15	
Sulfate	mg/L	556	250	250	800	803	97	99	80-120	0	15	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALIFIERS

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-K	Pace Analytical Services - Kansas City

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR SCPC
Pace Project No.: 60321518

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60321513010	S-BMW-1S	EPA 200.7	624736	EPA 200.7	624858
60321513011	S-BMW-3S	EPA 200.7	624736	EPA 200.7	624858
60321518001	S-UG-1A	EPA 200.7	625027	EPA 200.7	625177
60321518002	S-UG-2	EPA 200.7	625027	EPA 200.7	625177
60321518003	S-DG-1	EPA 200.7	625027	EPA 200.7	625177
60321518004	S-DG-2	EPA 200.7	625027	EPA 200.7	625177
60321518005	S-DG-3	EPA 200.7	625027	EPA 200.7	625177
60321518006	S-DG-4	EPA 200.7	625027	EPA 200.7	625177
60321518007	S-SCPC-DUP-1	EPA 200.7	625027	EPA 200.7	625177
60321518008	S-SCPC-FB-1	EPA 200.7	625027	EPA 200.7	625177
60321513010	S-BMW-1S	SM 2320B	624580		
60321513011	S-BMW-3S	SM 2320B	624580		
60321518001	S-UG-1A	SM 2320B	624293		
60321518002	S-UG-2	SM 2320B	624293		
60321518003	S-DG-1	SM 2320B	624293		
60321518004	S-DG-2	SM 2320B	624293		
60321518005	S-DG-3	SM 2320B	624293		
60321518006	S-DG-4	SM 2320B	624580		
60321518007	S-SCPC-DUP-1	SM 2320B	624293		
60321518008	S-SCPC-FB-1	SM 2320B	624293		
60321513010	S-BMW-1S	SM 2540C	624081		
60321513011	S-BMW-3S	SM 2540C	624081		
60321518001	S-UG-1A	SM 2540C	624015		
60321518002	S-UG-2	SM 2540C	624015		
60321518003	S-DG-1	SM 2540C	624015		
60321518004	S-DG-2	SM 2540C	624015		
60321518005	S-DG-3	SM 2540C	624015		
60321518006	S-DG-4	SM 2540C	624082		
60321518007	S-SCPC-DUP-1	SM 2540C	624015		
60321518008	S-SCPC-FB-1	SM 2540C	624015		
60321513010	S-BMW-1S	EPA 300.0	625047		
60321513011	S-BMW-3S	EPA 300.0	625047		
60321518001	S-UG-1A	EPA 300.0	625048		
60321518002	S-UG-2	EPA 300.0	625048		
60321518003	S-DG-1	EPA 300.0	625048		
60321518004	S-DG-2	EPA 300.0	625048		
60321518005	S-DG-3	EPA 300.0	625048		
60321518006	S-DG-4	EPA 300.0	625468		
60321518007	S-SCPC-DUP-1	EPA 300.0	625048		
60321518008	S-SCPC-FB-1	EPA 300.0	625048		

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Sample Condition Upon Receipt

WO# : 60321518

60321518

Client Name: Golder

Courier: FedEx ☐ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☑ Client ☐ Other ☐

Tracking #: _____ Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

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

Thermometer Used: T-299 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 1.8 **Corr. Factor** 0.2 **Corrected** 2.0

Date and initials of person examining contents: 11/15/19 A

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: WT	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☑N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jason Clark Date: 11/20/19

F-KS-C-003-Rev.11, February 28, 2018

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CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

Section A Required Client Information:

Company:	Golder Associates
Address:	13515 Barrett Parkway Dr., Ste 260
	Ballwin, MO 63021
Email To:	jeffrey_ingram@golder.com
Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	Jeffrey Ingram
Copy To:	
Purchase Order No.:	
Project Name:	Ameren Sioux Energy Center SCPC
Project Number:	

Section C Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285

REGULATORY AGENCY

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

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Requested Analysis Filtered (Y/N): Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N		60321518
1	S-UG-1A	WT	G			11-14-19	0920		2	1		1							✓	✓	✓	✓		
2	S-UG-2	WT	G			"	1603		2	1		1							✓	✓	✓	✓		
3	S-DG-1	WT	G				1036		2	1		1							✓	✓	✓	✓		
4	S-DG-2	WT	G				1215		2	1		1							✓	✓	✓	✓		
5	S-DG-3	WT	G			"	1413		2	1		1							✓	✓	✓	✓		
6	S-DG-4	WT	G			11-15-19	0950		2	1		1							✓	✓	✓	✓		
7	S-SCPC-DUP-1	WT	G			11-14-19	—		2	1		1							✓	✓	✓	✓		
8	S-SCPC-FB-1	WT	G			"	0950		2	1		1							✓	✓	✓	✓		
9	MS	WT	G			11-15-19	0950		2	1		1							✓	✓	✓	✓		
10	MSD	WT	G			"	0950		2	1		1							✓	✓	✓	✓		
11		WT	G																					
12		WT	G																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca, Fe, Mn, Mg, K, Na	Annie Muehlfarth / Golder	11-15-19	1540	Angela McManus	11/15	1545				
	Angela McManus	11/15	1545		11/15/19	0235	2.0	✓	✓	✓

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Annie Muehlfarth

SIGNATURE of SAMPLER: Annie Muehlfarth DATE Signed (MM/DD/YY): 11-15-19

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

F-ALL-Q-020rev.08, 12-Oct-2007

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Sample Condition Upon Receipt

WO# : 60321513

60321513

Client Name: Golder

Courier: FedEx ☐ UPS ☐ VIA ☐ Clay ☐ PEX ☐ ECI ☐ Pace ☐ Xroads ☑ Client ☐ Other ☐

Tracking #: _____ Pace Shipping Label Used? Yes ☐ No ☑

Custody Seal on Cooler/Box Present: Yes ☑ No ☐ Seals intact: Yes ☑ No ☐

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

Thermometer Used: T-299 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 2.8, 2.3 **Corr. Factor** 0.2 **Corrected** 3.0, 2.5

Date and initials of person examining contents: 11/14/19

Temperature should be above freezing to 6°C

Chain of Custody present:	☑Yes ☐No ☐N/A	
Chain of Custody relinquished:	☑Yes ☐No ☐N/A	
Samples arrived within holding time:	☑Yes ☐No ☐N/A	
Short Hold Time analyses (<72hr):	☐Yes ☑No ☐N/A	
Rush Turn Around Time requested:	☐Yes ☑No ☐N/A	
Sufficient volume:	☑Yes ☐No ☐N/A	
Correct containers used:	☑Yes ☐No ☐N/A	
Pace containers used:	☑Yes ☐No ☐N/A	
Containers intact:	☑Yes ☐No ☐N/A	
Unpreserved 5035A / TX1005/1006 soils frozen in 48hrs?	☐Yes ☐No ☑N/A	
Filtered volume received for dissolved tests?	☐Yes ☐No ☑N/A	
Sample labels match COC: Date / time / ID / analyses	☑Yes ☐No ☐N/A	
Samples contain multiple phases? Matrix: LQ	☐Yes ☑No ☐N/A	
Containers requiring pH preservation in compliance? (HNO_3, H_2SO_4, HCl<2; NaOH>9 Sulfide, NaOH>10 Cyanide) (Exceptions: VOA, Micro, O&G, KS TPH, OK-DRO)	☑Yes ☐No ☐N/A	List sample IDs, volumes, lot #'s of preservative and the date/time added.
Cyanide water sample checks: Lead acetate strip turns dark? (Record only)	☐Yes ☐No	
Potassium iodide test strip turns blue/purple? (Preserve)	☐Yes ☐No	
Trip Blank present:	☐Yes ☐No ☑N/A	
Headspace in VOA vials (>6mm):	☐Yes ☐No ☑N/A	
Samples from USDA Regulated Area: State:	☐Yes ☐No ☑N/A	
Additional labels attached to 5035A / TX1005 vials in the field?	☐Yes ☐No ☑N/A	

Client Notification/ Resolution: Copy COC to Client? Y / N Field Data Required? Y / N

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: Jami Church Date: 11/20/19

F-KS-C-003-Rev.11, February 28, 2018

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
www.pacelabs.com

Section A Required Client Information:

Company:	Golder Associates
Address:	13515 Barrett Parkway Dr., Ste 260
	Ballwin, MO 63021
Email To:	jeffrey_ingram@golder.com
Phone: 636-724-9191	Fax: 636-724-9323
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	Jeffrey Ingram
Copy To:	
Purchase Order No.:	
Project Name:	Ameren Sioux Energy Center SCPB
Project Number:	

Section C Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285

REGULATORY AGENCY

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

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

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

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N		60321513
1	S-LMW-1S	WT	G			11-15-19	1314		2	1		1							✓	✓	✓	✓		001
2	S-LMW-2S	WT	G				1405		2	1		1							✓	✓	✓	✓		002
3	S-LMW-3S	WT	G				1105		2	1		1							✓	✓	✓	✓		003
4	S-LMW-4S	WT	G				1204		2	1		1							✓	✓	✓	✓		004
5	S-LMW-5S	WT	G				1052		2	1		1							✓	✓	✓	✓		005
6	S-LMW-6S	WT	G				1148		2	1		1							✓	✓	✓	✓		006
7	S-LMW-7S	WT	G				1231		2	1		1							✓	✓	✓	✓		007
8	S-LMW-8S	WT	G				1331		2	1		1							✓	✓	✓	✓		008
9	S-LMW-9S	WT	G				1418		2	1		1							✓	✓	✓	✓		009
10	S-BMW-1S	WT	G			11-13-19	1443		2	1		1								✓	✓	✓		010
11	S-BMW-3S	WT	G			11-13-19	1218		2	1		1							✓	✓	✓	✓		011
12	S-LMW-DUP-1	WT	G			1	—		2	1		1							✓	✓	✓	✓		012

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca, Fe, Mn, Mg, K, Na	Annie Muehlfarth / Golder	11-15-19	1540	Angela McMaw	11-15-19	15:45				
	Angela McMaw	11-15-19	15:45		11/15/19	0735	3.0	✓	Y	Y
							2.5			

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Annie Muehlfarth
SIGNATURE of SAMPLER: Annie Muehlfarth
DATE Signed (MM/DD/YY): 11-15-19

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

Pace Analytical
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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Page: 2 of 2

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Project Number:	

Section C Invoice Information:

Attention:	
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285

REGULATORY AGENCY

NPDES ✓ GROUND WATER DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Section D Required Client Information

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

Valid Matrix Codes

MATRIX	CODE
DRINKING WATER	DW
WATER	WT
WASTE WATER	WW
PRODUCT	P
SOIL/SOLID	SL
OIL	OL
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	AR
	OT
	TS

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	Metals*	Chloride/Fluoride/Sulfate	TDS	Alkalinity	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N		
1	S-LMW-DUP-2	WT	G			11-15-19	—		2	1		1							✓	✓	✓	✓		013
2	S-LMW-FB-1	WT	G			1	1140		3	1		1							✓	✓	✓	✓		014
3	S-LMW-FB-2	WT	G			1	1320		3	1		1							✓	✓	✓	✓		015
4		WT	G																					
5		WT	G																					
6		WT	G																					
7		WT	G																					
8		WT	G																					
9		WT	G																					
10		WT	G																					
11		WT	G																					
12		WT	G																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
*EPA 200.7: B, Ca, Fe, Mn, Mg, K, Na	Angela Linn	11/15/19	1545		11/15/19	0235	3.6 2.5	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER:

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

MEMORANDUM

DATE January 10, 2020 **Project No.** 153140601

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Tommy Goodwin **EMAIL Tommy_Goodwin@golder.com**

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCPC – DATA PACKAGE 60321518

The following is a summary of instances where quality control criteria in the functional guidelines were not met and data qualification was required:

- When a compound was detected in a sample result between the MDL and the PQL the results were recorded at the detection value and qualified as estimates (J).
- When MS/MSD recovery exceeded the QC limits, the associated sample result was qualified as an estimate (J).

Golder Associates Inc.
13515 Barrett Parkway Drive, Suite 260,
Ballwin, Missouri, USA 63021

T: +1 314 984-8800 F: +1 314 984-8770

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Manager: J Ingram
Project Name: Ameren - Sioux - SCPC
Project Number: 153140601
Reviewer: T Goodwin
Validation Date: 1/9/2020

Laboratory: Pace Analytical - KS
SDG #: 60321518
Analytical Method (type and no.): EPA 200.7 (Metals); SM 2320B (Alk); SM 2540C (TDS); EPA 300.0 (Anions)
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐
Sample Names S-UG-1A, S-UG-2, S-DG-1, S-DG-2, S-DG-3, S-DG-4, S-SCPC-DUP-1, S-SCPC-FB-1, S-BMW-1S, S-BMW-3S

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information	YES	NO	NA	COMMENTS
a) Sampling dates noted?	☒	☐	☐	11/14-15/2019
b) Sampling team indicated?	☒	☐	☐	
c) Sample location noted?	☒	☐	☐	
d) Sample depth indicated (Soils)?	☐	☐	☒	
e) Sample type indicated (grab/composite)?	☒	☐	☐	
f) Field QC noted?	☒	☐	☐	
g) Field parameters collected (note types)?	☒	☐	☐	pH, Sp.Cond, ORP, Temp, DO, Turb
h) Field Calibration within control limits?	☒	☐	☐	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	☐	☒	☐	
j) Does the laboratory narrative indicate deficiencies?	☐	☐	☒	

Note Deficiencies:

Chain-of-Custody (COC)	YES	NO	NA	COMMENTS
a) Was the COC properly completed?	☒	☐	☐	
b) Was the COC signed by both field and laboratory personnel?	☐	☒	☐	Page 2 of COC not completed/signed by field staff
c) Were samples received in good condition?	☒	☐	☐	

General (reference QAPP or Method)	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	☒	☐	☐	
b) Were hold times met for sample analysis?	☒	☐	☐	
c) Were the correct preservatives used?	☒	☐	☐	
d) Was the correct method used?	☒	☐	☐	
e) Were appropriate reporting limits achieved?	☒	☐	☐	
f) Were any sample dilutions noted?	☒	☐	☐	See Notes
g) Were any matrix problems noted?	☐	☒	☐	

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	[x]	[ ]	[ ]	See Notes
b) Were analytes detected in the field blank(s)?	[x]	[ ]	[ ]	See Notes
c) Were analytes detected in the equipment blank(s)?	[ ]	[ ]	[x]	
d) Were analytes detected in the trip blank(s)?	[ ]	[ ]	[x]	

Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	[x]	[ ]	[ ]	
b) Were the proper analytes included in the LCS?	[x]	[ ]	[ ]	
c) Was the LCS accuracy criteria met?	[x]	[ ]	[ ]	

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?				DUP-1 @ S-DG-2
	[x]	[ ]	[ ]	FB-1 @ S-UG-1A
b) Were field dup. precision criteria met (note RPD)?	[x]	[ ]	[ ]	See Notes
c) Were lab duplicates analyzed (note original and duplicate samples)?				
	[x]	[ ]	[ ]	-13010 (Alk); -18006 (Alk, TDS); -18004 (TDS)
d) Were lab dup. precision criteria met (note RPD)?	[x]	[ ]	[ ]	See Notes

Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, analytes included and concentrations)?	[ ]	[x]	[ ]	
b) Was the %D within control limits?	[ ]	[ ]	[x]	

Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	[ ]	[x]	[ ]	See Notes
Recovery could not be calculated since sample contained high concentration of analyte?	[ ]	[ ]	[x]	
b) Was MSD accuracy criteria met?	[ ]	[x]	[ ]	See Notes
Recovery could not be calculated since sample contained high concentration of analyte?	[ ]	[ ]	[x]	
c) Were MS/MSD precision criteria met?	[x]	[ ]	[ ]	

Comments/Notes:

FB-1: TDS (5.0), Cl (0.45)

MB: -13010-11: Fe (21.5)

MS/MSD: -18006: Cl_MSD-H (123% of 80-120%); -13010: Ca_MS-L (26% of 70-130%)

Max Field Duplicate RPD: 7.4% (Limit 20%)

Max Lab Duplicated RPD: 6% (Limit 10%)

Dilution: Chloride and Sulfate diluted in several samples; no qualification is required.

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-DG-4	Chloride (Cl)	96.9	J	MSD Exceeded QC Range
S-BMW-1S	Calcium (Ca)	149,000	J	MS Exceeded QC Range

Signature: [signature] Date: 1/09/2020

APPENDIX B

Alternative Source Demonstration-August 2019 Sampling Event

SCPC - Alternative Source Demonstration

Sioux Energy Center, St. Charles County, Missouri, USA

Submitted to:

Ameren Missouri

1901 Chouteau Ave, St. Louis, MO 63103

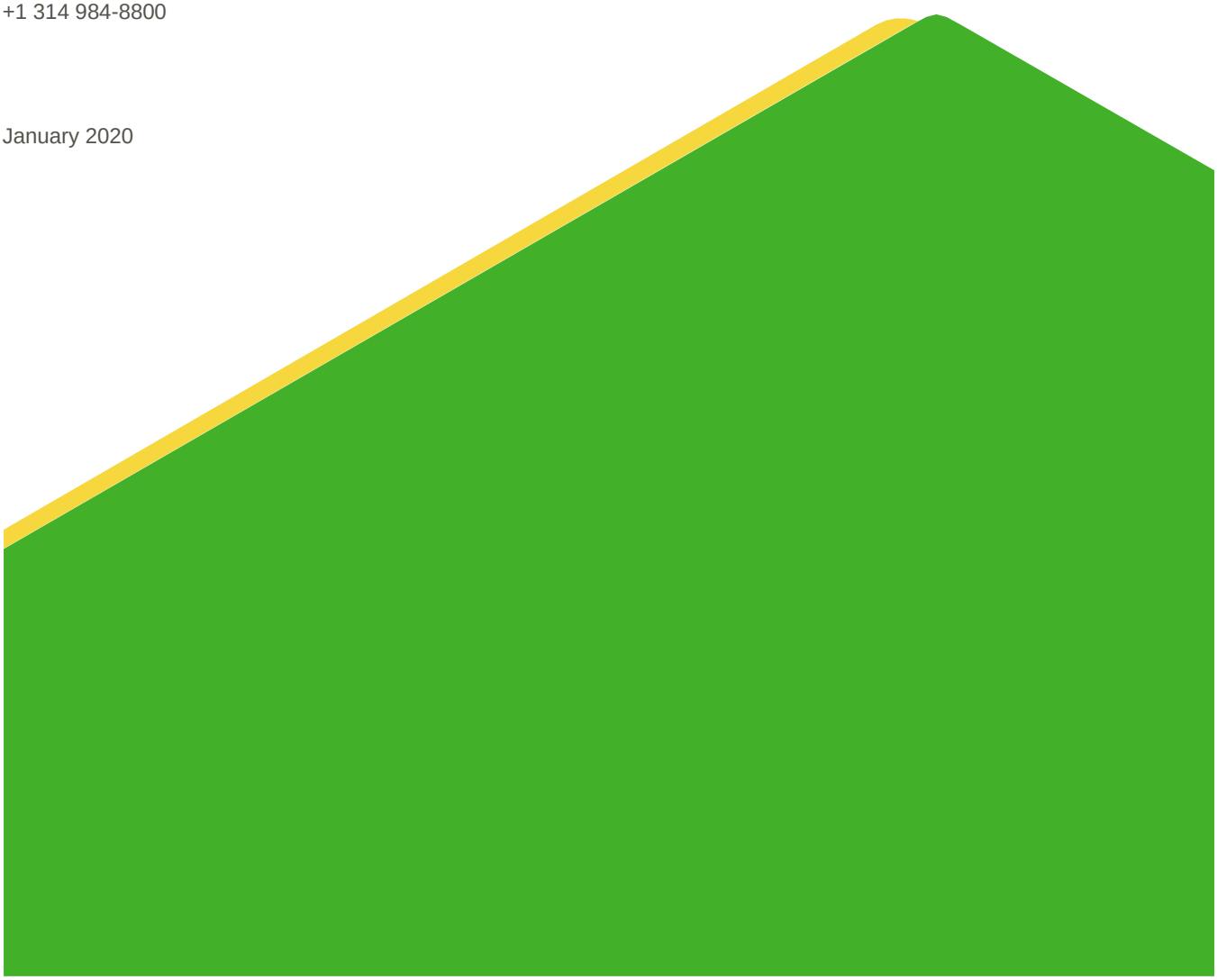
Submitted by:

Golder Associates Inc.

13515 Barrett Parkway Drive, Suite 260, Ballwin, Missouri, USA 63021

+1 314 984-8800

January 2020



Distribution List

1 Electronic Copy - Ameren Missouri

1 Hard Copy - Golder

Table of Contents

Tables

FIGURES

1.0 CERTIFICATION STATEMENT

This *SCPC – Alternative Source Demonstration, Sioux Energy Center, St. Charles County, Missouri, USA* has been prepared to comply with the United States Environmental Protection Agency (EPA) coal combustion residual (CCR) rule) under the direction of a licensed professional engineer with Golder Associates Inc.

I hereby certify that this *SCPC – Alternative Source Demonstration, Sioux Energy Center, St. Charles County, Missouri, USA* located at 8501 Missouri 94, West Alton, Missouri 63386 has been prepared to meet the requirements of 40 CFR §257.94(e)(2).

GOLDER ASSOCIATES INC.

_____

Mark Haddock, P.E., R.G.

Principal, Practice Leader

2.0 INTRODUCTION

In accordance with the United States Environmental Protection Agency (EPA) coal combustion residual (CCR) rule (CCR Rule or The Rule), this *SCPC – Alternative Source Demonstration* has been prepared to document an Alternative Source Demonstration (ASD) for a Statistically Significant Increase (SSI) calculated at Ameren Missouri's (Ameren) Sioux Energy Center (SEC), Utility Waste Landfill (UWL) SCPC Cell 1. This document satisfies the requirements of §257.94(e)(2) which allows the owner or operator to demonstrate that a source other than the CCR Unit has caused an SSI and that the apparent SSI was the result of an alternative source or resulted from errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

3.0 SITE DESCRIPTION AND BACKGROUND

Ameren owns and operates the SEC in St. Charles County, Missouri located approximately 12 miles west-northwest of the confluence of the Mississippi and Missouri Rivers. **Figure 1** depicts the site location and layout, including the location of SCPC. The SEC is approximately 1,025 acres and is located in the floodplain between the Mississippi and Missouri Rivers. The SEC is bounded to the north by wooded areas associated with the Mississippi River. The property is bounded to the south by a railroad. The SEC is bounded to the east and west by agricultural fields.

3.1 Geological and Hydrogeological Setting

The SCPC lies between the Mississippi River to the north and the Missouri River to the south. Flow and deposition from these rivers have resulted in thick alluvial deposits which lie unconformable on top of bedrock. These alluvial deposits, which can range from approximately 100 to 130 feet thick, make up the uppermost aquifer called the alluvial aquifer. Overall, this aquifer is described as a fining upwards sequence of stratified sands and gravels with varying amounts of silts and clays. Drilling in the alluvial aquifer identified different sub-units, including floodplain deposits, natural levee deposits, and channel deposits along with volumetrically less important loess deposits. Grain sizes of these alluvial deposits are highly variable.

Beneath the alluvial aquifer lies the bedrock aquifer. Bedrock in this region includes Mississippian-aged rocks of the Meramecian Series. Formations include primarily limestone, dolomite, and shale and are comprised of the Salem Formation overlying the Warsaw Formation and the Burlington-Keokuk Formation.

3.2 Utility Waste Landfill Cell 1 - SCPC

UWL Cell 1 is referred to by Ameren as the SCPC, or "Gypsum Pond" Cell 1. The SCPC is approximately 37.5 acres in size and is located south of the generating plant on the south side of Highway 94 (**Figure 1**). The CCR Unit manages Coal Combustion Residuals (CCR) from the SEC Wet Flue-Gas Desulfurization System (WFGD) which began operation in 2010.

The WFGD process occurs after the removal of slag and fly ash where a crushed limestone ($CaCO_3$) mix is introduced into the boiler flue gas flow. The limestone reacts with the sulfur dioxide (SO_2) in the flue gas and produces 'synthetic' gypsum (calcium sulfate dihydrate ($CaSO_4 * 2H_2O$)). The resultant gypsum material is wet sluiced from the plant across the highway to the SCPC. Once there, the gypsum dewaters by gravity with the sluice conveying water recycled back

to the WFGD for reuse. The primary soluble constituents of the gypsum CCR are sulfate, calcium, chloride, and sodium (Gredell and Reitz & Jens, 2014).

The SCPC was constructed with a composite liner system consisting of two feet of compacted clay soil with a hydraulic conductivity of less than 1 X 10^{-7} centimeters per second (cm/sec) overlain by an 80-mil HDPE geomembrane liner. Information on the design of the UWL is available in the 2014 Proposed Construction Permit Modification, Construction Permit Number 0918301 (Gredell and Reitz & Jens, 2014).

A groundwater monitoring well network was installed in 2007 and 2008 in order to permit the UWL construction. This monitoring well network was approved by the Missouri Department of Natural Resources (MDNR) and consists of 16 monitoring wells ringing the current and proposed future extents of the UWL (**Figure 1**). These monitoring wells are installed in the uppermost portions of the alluvial aquifer, just below the seasonally low elevation for groundwater. Quarterly groundwater samples have been collected in these monitoring wells since June 2008 for the state required UWL parameters.

The permit for the SCPC was issued July 30, 2010 (permit #0918301). Nine (9) sampling events were performed prior to July 30, 2010 and represent groundwater quality prior to WFGD placement in the UWL. The results from these pre-disposal monitoring events are used in conjunction with other site information in the ASD presented below.

3.3 CCR Rule Groundwater Monitoring

As required by the CCR Rule, the following were completed prior to the October 17, 2017 deadline; (1) a groundwater monitoring well system was installed and certified by a Professional Engineer, (2) a Statistical Method Certification was prepared and certified by a Professional Engineer, (3) a Groundwater Monitoring Plan (GMP) was prepared recording the design, installation, development, sampling procedures, as well as statistical methods, and placed in the owner's operating record, and (4) eight baseline groundwater sampling events were completed for all Appendix III and Appendix IV parameters of CCR Rule.

The groundwater monitoring system for the SCPC consists of eight (8) monitoring wells screened in the uppermost aquifer (alluvial aquifer) as shown on **Figure 1**. Six (6) existing monitoring wells (UG-1A, UG-2, DG-1, DG-2, DG-3, and DG-4) were installed by Gredell Engineering Resources, Inc. in December 2007 and June 2008 as a part of the state UWL monitoring program. The remaining monitoring wells (BMW-1S and BMW-3S) were installed by Golder in 2016 for CCR Rule groundwater monitoring purposes. More information on the design and installation of the monitoring wells is provided in the SCPC GMP and the SCPC 2017 Annual Report.

Between May 2016 and June 2017, eight (8) baseline sampling events were completed for the SCPC. After baseline sampling, the first Detection Monitoring event was completed in November of 2017. The following Appendix III constituents were sampled during detection monitoring;

- Boron
- Calcium
- Chloride
- pH
- Sulfate
- Total Dissolved Solids (TDS)
- Fluoride

In January 2018, background results from the eight (8) baseline sampling events were used to calculate statistical upper prediction limits (UPLs). These UPLs were then compared to the Detection Monitoring results from the November 2017 samples and subsequent semi-annual detection monitoring sampling events. If results from the Detection Monitoring sampling were higher than the calculated UPL, it was considered to be an initial exceedance, in which case a verification sample was then collected and tested in accordance with the SCPC Statistical Analysis Plan. At the SCPC in November 2017, initial exceedances were identified in monitoring wells UG-2 for fluoride and DG-4 for boron. Verification sampling results confirmed a Statistically Significant Increase (SSI) for fluoride at UG-2. An ASD was prepared that demonstrated that this SSI was primarily caused by natural temporal and spatial variability in the aquifer, a relatively low calculated UPL when compared to historical data from this well, and low fluoride results that are near the laboratory practical quantitation limit (PQL). In May 2018, there were three (3) initial exceedances for boron at DG-1, DG-3, and DG-4 but none were confirmed by verification sampling. In November 2018, there were five initial exceedances for pH at DG-1, DG-2, and DG-3; boron at DG-1; and sulfate at DG-3. Similar to May 2018, none were confirmed by verification sampling.

For the August 2019 sampling event, there were four initial exceedances for calcium and chloride at UG-1A, for fluoride at UG-2 and for sulfate at DG-3. All except sulfate at DG-3 were confirmed by verification sampling. The SSIs from the August 2019 sampling event are displayed in **Table 1** below and are for calcium and chloride at UG-1A and fluoride at UG-2.

4.0 REVIEW OF THE STATISTICALLY SIGNIFICANT INCREASES

Analytical data from two monitoring wells confirmed SSIs during the August 2019 sampling event; UG-1A and UG-2. These wells are screened in the upper portion of the alluvial aquifer just below the average seasonal low for groundwater. As shown on **Figure 1**, UG-1A and UG-2 are located north or northwest of the SCPC and south of Highway 94, the generating plant, and the two surface impoundments near the plant (SCPA and SCPB).

Based on Golder's review of the pre-disposal data discussed in Section 3.2 above, and our comparison of those pre-disposal data with the results from the eight CCR-rule baseline events, it was concluded that the groundwater at the SCPC contained low-level pre-existing impacts from CCR that pre-dated SCPC operation. As a result of these pre-existing impacts, the SCPC statistical analysis plan uses intrawell UPLs to determine SSIs. Intrawell UPLs are calculated from historical data within a particular well, and not by pooling data from the background wells, such that individual limits are calculated for each constituent in each well in the monitoring program.

Table 1 - Review of Statistically Significant Increases

Constituent	Well ID	UPL Based on Baseline Events	August 2019 Updated UPL	Baseline Sampling Event Range	All CCR Sampling Events (through January 2019) Range	State UWL Program Sampling Events Range	August 2019 Results	October 2019 Results
Calcium (µg/L)	UG-1A	164,715	177,869	124,000 - 154,000	116,000 - 154,000	129,000 - 212,000	177,000	166,600
Chloride (mg/L)	UG-1A	131.6	145.9	25.4 - 99.8	25.4 - 99.8	15 - 159	145	140
Fluoride (mg/L)	UG-2	0.24	0.3308	0.17 - 0.24	ND - 0.28	0.16 - 0.34	0.25	0.30

Notes

1) mg/L – milligrams per liter.
2) µg/L – micrograms per liter.
3) UPL – Upper Prediction Limit. UPL's calculated using Sanitas™ software.
4) ND – Non-detect.

5.0 EVIDENCE OF SSI FROM ALTERNATIVE SOURCE

Several different lines of evidence indicate that the SSIs at the SCPC are not caused by a release from the SCPC, but rather from an alternative source. The following section describes the different lines of evidence, listed below, that demonstrate this position.

- Documentation of pre-existing, low level concentrations of CCR indicators in groundwater that pre-date the SCPC operation.
- Comparison of key WFGD indicator parameter concentrations (sulfate, calcium, chloride, and boron) prior to and following receipt of CCR in the SCPC.
- Documentation of the construction of the SCPC with a 80-mil geomembrane liner and a 2-foot thick clay barrier.
- Preparation of geochemical models displaying current and historical groundwater chemistries.
- Road salt (sodium chloride) is commonly used for road de-icing purposes on Missouri State Highway 94, which is located within 300 feet of UG-1A.

5.1 CCR Indicators

Several types of CCR byproducts are generated by coal-fired power plants. The different types of CCR typically display distinct geochemical signatures and indicator parameters. **Table 2** below describes the different types of CCRs and their typical indicator parameters (USEPA 2018, EPRI 2011, EPRI 2012, and EPRI 2017).

Table 2: Types of CCR and Typical Indicator Parameters

Type of CCR	Description of CCR (USEPA 2018)	Key Indicators (EPRI 2011, 2012, 2017)
Fly Ash	Fine grained, powdery material composed mostly of silica made from the burning of finely ground coal in the boiler.	■ Boron ■ Molybdenum ■ Lithium ■ Sulfate ■ Bromide ■ Potassium ■ Sodium ■ Fluoride
Boiler Slag / Bottom Ash	Molten bottom ash from the slag tap and cyclone type furnaces that turns into pellets that have a smooth glassy appearance after quenching with water.	
Flue Gas Desulfurization Material (FGD)	A material leftover from the process of reducing sulfur dioxide emissions from a coal-fired boiler that can be a wet sludge consisting of calcium sulfite or calcium sulfate or a dry powdered material that is a mixture of sulfites and sulfates.	■ Sulfate ■ Fluoride ■ Calcium ■ Boron ■ Bromide ■ Chloride

Notes:

1) Fly Ash and Boiler Slag/Bottom Ash typically have the same indicator parameters.

2) Definitions from USEPA website, available at https://www.epa.gov/coalash/coal-ash-basics.
3) Key indicators from EPRI 2011, 2012, and 2017 as well as Gredell and Reitz & Jens, 2014.

In 2011, the Electric Power Research Institute (EPRI) completed a study of FGD composition from many sites across the country and determined that greater than 90% of the material present in FGD deposits is calcium sulfate dihydrate ($CaSO_4*2H_20$). Therefore, impacts from WFGD deposits will likely contain high concentrations of sulfate and calcium compared to background and adjacent samples. Additionally, chloride, fluoride, boron, and sodium concentrations are also potential indicators of WFGD gypsum (EPRI 2012, EPRI 2017).

5.1.1 Sulfate Concentrations at the SCPC

Sulfate is the key indicator of potential WFGD impacts because high concentrations of sulfate are found ubiquitously in WFGD materials with the exception of strongly reducing conditions, and sulfate is relatively mobile in most hydrogeological environments. The groundwater around the SCPC does not demonstrate strongly reducing conditions, such as dissolved oxygen values below 0.5 milligrams per liter (mg/L), negative oxidation reduction potential (ORP), dissolved iron concentrations above 1 mg/L, nor are hydrogen sulfide odors reported at the SCPC. Therefore, if the SSI was caused by impacts from the SCPC, it would be expected that high sulfate values would increase following placement of CCR materials.

Figure 2 displays the full historical set of sulfate concentrations at UG-1A and UG-2 including the period prior to the receipt of CCR. If the SSI was caused by impacts from the SCPC, sulfate concentrations would be expected to increase following the placement of CCR materials. **Figure 2** demonstrates that current sulfate concentrations are at levels similar too or below those from pre-CCR placement.

5.1.2 Boron Concentrations

Based on the EPRI (2011, 2012, 2017) reports, elevated concentrations in boron may indicate WFGD impacts. Like chloride and sodium, boron is soluble and mobile, and thus a good tracer for CCR related impacts. However, any increased boron concentrations associated with a release from a WFGD type impoundment would be expected to also contain increasing sulfate and calcium concentrations, as discussed in previous sections. If groundwater was impacted by the SCPC, current boron concentrations should be statistically elevated with respect to pre-CCR placement.

Figure 3 displays boron concentrations at UG-1A and UG-2 from prior to the receipt of CCR through the current CCR Rule sampling. This figure demonstrates that current boron concentrations are at similar levels to those from pre-CCR placement.

5.2 SSIs at UG-1A

5.2.1 Calcium Concentrations

Calcium is a key indicator in WFGD impoundments because there are high concentrations of calcium (calcium sulfate dihydrate) in WFGD type impoundments. Like sulfate, if the SSI was caused by impacts from the SCPC, calcium concentrations would be noticeably higher and at levels statistically higher than pre-CCR placement.

The initial intrawell UPL for calcium at UG-1A is 164,715 micrograms per liter (µg/L) and was calculated using the results of the eight initial CCR Rule baseline sampling events that ranged from 124,000 to 154,000 µg/L. The UPLs were updated after the August 2019 sampling event as outlined by the Statistical Analysis Plan. The updated UPL value that will be used for UG-1A, starting with the November 2019 sampling event, is 177,869 µg/L (**Figure 4**). During the August 2019 Detection Monitoring event, a value of 177,000 µg/L was reported, which was confirmed by a value of 166,600 µg/L during the verification sampling.

Figure 4 shows a time series plot of calcium and compares data from historic State UWL sampling and CCR Rule sampling. Current calcium concentrations in monitoring well UG-1A are similar to or lower than those reported prior to the operation of the SCPC. If only the data collected in the state program prior to the receipt of CCR was used to calculate the prediction limit, the resulting limit would be 233,576 µg/L, which is well above the August value of 177,000 µg/L.

Based on these data, in addition to the observations reported above for sulfate and boron, the variability in calcium concentrations over time is not a result of WFGD influence on the groundwater. It is likely a result of geochemical variability and the limited sample set used for UPL calculation that does not reflect the whole variability of the aquifer.

5.2.2 Chloride and Sodium Concentrations

Chloride and sodium can be present at elevated concentrations within the SCPC because the water used for transporting the slurry to the SCPC is in a closed loop, meaning water is being recycled and re-used, resulting in increased chloride and sodium concentrations. Chloride and sodium are also highly soluble, mobile, and conservative (i.e., don't interact with geologic materials) under most hydrogeological environments, and as such, are routinely used as indicator parameters of landfill leachate migration at municipal waste facilities throughout the United States. Therefore, if the SSI was caused by an impact from the SCPC, chloride and sodium concentrations would be expected to increase after the placement of CCR. Only chloride is required to be monitored as part of the CCR Rule.

The initial intrawell UPL for chloride at UG-1A is 131.6 mg/L and was calculated using the results of the eight initial CCR Rule baseline sampling events that ranged from 25.4 to 99.8 mg/L. UPLs were updated after the August 2019 sampling event as outlined by the Statistical Analysis Plan. The updated chloride UPL value that will be used for UG-1A, starting with the November 2019 sampling event, is 145.9 mg/L (**Figure 5**). During the August 2019 Detection Monitoring event, a value of 145 mg/L was reported, which was confirmed by a value of 140 mg/L during the verification sampling.

Figure 5 shows a time series plot of chloride and compares data from historic State UWL sampling and CCR Rule sampling. Current chloride concentrations in monitoring well UG-1A are similar to or lower than those reported prior to the operation of the SCPC. If only the data collected in the state program prior to the receipt of CCR was used to calculate the prediction limit, the resulting limit would be 215.5 mg/L, which is well above the August value of 145 mg/L.

Based on these data, in addition to the observations reported above for sulfate and boron, the variability in chloride concentrations over time is not a result of WFGD influence on the groundwater. It is likely a result of geochemical variability and the limited sample set used for UPL calculation that does not reflect the whole variability of the aquifer.

Additionally, while WGFD CCR materials contain high concentrations of chloride, a common alternative source for chloride is road salt (sodium chloride). Road salt is commonly used for road de-icing purposes on Missouri State Highway 94, which is located within 300 feet of UG-1A. **Figure 6** is a multi-constituent time series plot displaying sodium and chloride concentrations. Results from this plot display a good correlation between sodium and chloride results. The seasonal variation in sodium and chloride results is likely caused by road salt application, which subsequently dissolves and infiltrates into the shallow alluvial aquifer.

5.3 SSI at UG-2

5.3.1 Fluoride Concentrations

The intrawell UPL for fluoride at UG-2 is 0.24 mg/L, which is only slightly above the PQL of 0.20 mg/L provided by the laboratory. The UPL of 0.24 mg/L was based on the results of the eight CCR Rule baseline sampling events for UG-2 that ranged from 0.17 to 0.24 mg/L. The results from this small dataset could not be normalized, therefore, a non-parametric limit was used as the prediction limit (i.e., the highest of the baseline sampling results). UPLs were updated after the August 2019 sampling event as outlined by the Statistical Analysis Plan. Using the expanded dataset, the values could be normalized and the updated UPL value that will be used for UG-2, starting with the November 2019 sampling event, is 0.3308 mg/L. During the August 2019 Detection Monitoring event, a value of 0.25 mg/L was reported, which was confirmed by a value of 0.30 mg/L during subsequent verification sampling. These values do represent an SSI, but it is important to note they are very low (within 0.01 and 0.06 mg/L of the baseline UPL, respectively) and close to the PQL value the laboratory can accurately detect.

While sulfate and calcium are the two primary components of WFGD byproducts, fluoride (which triggered the SSI at UG-2) may also be an indicator of potential impacts from WFGD deposits. However, any increased fluoride concentrations associated with a release from a WFGD type impoundment would be expected to also contain increasing sulfate and calcium concentrations. So, while it is possible that the SSI reported for fluoride in monitoring well UG-2 is from a release of WFGD, the absence of increased concentrations for sulfate and calcium effectively eliminate WFGD as the source.

Figure 7 shows a time series plot of fluoride and compares data from historic State UWL sampling and CCR Rule sampling. Current fluoride concentrations in monitoring well UG-2 are similar to those reported prior to the operation of the SCPC. In addition, fluoride concentrations have varied between 0.16 mg/L and 0.34 mg/L over the entire historical monitoring period. Based on these data, in addition to the observations reported above for sulfate and calcium, the variability in fluoride concentrations over time is not a result of WFGD influence on the groundwater, but is likely a result of geochemical variability or other sources not related to the SCPC.

As also shown on **Figure 7**, if only the fluoride results reported prior to placement of WFGD waste are used, the calculated UPL is 0.3371 mg/L, which is approximately 0.097 mg/L higher than the UPL calculated from the eight baseline samples collected for the CCR Rule and 0.037 mg/L higher than the result reported for the verification sampling event. From this, it is clear that the calculated prediction limit from the CCR Rule was biased low because the results reported during the initial eight (8) CCR Rule baseline sampling rounds were relatively low for fluoride in this well. If the historical data are used to supplement the results collected during the CCR Rule baseline period, no SSI would be triggered for fluoride in UG-2.

The pre-CCR based prediction limit of 0.3371 mg/L is also within the range of fluoride concentrations reported for upgradient background wells BMW-1S and BMW-3S, which are located approximately ½ mile to the northwest of the SEC. The calculated initial background limit for fluoride in background wells BMW-1S and BMW-3S is 0.38 mg/L. These similarities in concentrations between the upgradient background wells and the pre-CCR based prediction limit for the SCPC is an indication that the pre-CCR based prediction limit and the updated prediction limit for fluoride are more representative of true background limits for fluoride.

5.4 Geochemical Modeling

In June 2006, temporary groundwater piezometers that were installed as part of the Detailed Site Investigation (DSI) were sampled for major cation and anion concentrations. These data are available in Appendix 13 of the DSI and the piezometer locations are provided in **Figure 1**. Additionally, during the Detection Monitoring event in August 2019, major cation and anion concentrations were collected from the CCR Rule monitoring network for the

SCPC. These data were used to compare current major ion chemistry with the chemistry from 2006, four (4) years prior to placement of CCR in the UWL.

Table 3 contains the values of the major cations and anions from both the recent and historical sampling events. These data were used in the generation of the Stiff and Piper diagrams discussed below. While most of the numbers are similar between the two datasets, chloride and sodium values are significantly higher for some of the wells located near roads. As discussed above, these changes in groundwater chemistry are likely caused by the use of road salt on Highway 94 and are not a result of the SCPC or any other source of CCR.

5.4.1 Stiff Diagrams

Stiff diagrams visually display the major cation and anion data. **Figure 8**, displays the Stiff diagrams from the historical 2006 data, as well as the current SCPC and SCL4A CCR Rule monitoring data. Data from 2006 display a similar distribution to that of August 2019 data. The only major difference between the two sampling events is the increase in the sodium + potassium and chloride plots, causing a slightly different shape in monitoring wells UG-1A, UG-2, and UG-3 relative to piezometers PZ-4, PZ-21, and PZ-36. As discussed above, sodium and chloride concentrations are very seasonally dependent and are influenced by the use of road salt on the nearby Highway 94. Therefore, except for seasonal changes in chloride and sodium, overall groundwater chemistry at the UWL has remained similar since 2006, which is four (4) years prior to CCR placement in the SCPC.

5.4.2 Piper Diagram

A Piper diagram is a graphical technique used to classify different groundwater chemistry. The same data used to generate the Stiff diagram are plotted on a ternary Piper diagram according to major cation and anion concentrations. In addition to showing instantaneous concentrations, Piper diagrams can be used to determine if groundwater chemistry is changing, either spatially or temporally. **Figures 9** and **10** are Piper diagrams displaying data from 2006 and August 2019, respectively.

As shown by the similar placement on the Piper diagrams, the data from 2006 (**Figure 9**) display a similar distribution to that of August 2019 (**Figure 10**). The only notable difference between the two sampling events is the placement of UG-1A, UG-2, and UG-3 relative to other wells. UG-1A, UG-2, and UG-3 plot slightly higher on the sodium + potassium and chloride axes, causing them to be slightly shifted. As discussed above, sodium and chloride concentrations are seasonally dependent and are influenced by the use of road salt on the nearby Highway 94. Except for seasonal differences in chloride and sodium, overall groundwater chemistry at the UWL has remained similar since 2006, which was four (4) years prior to CCR placement in the SCPC.

6.0 DEMONSTRATION THAT SSI WAS NOT CAUSED BY SCPC IMPACT

Based on the information presented in Section 5 above, the SSIs for calcium, chloride and fluoride were not caused by impacts from the SCPC. The SSIs appear to be caused by numerous factors, but are primarily caused by the following:

- Relatively low calculated initial UPLs for the CCR Rule monitoring data, when compared to historical data.
- Very low fluoride concentrations that are near the laboratory PQL threshold for the testing method accuracy.
- Spatial and temporal variability in the alluvial aquifer sampling results that are influenced by pre-existing low-level CCR impacts.
- The use of road salt (NaCL) on Highway 94. This causes an increase in chloride concentrations in monitoring wells located near the highway such as UG-1A and UG-2. Additionally, UG-1A and UG-2 are located south of Highway 94, which is typically the downgradient direction of groundwater flow in that area.

As required by the CCR Rule, eight (8) baseline samples were collected prior to the October 2017 deadline which were used to calculate the UPL for UG-2. According to the *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (USEPA 2009), eight (8) samples is the minimum number of samples recommended in order to complete statistical tests and future data will be used to enlarge the dataset for UPL calculation. At the SCPC, previous data from State UWL monitoring show pre-existing low-level CCR impacts and put the SSI in context relative to historical groundwater conditions at the site.

As shown in Section 5, each of the SSIs was below historical results at that well. The eight (8) background events, all collected in a relatively short timeframe in accordance with the CCR Rule, had statistically lower results than typically found prior to the receipt of WFGD in the SCPC. Therefore, the UPLs calculated from those data only represent the lower range of values in the overall population.

The comparison of key WFGD indicator parameters (sulfate, calcium, chloride, fluoride, and boron) between current groundwater conditions and those present prior to SCPC operations support the conclusion that the SCPC is not the source of the SSIs. The data and analyses presented herein demonstrate that no significant change in groundwater conditions has occurred from SCPC operations.

Other supplemental lines of evidence also demonstrate that there are no impacts on groundwater from the SCPC. Hydrogeological analysis of groundwater flow since 2008 indicates that groundwater at the SCPC typically flows to the south. Therefore, impacts from the SCPC would likely be observed in the downgradient (DG) wells to the south of the SCPC instead of to the north. Geochemical comparisons also display that there has been no significant change in groundwater quality between pre-CCR conditions (2006) and present-day sampling, except for seasonal changes in sodium and chloride concentrations caused by road salt usage on Highway 94. Further, the double-lined construction of the SCPC with 2-feet of compacted clay overlain by an 80-mil HDPE liner, also limits the likelihood that the SSI is a result of impact from SCPC.

In summary, there are no indications to support migration of CCR contaminants from the SCPC. Instead, the data indicate that the cause for the SSIs is due to alluvial aquifer variability, of pre-existing impacts, laboratory method accuracy, limited baseline data available for the calculation of the UPL, and the use of road salt on Highway 94.

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Tables

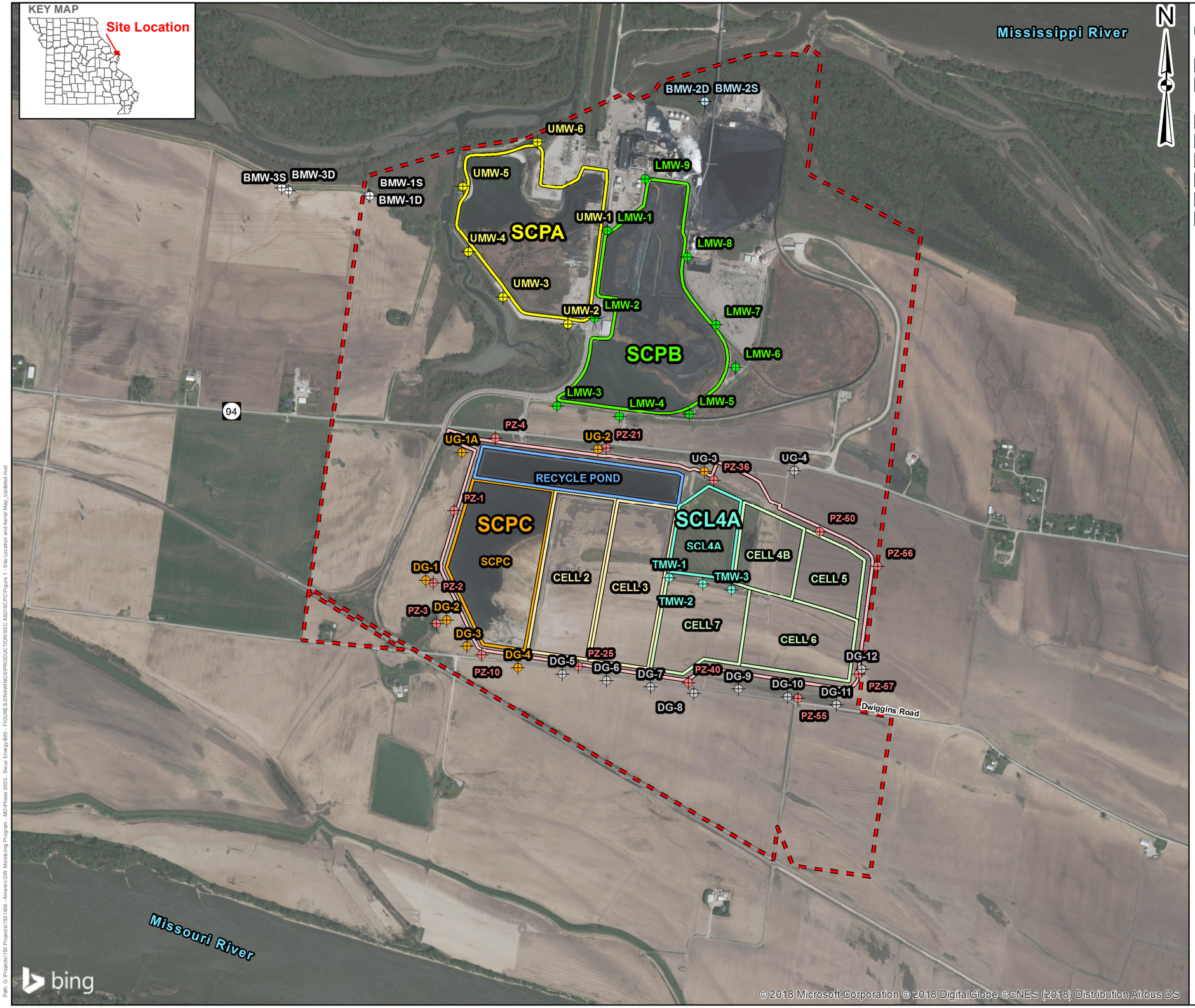
Table 3
Major Cation and Anion Concentrations
SCPC - Alternative Source Demonstration
Sioux Energy Center, St. Charles County, MO

Monitoring Well ID	Total Sodium (mg/L)	Total Potassium (mg/L)	Total Calcium (mg/L)	Total Magnesium (mg/L)	Total Chloride (mg/L)	Total Sulfate (mg/L)	Total Alkalinity [(2)] (mg/L)
Detection Monitoring - August 2019							
S-BMW-1S	5.35	0.383	149	28.4	8.8	34.1	432
S-BMW-3S	5.28	0.648	122	22.4	10.6	25.3	358
S-DG-1	4.23	4.01	135	32.3	6.2	41.7	411
S-DG-2	4.76	5.14	133	33.3	8.2	37.1	425
S-DG-3	4.68	6.47	148	39.1	4.8	49.5	450
S-DG-4	44.6	7.57	136	39.5	103	31.5	403
S-TMW-1	2.76	4.9	99.8	18.2	2.1	40.2	269 J
S-TMW-2	3.18	5.15	123 J	23.1	3.3	52.1	361 J
S-TMW-3	4.08	5.55	123	23.3	2.6	37.2	369 J
S-UG-1A	39.1	9.53	177	42	145	57.7	437
S-UG-2	30.4	4.7	116	24.6	30	45.2	362
S-UG-3	24.2	5.75	159	32.3	85	144	337 J
Historical Data - June 2006							
PZ-1	5.2	4.1	140	38	11	69	480
PZ-2	3.8	2.8	120	32	36	6.6	420
PZ-3	5.4	5.2	140	27	12	53	440
PZ-4	16	4.5	140	35	13	220	320
PZ-10	3.4	3.9	99	31	4.6	43	370
PZ-21	8.0	2.9	130	26	25	100	350
PZ-25	4.2	4.9	120	38	19	29	470
PZ-36	7.2	4.2	110	22	21	34	310
PZ-40	3.2	4.0	120	21	1.7	33	370
PZ-50	3.4	3.8	97	24	18	43	290
PZ-55	3.9	4.5	120	24	6.1	52	370
PZ-56	4.4	4.5	110	22	25	49	340
PZ-57	4.8	4.4	120	24	4.0	42	370

Notes:
1) 2006 Historical Data from Appendix 13 of the Detailed Site Investigation (DSI).
2) Alkalinity is equal to Carbonate + Bicarbonate.
3) mg/L - milligrams per liter.

Prepared by: EMS
Checked by: KAB
Reviewed by: MNH

Figures



LEGEND

- Sioux Energy Center Property Boundary

Surface Impoundments

- SCPB - Lined Fly Ash Surface Impoundment
- SCPA - Unlined Bottom Ash Surface Impoundment

Utility Waste Landfill (UWL)

- Active Dry CCR Disposal Area
- Active WFGD Disposal Area
- Active Water Recycle Pond
- Proposed Dry CCR Disposal Area
- Proposed WFGD Disposal Area
- UWL Perimeter Fence

CCR Rule Monitoring Wells

- Background Monitoring Well
- SCPA - Bottom Ash Surface Impoundment Monitoring Well
- SCPB - Fly Ash Surface Impoundment Monitoring Well
- Existing UWL Monitoring Well Currently Used for CCR Monitoring
- Temporary Monitoring Well for SCL4A

Other Piezometers and Monitoring Wells

- Existing UWL Monitoring Well Not Currently Used for CCR Monitoring
- Groundwater Elevation Piezometer
- 2006 Detailed Site Investigation Piezometer and Sample Locations

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) UWL - UTILITY WASTE LANDFILL.
3.) WFGD - WET FLUE GAS DESULFURIZATION.
4.) CCR - COAL COMBUSTION RESIDUALS.
5.) UWL BOUNDARIES, DESIGNATIONS AND EXISTING MONITORING WELL LOCATIONS BASED ON DRAWINGS IN THE UWL PROPOSED LANDFILL PERMIT (#0918301).

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3.) AMEREN MISSOURI SIOUX POWER PLANT UTILITY WASTE LANDFILL PROPOSED CONSTRUCTION PERMIT MODIFICATION (#0918301), AUGUST 2014.
4.) 2006 PIEZOMETER AND SAMPLE LOCATIONS FROM APPENDIX 13 OF THE DETAILED GEOLOGIC AND HYDROLOGIC SITE INVESTIGATION REPORT

0 500 1,000 1,500 2,000 2,500 Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
SITE LOCATION AND AERIAL MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2018-03-06
PREPARED	RJF
DESIGN	JSI
REVIEW	JSI
APPROVED	MNH

PROJECT No.
153-1406

FIGURE
1

Path: G:\Projects\153 Projects\1531406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\SEC ASD\SCPC\Figure 1 - Site Location and Aerial Map_Updated.mxd

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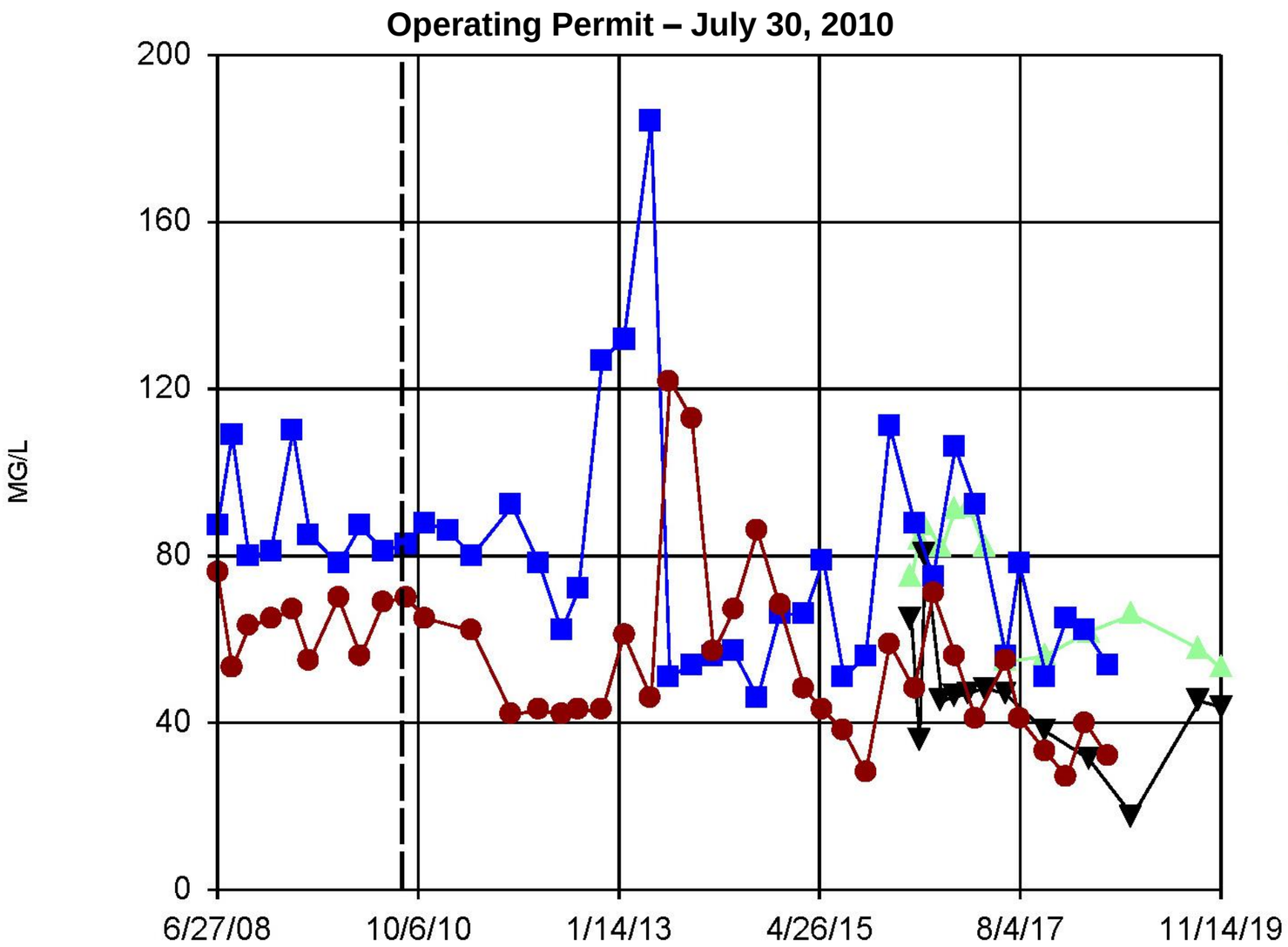
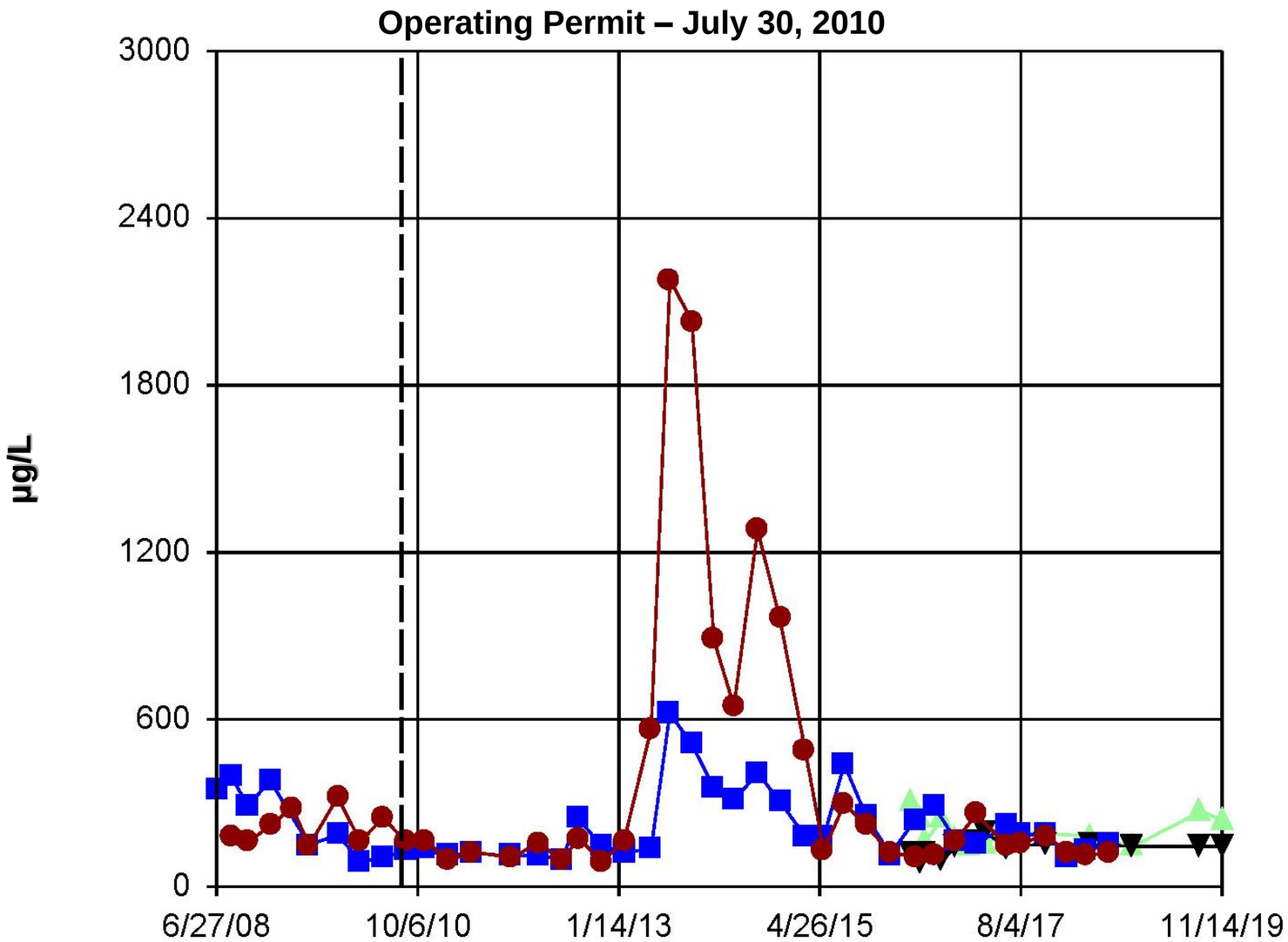
Time Series



Notes
1) MG/L – Milligrams per liter.
2) CCR – Coal Combustion Residuals.
3) UWL – Utility Waste Landfill.

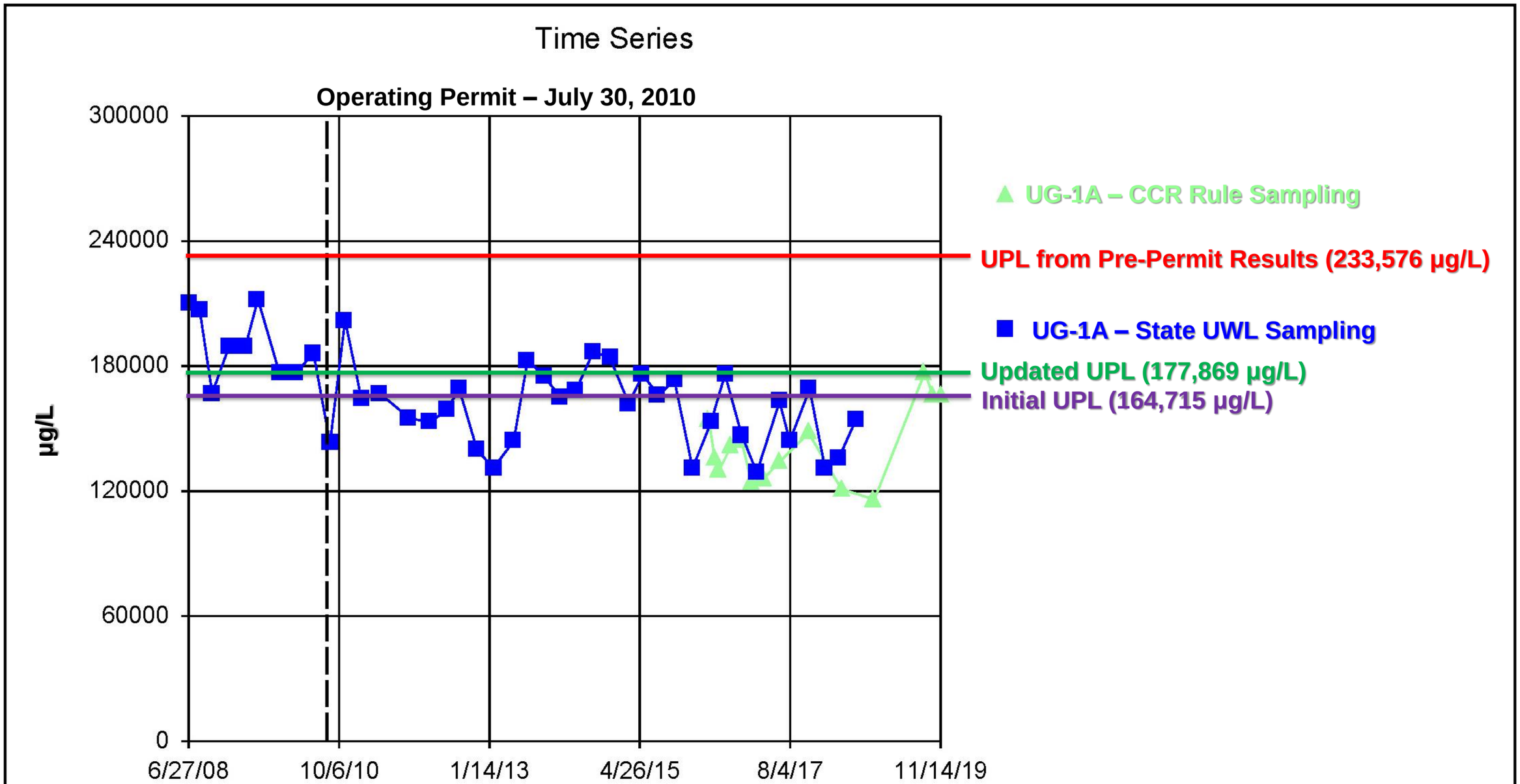
CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**				GOLDER			TITLE **UG-1A and UG-2 Time Series Plot for Sulfate**			
DRAWN JSI	CHECKED RJF	REVIEWED MNH	DATE 2020-01-20	SCALE N/A	FILE NO. N/A	JOB NO. 153140601.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **2**

Time Series



Notes
1) µg/L – Micrograms per liter.
2) CCR – Coal Combustion Residuals.
3) UWL – Utility Waste Landfill.

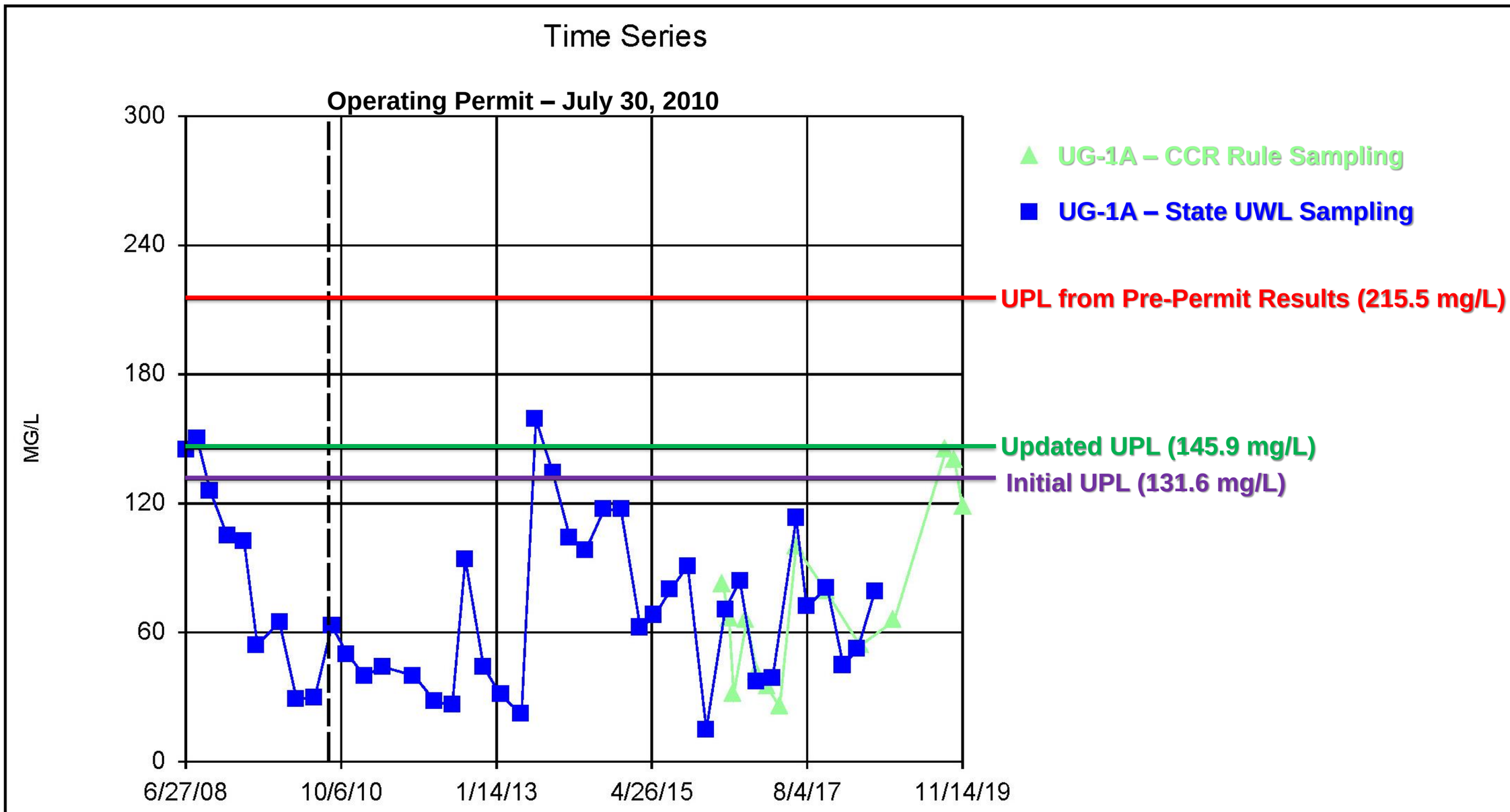
CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**				GOLDER			TITLE **UG-1A and UG-2 Time Series Plot for Boron**			
DRAWN JSI	CHECKED RJF	REVIEWED MNH	DATE 2020-01-20	SCALE N/A	FILE NO. N/A	JOB NO. 153140601.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **3**



Notes
1) µg/L – Micrograms per liter.
2) CCR – Coal Combustion Residuals.
3) UWL – Utility Waste Landfill.
4) UPL – Upper Prediction Limit

CLIENT/PROJECT							TITLE			
AMEREN MISSOURI **SIOUX ENERGY CENTER**				GOLDER			**UG-1A Time Series Plot for Calcium**			
DRAWN JSI	CHECKED RJF	REVIEWED MNH	DATE 2020-01-20	SCALE N/A	FILE NO. N/A	JOB NO. 153140601.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **4**

Time Series

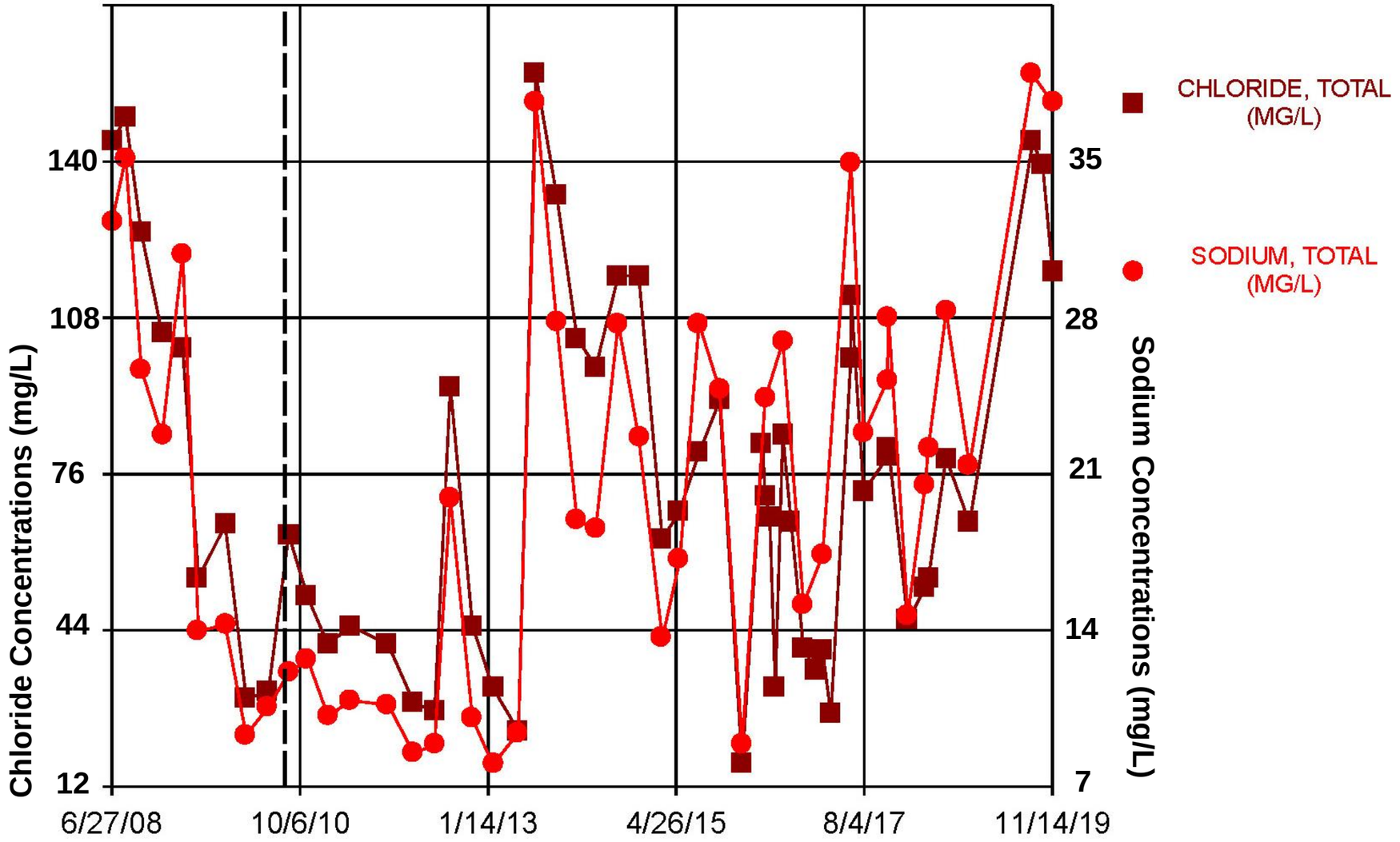


Notes
1) MG/L – Milligrams per liter.
2) CCR – Coal Combustion Residuals.
3) UWL – Utility Waste Landfill.
4) UPL – Upper Prediction Limit.

CLIENT/PROJECT							TITLE			
AMEREN MISSOURI **SIOUX ENERGY CENTER**				GOLDER			**UG-1A Time Series Plot for Chloride**			
DRAWN JSI	CHECKED RJF	REVIEWED MNH	DATE 2020-01-20	SCALE N/A	FILE NO. N/A	JOB NO. 153140601.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **5**

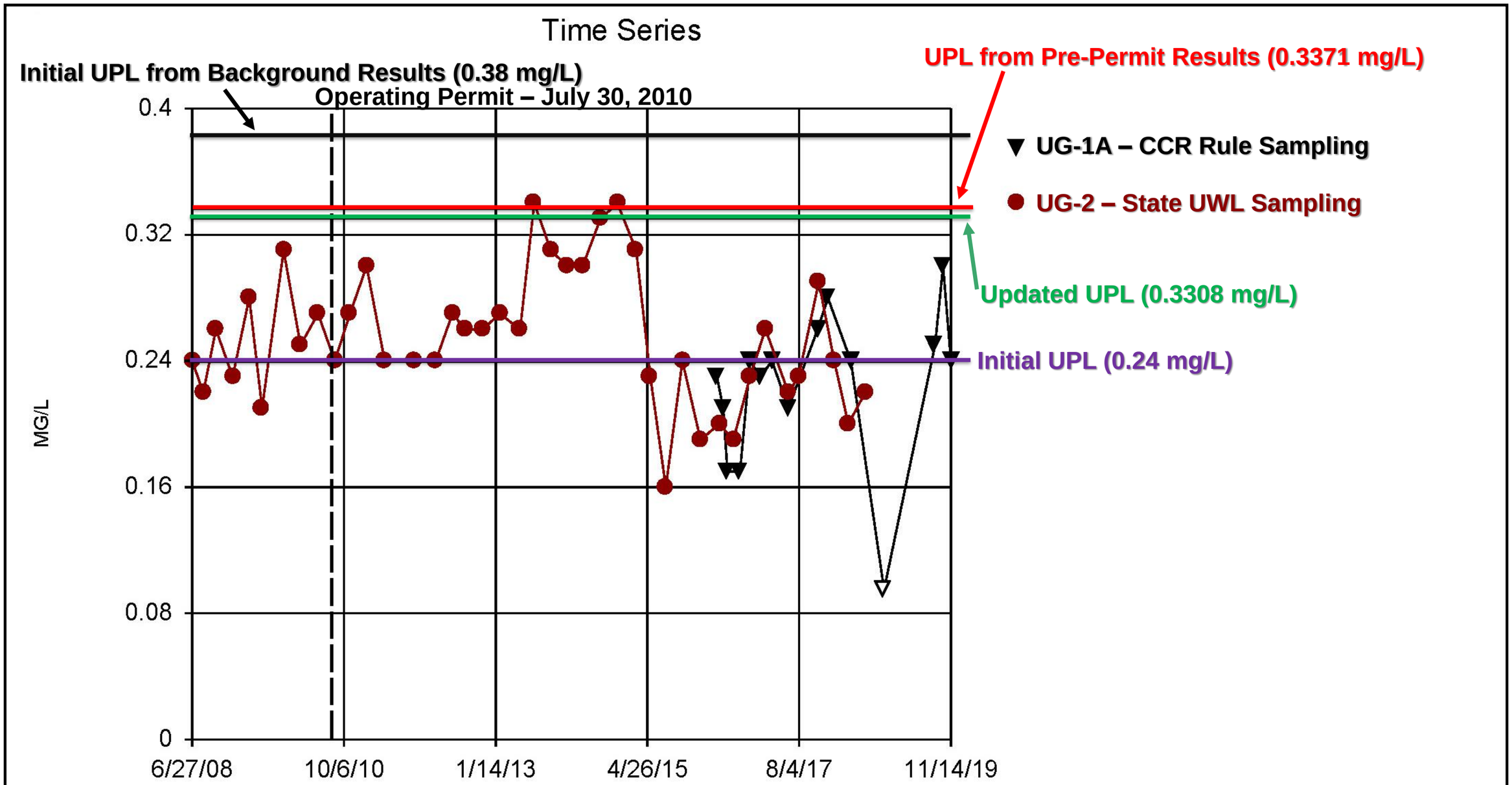
Time Series

Operating Permit – July 30, 2010



Notes
1) MG/L – Milligrams per liter.

CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**				GOLDER			TITLE **UG-1A Time Series Plot Comparing Chloride and Sodium**			
DRAWN JSI	CHECKED RJF	REVIEWED MNH	DATE 2020-01-20	SCALE N/A	FILE NO. N/A	JOB NO. 153140601.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **6**



Notes
1) MG/L – Milligrams per liter.
2) CCR – Coal Combustion Residuals.
3) UWL – Utility Waste Landfill.
4) UPL – Upper Prediction Limit.

CLIENT/PROJECT **AMEREN MISSOURI** **SIOUX ENERGY CENTER**						TITLE **UG-2 Time Series Plot for Fluoride**				
DRAWN JSI	CHECKED RJF	REVIEWED MNH	DATE 2020-01-20	SCALE N/A	FILE NO. N/A	JOB NO. 153140601.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **7**

KEY MAP

Site Location

SCPB

PZ-4

UG-1A

UG-2

PZ-21

RECYCLE POND

UG-3

PZ-36

94

PZ-1

SCL4A

PZ-50

SCPC

CELL 4B

CELL 2

CELL 3

CELL 5

PZ-56

PZ-2

TMW-1

TMW-2

TMW-3

DG-1

DG-2

CELL 7

CELL 6

PZ-3

DG-3

PZ-10

DG-4

PZ-25

PZ-40

PZ-57

PZ-55

Dwiggins Road

bing

N

LEGEND

Sioux Energy Center Property Boundary

Surface Impoundments

SCPB - Lined Fly Ash Surface Impoundment

Utility Waste Landfill (UWL)

Active Dry CCR Disposal Area

Active WFGD Disposal Area

Active Water Recycle Pond

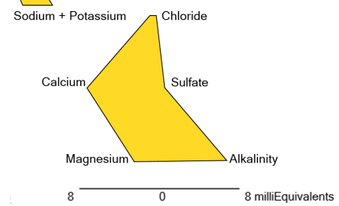
Proposed Dry CCR Disposal Area

Proposed WFGD Disposal Area

UWL Perimeter Fence

Green Stiff Diagrams are from the August 2019 Detection Monitoring Event

Yellow Stiff Diagrams are from the Historical 2006 Detailed Site Investigation Event



NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) UWL - UTILITY WASTE LANDFILL.
3.) WFGD - WET FLUE GAS DESULFURIZATION.
4.) CCR - COAL COMBUSTION RESIDUALS.
5.) UWL BOUNDARIES, DESIGNATIONS AND EXISTING MONITORING WELL LOCATIONS BASED ON DRAWINGS IN THE UWL PROPOSED LANDFILL PERMIT (#0918301).
6.) STIFF DIAGRAMS CALCULATED USING SANITAS. DATA USED TO GENERATE DIAGRAMS IN TABLE 3.

REFERENCES

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2401 FEET.
3.) AMEREN MISSOURI SIOUX POWER PLANT UTILITY WASTE LANDFILL PROPOSED CONSTRUCTION PERMIT MODIFICATION (#0918301), AUGUST 2014.
4.) 2006 PIEZOMETER AND SAMPLE LOCATIONS FROM APPENDIX 13 OF THE DETAILED GEOLOGIC AND HYDROLOGIC SITE INVESTIGATION REPORT

0 250 500 1,000

Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

Ameren

PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
SPATIAL DISTRIBUTION OF STIFF DIAGRAMS

CONSULTANT

GOLDER

YYYY-MM-DD	2020-01-22
PREPARED	EMS
DESIGN	JSI
REVIEW	TJG
APPROVED	MNH

PROJECT No.
153-140601

FIGURE
8

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:

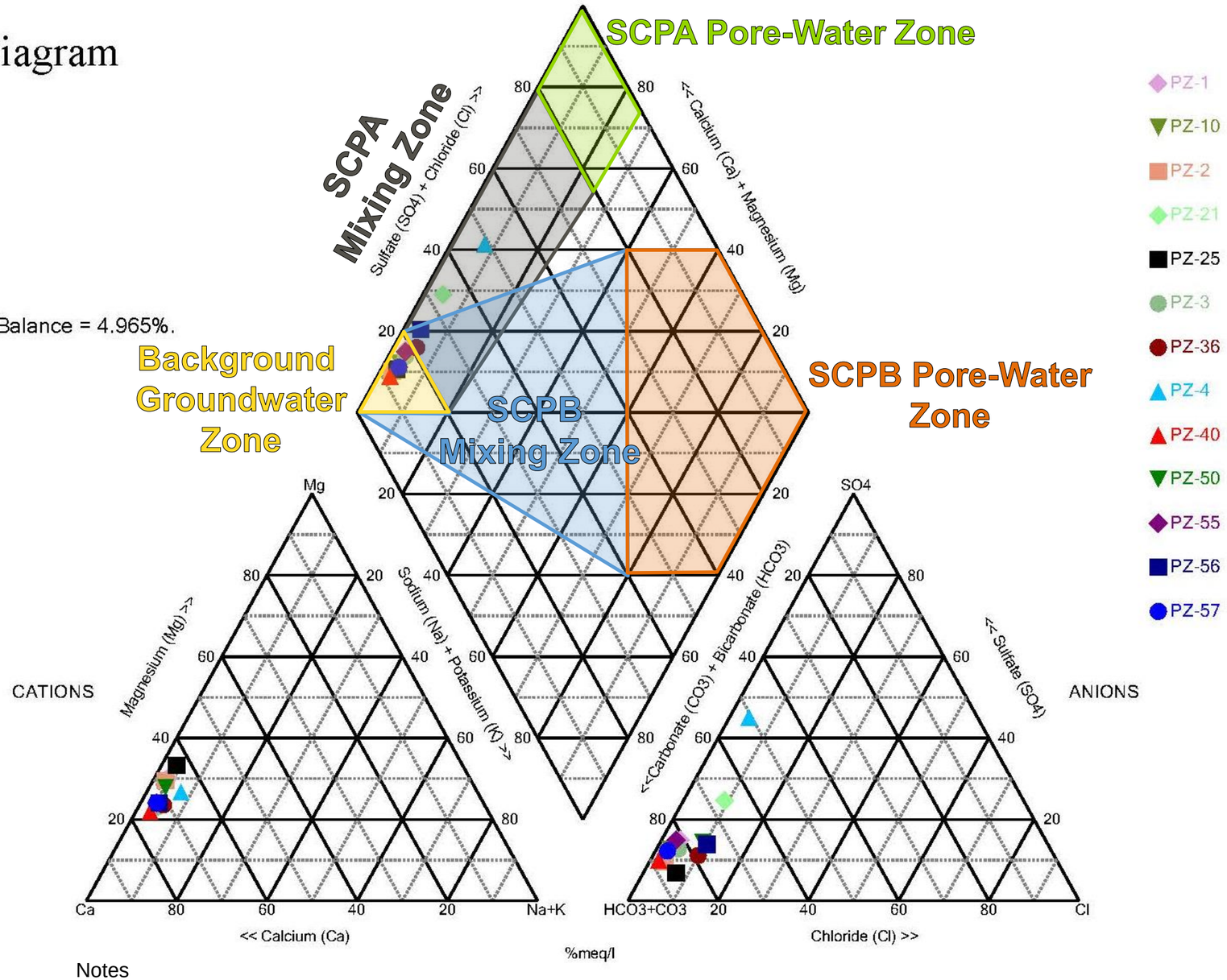
1in
0

Path: G:\Projects\153\Projects\153 1406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\2020-01-22 - Stiff Diagrams.mxd

Piper Diagram

6/7/2006

Cation-Anion Balance = 4.965%.



PZ-1
PZ-10
PZ-2
PZ-21
PZ-25
PZ-3
PZ-36
PZ-4
PZ-40
PZ-50
PZ-55
PZ-56
PZ-57

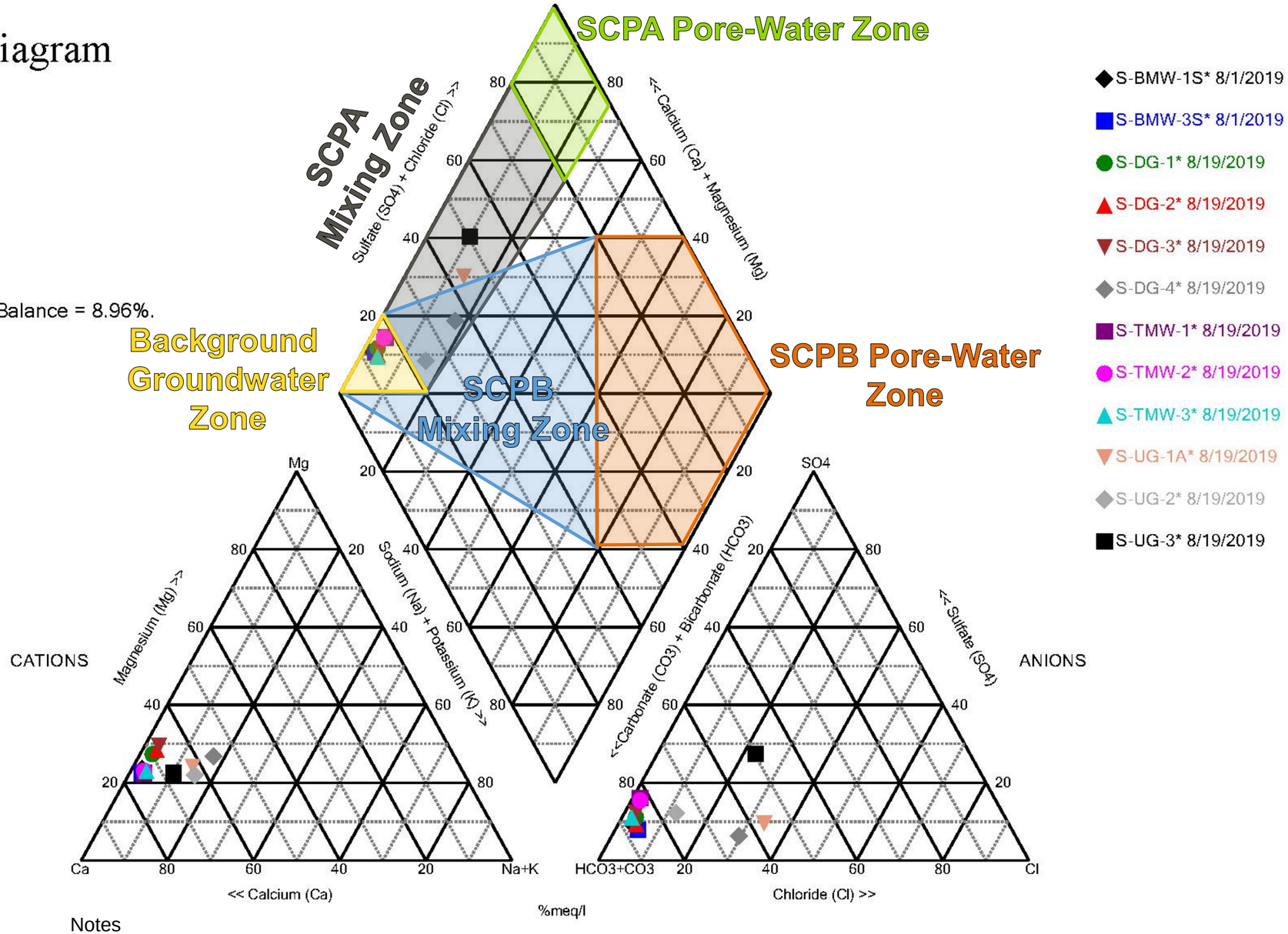
Notes

1) Data used to generate diagram is available in Table 3.
2) Piper diagram was generated using Sanitas software.
3) Data used to generate diagram and zones provided in the 2018 SCPB Alternative Source Demonstration

CLIENT/PROJECT					TITLE					
AMEREN MISSOURI **SIOUX ENERGY CENTER**					**June 2006 - Historical Piper Diagram**					
DRAWN	CHECKED	REVIEWED	DATE	SCALE	FILE NO.	JOB NO.	DWG NO.	SUBTITLE	REV. NO.	FIGURE
JSI	JAP	MNH	2020/01/22	N/A	N/A	153140601.0003	N/A	N/A	N/A	**9**

Piper Diagram

Cation-Anion Balance = 8.96%.



Notes

1) Data used to generate diagram is available in Table 3.
2) Piper diagram was generated using Sanitas software.
3) Data used to generate diagram and zones provided in the 2018 SCPB Alternative Source Demonstration

CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**				GOLDER			TITLE **August 2019 – Detection Monitoring Piper Diagram**			
DRAWN JSI	CHECKED RJF	REVIEWED MNH	DATE 2020/01/22	SCALE N/A	FILE NO. N/A	JOB NO. 153140601.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **10**

APPENDIX C

Potentiometric Surface Maps

Path: G:\Projects\150 Projects\1531406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\NEW_UPDATED_POTMAP_PRODUCTION\20190107_SECPM_153140601.mxd

LEGEND

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment
- SCPB - Fly Ash Surface Impoundment
- SCPC - WFGD Surface Impoundment
- SCL4A - Dry CCR Disposal Area
- Groundwater Flow Direction

Groundwater Elevation Contour (FT MSL)

- Inferred Groundwater Elevation Contour (FT MSL)
- Groundwater Elevation Contour (FT MSL)

Ground/Surface Water Measurement Locations

- SCPA Surface Impoundment Pond Gauge
- River Gauge Location
- Monitoring Well or Piezometer

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) GROUNDWATER AND SURFACE WATER ELEVATIONS DISPLAYED IN FEET ABOVE MEAN SEA LEVEL (FT MSL).
3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
4.) MISSOURI RIVER ELEVATION ESTIMATED BASED ON NEARBY UNITED STATES GEOLOGICAL SURVEY (USGS) RIVER GAUGING LOCATIONS.
5.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.
6.) TP-1S, PZ-6S, AND DG-11 WERE NOT USED IN POTENTIOMETRIC CONTOURING.

REFERENCE

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2,401 FEET.
3.) USGS NATIONAL WATER INFORMATION SYSTEM, USGS GAUGES 06935965 (ST. CHARLES), 07010000 (ST. LOUIS), 05587498 (ALTON), GRAFTON (05587450).

0 500 1,000 1,500 2,000 Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
JANUARY 07, 2019 POTENTIOMETRIC SURFACE MAP

CONSUL˙

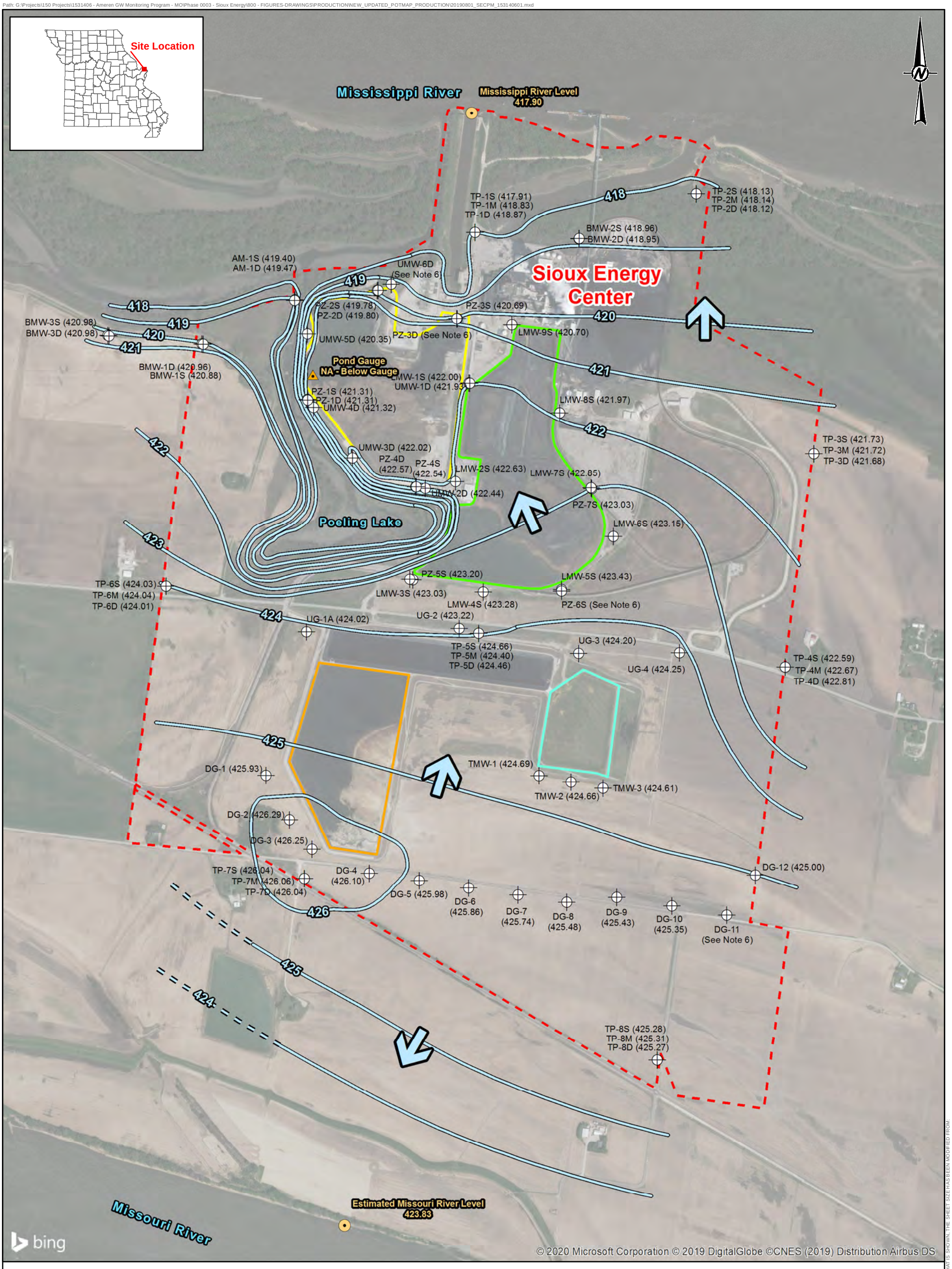
GOLDER

YYYY-MM-DD	2020-01-24
PREPARED	JSI
DESIGN	JSI
REVIEW	AMM
APPROVED	MNH

PROJECT No. 153-1406
PHASE 0003
FIGURE **P1**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 1 in 0

Path: G:\Projects\150 Projects\1531406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\NEW_UPDATED_POTMAP_PRODUCTION\20190801_SECPM_153140601.mxd



LEGEND

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment
- SCPB - Fly Ash Surface Impoundment
- SCPC - WFGD Surface Impoundment
- SCL4A - Dry CCR Disposal Area
- Groundwater Flow Direction

Groundwater Elevation Contour (FT MSL)

- Inferred Groundwater Elevation Contour (FT MSL)
- Groundwater Elevation Contour (FT MSL)

Ground/Surface Water Measurement Locations

- SCPA Surface Impoundment Pond Gauge
- River Gauge Location
- Monitoring Well or Piezometer

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) GROUNDWATER AND SURFACE WATER ELEVATIONS DISPLAYED IN FEET ABOVE MEAN SEA LEVEL (FT MSL).
3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
4.) MISSOURI RIVER ELEVATION ESTIMATED BASED ON NEARBY UNITED STATES GEOLOGICAL SURVEY (USGS) RIVER GAUGING LOCATIONS.
5.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.
6.) DG-11, PZ-3D, PZ-6S, AND UMW-6D WERE NOT USED IN POTENTIOMETRIC CONTOURING.

REFERENCE

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2,401 FEET.
3.) USGS NATIONAL WATER INFORMATION SYSTEM, USGS GAUGES 06935965 (ST. CHARLES), 07010000 (ST. LOUIS), 05587498 (ALTON), GRAFTON (05587450).

0 500 1,000 1,500 2,000 Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

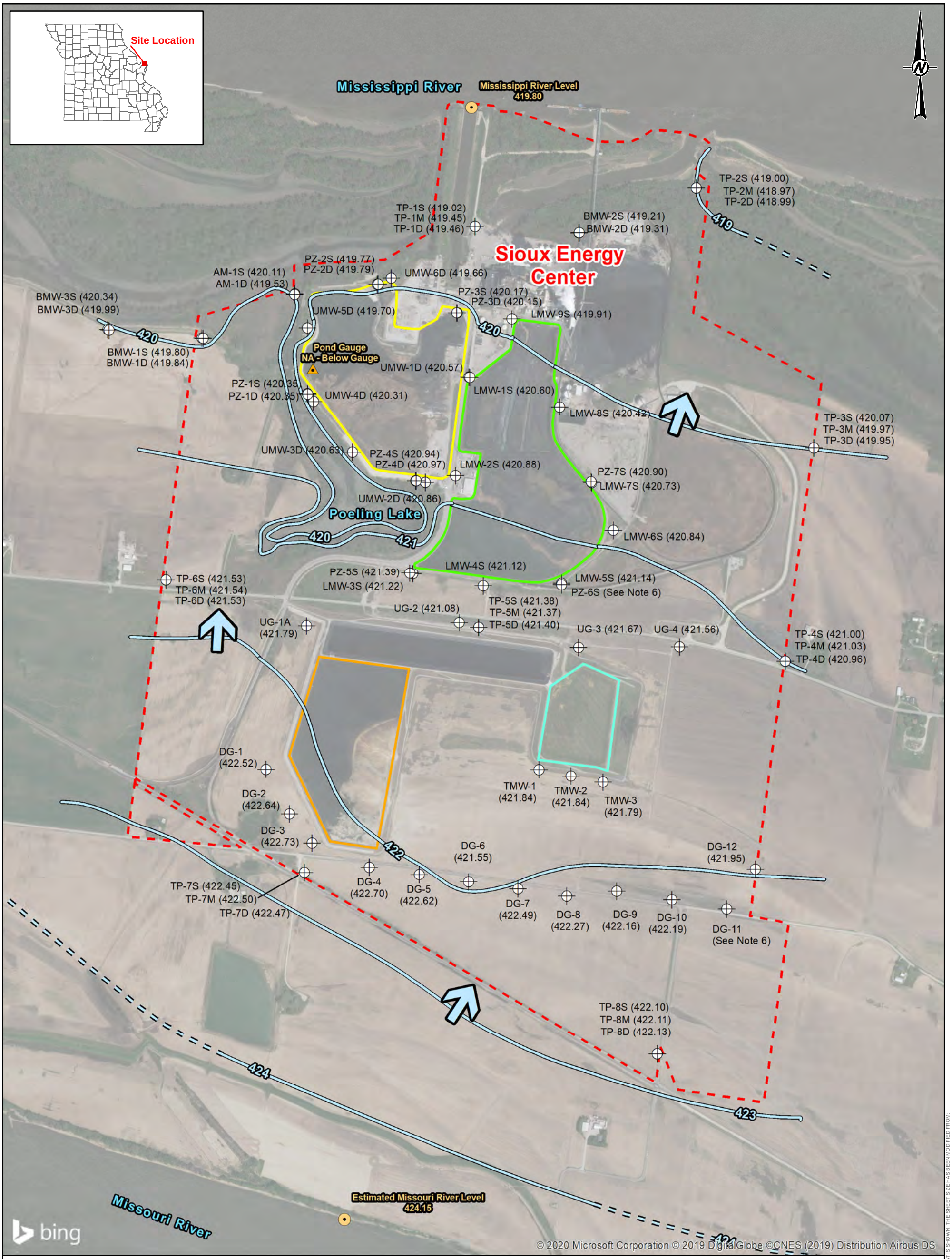
TITLE
AUGUST 1, 2019 POTENTIOMETRIC SURFACE MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2019-10-09
PREPARED	EMS
DESIGN	JSI
REVIEW	AMM
APPROVED	MNH

PROJECT No. 153-1406
PHASE 0003
FIGURE **P2**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
1 in
0



LEGEND

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment
- SCPB - Fly Ash Surface Impoundment
- SCPC - WFGD Surface Impoundment
- SCL4A - Dry CCR Disposal Area
- Groundwater Flow Direction

Groundwater Elevation Contour (FT MSL)

- Inferred Groundwater Elevation Contour (FT MSL)
- Groundwater Elevation Contour (FT MSL)

Ground/Surface Water Measurement Locations

- SCPA Surface Impoundment Pond Gauge
- River Gauge Location
- Monitoring Well or Piezometer

0 500 1,000 1,500 2,000 Feet

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) GROUNDWATER AND SURFACE WATER ELEVATIONS DISPLAYED IN FEET ABOVE MEAN SEA LEVEL (FT MSL).
3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
4.) MISSOURI RIVER ELEVATION ESTIMATED BASED ON NEARBY UNITED STATES GEOLOGICAL SURVEY (USGS) RIVER GAUGING LOCATIONS.
5.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.
6.) DG-11 AND PZ-6S WERE NOT USED IN POTENTIOMETRIC CONTOURING.

REFERENCE

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2,401 FEET.
3.) USGS NATIONAL WATER INFORMATION SYSTEM, USGS GAUGES 06935965 (ST. CHARLES), 07010000 (ST. LOUIS), 05587498 (ALTON), GRAFTON (05587450).

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
OCTOBER 1, 2019 POTENTIOMETRIC SURFACE MAP

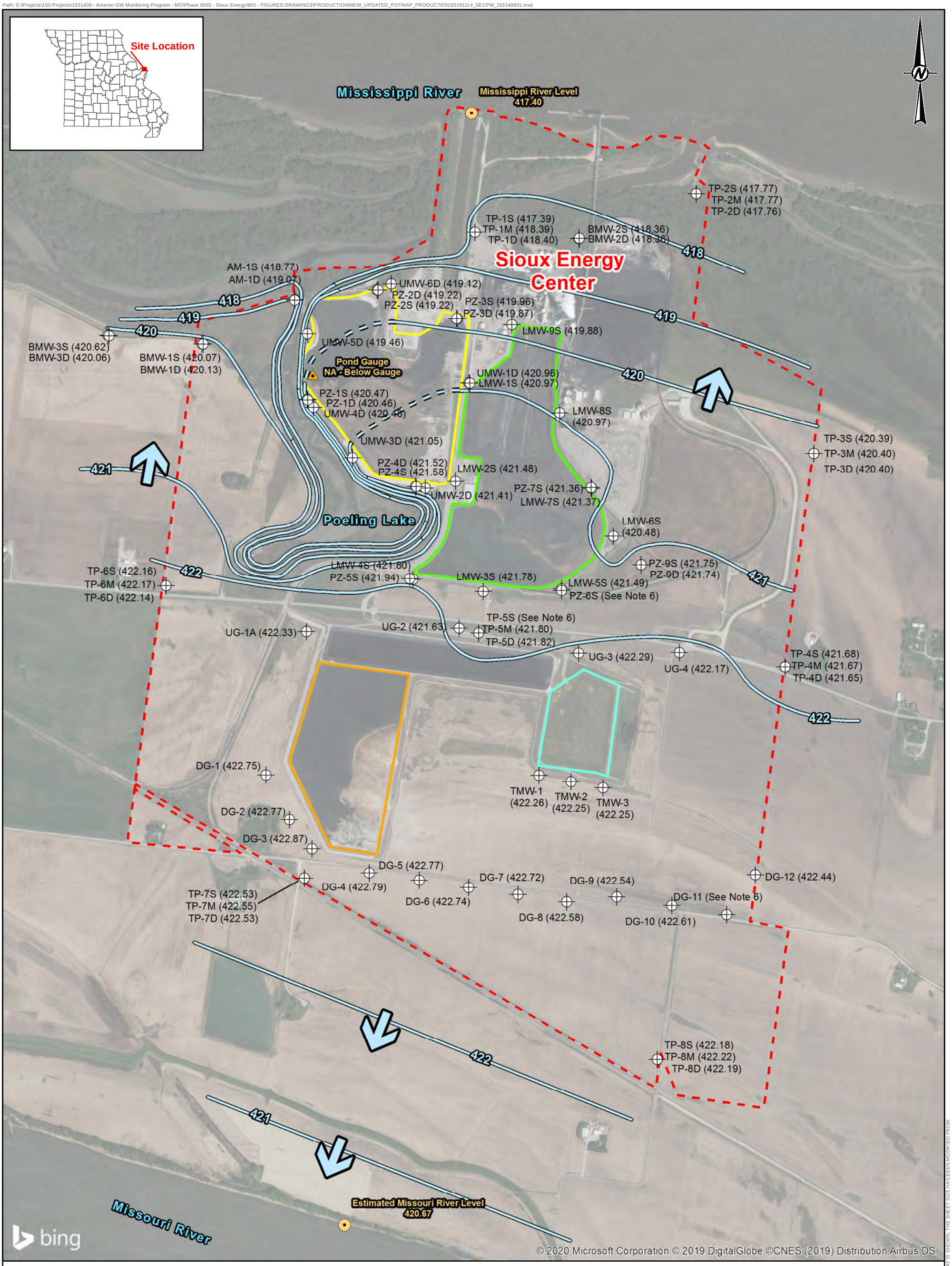
CONSULTANT
GOLDER

YYYY-MM-DD	2019-10-21
PREPARED	AMM
DESIGN	JSI
REVIEW	BCW
APPROVED	MNH

PROJECT No. 153-1406
PHASE 0003
FIGURE **P3**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 1 in 0

Path: G:\Projects\150 Projects\1531406 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\NEW_UPDATED_POTMAP_PRODUCTION\20191114_SECPM_153140601.mxd



LEGEND

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment
- SCPB - Fly Ash Surface Impoundment
- SCPC - WFGD Surface Impoundment
- SCL4A - Dry CCR Disposal Area
- Groundwater Flow Direction

Groundwater Elevation Contour (FT MSL)

- Inferred Groundwater Elevation Contour (FT MSL)
- Groundwater Elevation Contour (FT MSL)

Ground/Surface Water Measurement Locations

- SCPA Surface Impoundment Pond Gauge
- River Gauge Location
- Monitoring Well or Piezometer

NOTES

1.) ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE.
2.) GROUNDWATER AND SURFACE WATER ELEVATIONS DISPLAYED IN FEET ABOVE MEAN SEA LEVEL (FT MSL).
3.) GROUNDWATER ELEVATION MEASUREMENTS OBTAINED BY GOLDER.
4.) MISSOURI RIVER ELEVATION ESTIMATED BASED ON NEARBY UNITED STATES GEOLOGICAL SURVEY (USGS) RIVER GAUGING LOCATIONS.
5.) MISSISSIPPI RIVER ELEVATION PROVIDED BY AMEREN MISSOURI.
6.) DG-11, PZ-6S AND TP-5S WERE NOT USED IN POTENTIOMETRIC CONTOURING.

REFERENCE

1.) AMEREN MISSOURI SIOUX ENERGY CENTER, SIOUX PROPERTY CONTROL MAP, FEBRUARY 2011.
2.) COORDINATE SYSTEM: NAD 1983 STATE PLANE MISSOURI EAST FIPS 2,401 FEET.
3.) USGS NATIONAL WATER INFORMATION SYSTEM, USGS GAUGES 06935965 (ST. CHARLES), 07010000 (ST. LOUIS), 05587498 (ALTON), GRAFTON (05587450).

0 500 1,000 1,500 2,000 Feet

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

TITLE
NOVEMBER 13, 2019 POTENTIOMETRIC SURFACE MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2020-01-07
PREPARED	EMS
DESIGN	JSI
REVIEW	TJG
APPROVED	CMR

PROJECT No. 153-140601
PHASE 0003
FIGURE **P4**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 1 in 0

golder.com