REPORT

2020 Annual Groundwater Monitoring and Corrective Action Report

SCL4A - Utility Waste Landfill Cell 4A, Sioux Energy Center, St. Charles County, Missouri, USA

Submitted to:

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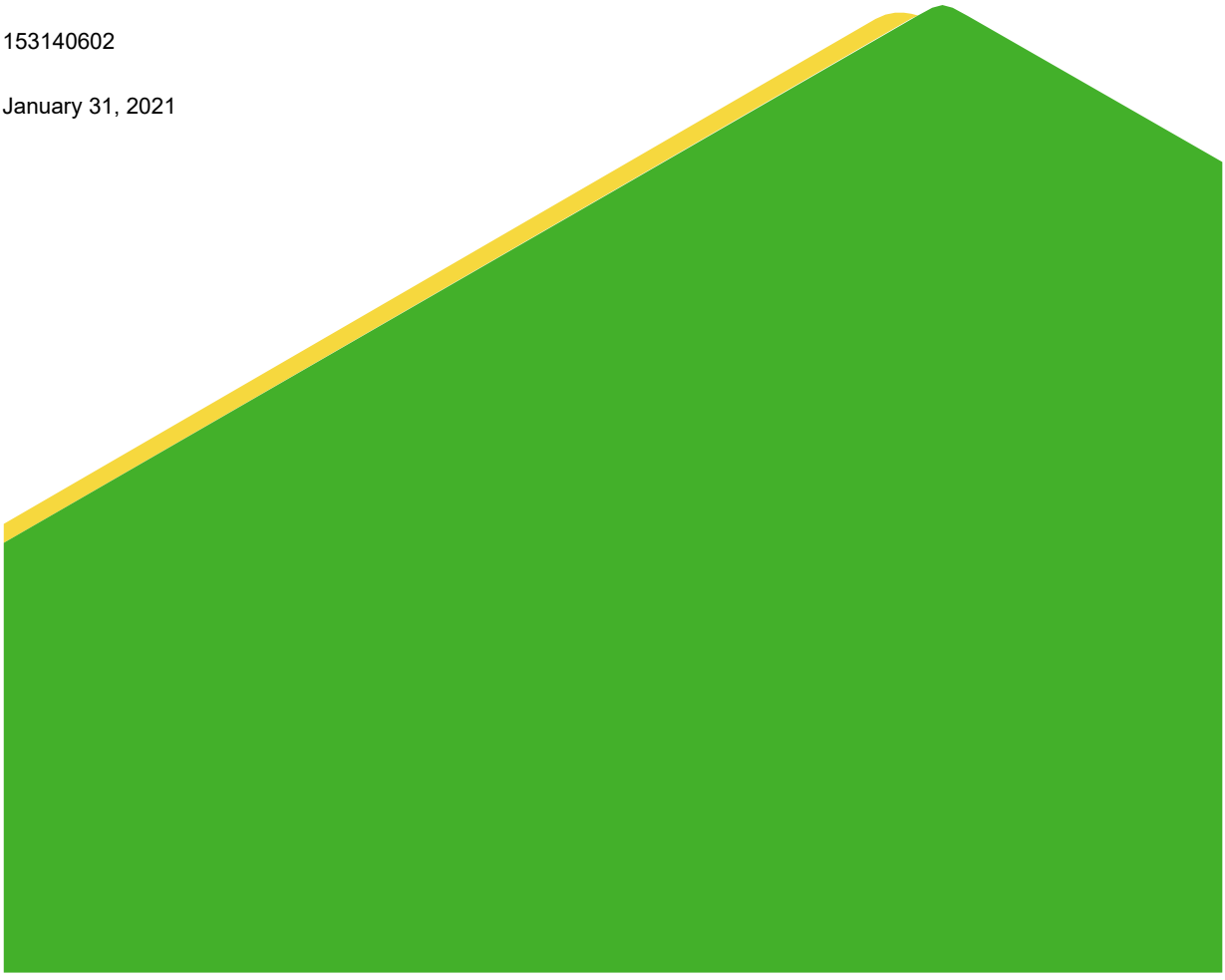
January 31, 2021



1.0 EXECUTIVE SUMMARY AND STATUS OF THE SCL4A GROUNDWATER MONITORING PROGRAM

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) Cell 4A (SCL4A) at the Sioux Energy Center (SEC) is subject to the requirements of the CCR Rule. This Annual Report for the SCL4A describes CCR Rule groundwater monitoring activities from January 1, 2020 through December 31, 2020, including verification results related to late 2019 sampling.

Throughout 2020, the SCL4A CCR unit has been operating under the Detection Monitoring Program (§257.94) which began October 17, 2017. As a part of Detection Monitoring, statistical evaluations are completed after each sampling event to determine if there are any values that represent a Statistically Significant Increase (SSI) over background concentrations. In 2020, SSIs have been determined for each sampling event and a summary of the SSIs for the past year is provided in **Table 1**.

Table 1 – Summary of 2020 SCL4A Sampling Events, Previous Year Verification, and Statistical Evaluations

Event Name	Type of Event and Sampling Dates	Laboratory Analytical Data Receipt Date	Parameters Collected	Verified SSI	SSI Determination Date	ASD Completion Date
November 2019 Sampling Event	Detection Monitoring, November 14-15, 2019	December 9, 2019	Appendix III, Major Cations and Anions	**Chloride:** TMW-2 **Sulfate:** TMW-2 **TDS:** TMW-2	March 8, 2020	June 5, 2020
	Verification Sampling, January 2-3, 2020	January 13, 2020	Detected Appendix III parameters (See Note 1)			
April 2020 Sampling Event	Detection Monitoring, April 22-27, 2020	June 3, 2020	Appendix III, Major Cations and Anions	**Fluoride:** UG-3	September 1, 2020	November 30, 2020
	Verification Sampling, June 16-18, 2020	July 27, 2020	Detected Appendix III parameters (See Note 1)			
November 2020 Sampling Event	Detection Monitoring, November 16-17, 2020	December 28, 2020	Appendix III, Major Cations and Anions	To be determined after statistical analysis and Verification Sampling are completed in 2021.		

Notes:
1) Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.
2) SSI – Statistically Significant Increase.
3) ASD – Alternative Source Demonstration.
4) TDS – Total Dissolved Solids.

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. Alternative Source Demonstrations (ASDs) were prepared for each of these sampling events and are discussed further in this Annual Report.

There were no changes made to the monitoring system in 2020 with no new wells being installed or decommissioned.

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2.0 INSTALLATION OR DECOMMISSIONING OF MONITORING WELLS

In accordance with the CCR Rule, a groundwater monitoring system has been installed to monitor the SCL4A. The groundwater monitoring system consists of six (6) groundwater monitoring wells screened in the uppermost aquifer and is displayed in **Figure 1**. No new monitoring wells were installed or decommissioned in 2020 as a part of the CCR Rule monitoring program for the SCL4A. For more information on the groundwater monitoring network, details are provided in the previous Annual Groundwater Monitoring Reports for the SCL4A.

3.0 GROUNDWATER SAMPLING RESULTS AND DISCUSSION

The following sections discuss the sampling events completed for the SCL4A CCR Unit in 2020. **Table 2** below provides a summary of the groundwater samples collected in 2020 including the number of samples, the date of sample collection, and the monitoring program.

Table 2 – Summary of Groundwater Sampling Dates

Sampling Event	Groundwater Monitoring Wells						Monitoring Program
	BMW-1S	BMW-3S	UG-3	TMW-1	TMW-2	TMW-3	
	Date of Sample Collection						
January 2020 Verification Sampling	-	-	1/3/2020	-	1/2/2020	-	Detection
April 2020 Detection Monitoring	4/22/2020	4/22/2020	4/27/2020	4/27/2020	4/27/2020	4/27/2020	Detection
June 2020 Verification Sampling	-	-	6/16/2020	-	6/18/2020	-	Detection
November 2020 Detection Monitoring	11/16/2020	11/16/2020	11/17/2020	11/17/2020	11/17/2020	11/17/2020	Detection
Total Number of Samples Collected	2	2	4	2	4	2	NA

Notes:

1.) Detection Monitoring Events tested for Appendix III Parameters.

2.) Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.

3.) "-" No sample collected.

4.) NA - Not applicable.

3.1 Detection Monitoring Program

A Detection Monitoring sampling event was completed November 14-15, 2019. Verification sampling and the statistical analysis to evaluate for SSIs for the November 2019 event were not completed until 2020 and are, therefore, included in this report. Detections of Appendix III analytes triggered a verification sampling event, which was completed on January 2-3, 2020 and verified SSIs. **Table 3** summarizes the results of the statistical analysis of the November 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 ASD was completed for these SSIs and is provided in **Appendix B**. This ASD demonstrates that SSIs at the monitoring wells around SCL4A are not caused by the SCL4A CCR Unit and the SCL4A CCR Unit remains in Detection Monitoring.

Detection Monitoring samples were collected April 22-27, 2020, and testing was completed for all Appendix III analytes, as well as major cations and anions. Statistical analysis of the data determined SSIs. Detections of Appendix III analytes triggered Verification Sampling, which was completed June 16-18, 2020 and the testing results verified one SSI. **Table 4** summarizes the results of the statistical analysis of the April 2020 Detection Monitoring event and laboratory analytical data are provided in **Appendix A**. As with the November 2019 sampling event, the SSI reported for the monitoring data is not caused by the SCL4A CCR Unit and an ASD for this is provided in **Appendix C**.

A Detection Monitoring sampling event was completed November 16-17, 2020, and testing was performed for all Appendix III analytes, as well as major cations and anions. Statistical analyses to evaluate for SSIs in the November 2020 data were not completed in 2020 and the results will be provided in the 2021 Annual Report. **Table 5** summarizes the results of the November 2020 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 D**. 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 in the alluvial aquifer at the SEC was toward the northeast but ranged from north to south. Horizontal gradients calculated by the program range from 0.00006 to 0.001 feet/foot with an estimated net annual groundwater movement of approximately three (3) feet.

3.3 Sampling Issues

Verification sampling and a Corrective Action Sampling event for the SEC were planned to start June 1, 2020. However, from approximately June 1, 2020 to June 14, 2020 some of the monitoring wells at the SEC were not accessible or partially submerged due to the flooding of the Mississippi and Missouri Rivers which caused a delay in the planned sampling dates. Prior to collecting water levels or groundwater samples, Golder performed a post-flood monitoring well inspection and based on this evaluation, no monitoring wells were impacted by the flood.

No additional notable sampling issues were encountered at the SCL4A in 2020.

4.0 ACTIVITIES PLANNED FOR 2021

Detection Monitoring is scheduled to continue a semi-annual basis in the second and fourth quarters of 2021. Statistical analysis of the November 2020 Detection Monitoring data will be completed in 2021 and included in the 2021 Annual Report.

Tables

Table 3
November 2019 Detection Monitoring Results
SCL4A - Landfill Cell 4A
Sioux Energy Center, St. Charles County, MO

		BACKGROUND		GROUNDWATER MONITORING WELLS							
ANALYTE	UNITS	BMW-1S	BMW-3S	Prediction Limit UG-3	UG-3	Prediction Limit TMW-1	TMW-1	Prediction Limit TMW-2	TMW-2	Prediction Limit TMW-3	TMW-3
November 2019 Detection Monitoring Event											
DATE	NA	11/15/2019	11/15/2019	NA	11/14/2019	NA	11/14/2019	NA	11/14/2019	NA	11/14/2019
pH	SU	6.88	7.13	6.243-7.648	7.08	6.216-7.528	6.93	6.441-7.519	6.90	6.337-7.638	6.99
BORON, TOTAL	µg/L	118	80.1 J	1,027	976	DQR	79.7 J	DQR	98.1 J	114.8	97.6 J
CALCIUM, TOTAL	µg/L	143,000 J	102,000	160,085	135,000 J	115,800	95,100	134,272	120,000	150,887	116,000
CHLORIDE, TOTAL	mg/L	6.4	7.6	102.2	83.5	4.463	1.8	3.954	4.5	3.1	2.4
FLUORIDE, TOTAL	mg/L	0.28	0.23	0.3772	0.33	0.4264	0.34	0.4061	0.35	0.3573	0.28
SULFATE, TOTAL	mg/L	26.5	34.4	165.7	185 J	50.29	36.9	52.1	75.1	60.9	36.7
TOTAL DISSOLVED SOLIDS	mg/L	551	418	698.7	721	485.1	387	495.8	502	505.9	454
January 2020 Verification Sampling Event											
DATE	NA				1/3/2020				1/2/2020		
pH	SU										
BORON, TOTAL	µg/L										
CALCIUM, TOTAL	µg/L										
CHLORIDE, TOTAL	mg/L								4.7		
FLUORIDE, TOTAL	mg/L										
SULFATE, TOTAL	mg/L				66.2				85.8		
TOTAL DISSOLVED SOLIDS	mg/L				576				513		

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.
4. Prediction Limits calculated using Sanitas Software.
5. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).
6. Values highlighted in green indicate an initial exceedance above the prediction limit that was not confirmed by Verification Sampling (not an SSI).
7. Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.
8. If all background values are less than the Practical Quantitation Limit (PQL) then the Double Quantification Rule (DQR) is used.

Prepared By: EMS
Checked By: BTT
Reviewed By: SCP

Table 4
April 2020 Detection Monitoring Results
SCL4A - Landfill Cell 4A
Sioux Energy Center, St. Charles County, MO

		BACKGROUND		GROUNDWATER MONITORING WELLS							
ANALYTE	UNITS	BMW-1S	BMW-3S	Prediction Limit UG-3	UG-3	Prediction Limit TMW-1	TMW-1	Prediction Limit TMW-2	TMW-2	Prediction Limit TMW-3	TMW-3
April 2020 Detection Monitoring Event											
DATE	NA	4/22/2020	4/22/2020	NA	4/27/2020	NA	4/27/2020	NA	4/27/2020	NA	4/27/2020
pH	SU	6.54	6.90	6.243-7.648	7.12	6.216-7.528	7.02	6.441-7.519	7.02	6.337-7.638	7.04
BORON, TOTAL	µg/L	114	95.9 J	1,027	313	DQR	72.3 J	DQR	91.5 J	114.8	84.0 J
CALCIUM, TOTAL	µg/L	150,000	134,000	160,085	129,000	115,800	111,000	134,272	122,000	150,887	121,000
CHLORIDE, TOTAL	mg/L	8.0	13.2	102.2	51.6	4.463	1.5	3.954	3.8	3.1	1.6
FLUORIDE, TOTAL	mg/L	0.37	0.43	0.3772	0.39	0.4264	0.40	0.4061	0.40	0.3573	0.34
SULFATE, TOTAL	mg/L	27.0	29.6	165.7	68.2	50.29	33.8	52.1	60.5	60.9	33.9
TOTAL DISSOLVED SOLIDS	mg/L	565	472	698.7	579	485.1	399	495.8	505	505.9	437
June 2020 Verification Sampling Event											
DATE	NA				6/16/2020				6/18/2020		
pH	SU										
BORON, TOTAL	µg/L										
CALCIUM, TOTAL	µg/L										
CHLORIDE, TOTAL	mg/L										
FLUORIDE, TOTAL	mg/L				0.38						
SULFATE, TOTAL	mg/L								45.3		
TOTAL DISSOLVED SOLIDS	mg/L								420		

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.
4. Prediction Limits calculated using Sanitas Software.
5. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).
6. Values highlighted in green indicate an initial exceedance above the prediction limit that was not confirmed by Verification Sampling (not an SSI).
7. Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.
8. If all background values are less than the Practical Quantitation Limit (PQL) then the Double Quantification Rule (DQR) is used.

Prepared By: JSI
Checked By: BTT
Reviewed By: MNH

Table 5
November 2020 Detection Monitoring Results
SCL4A - Landfill Cell 4A
Sioux Energy Center, St. Charles County, MO

		BACKGROUND		GROUNDWATER MONITORING WELLS			
ANALYTE	UNITS	BMW-1S	BMW-3S	UG-3	TMW-1	TMW-2	TMW-3
November 2020 Detection Monitoring Event							
DATE	NA	11/16/2020	11/16/2020	11/17/2020	11/17/2020	11/17/2020	11/17/2020
pH	SU	6.96	7.07	7.25	7.25	7.16	7.13
BORON, TOTAL	µg/L	75.1 J	66.3 J	188	65.7 J	87.9 J	88.5 J
CALCIUM, TOTAL	µg/L	141,000	125,000	119,000	119,000	128,000 J	130,000 J
CHLORIDE, TOTAL	mg/L	7.0	11.4	16.5	1.8	3.3	2.1
FLUORIDE, TOTAL	mg/L	0.34	0.40	0.34	0.43	0.34	0.37
SULFATE, TOTAL	mg/L	24.8	30.6	69.5	37.1	46.3	37.6
TOTAL DISSOLVED SOLIDS	mg/L	505	455	473	398	673	433

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: BTT
Checked By: EMS
Reviewed By: MNH

Figures

KEY MAP

LEGEND

- Sioux Energy Center Property Boundary
- Proposed Final UWL Perimeter Fence
- SCL4A - Landfill Cell 4A
- Water Recycle Pond

Groundwater Monitoring Wells used for SCL4A CCR Rule Monitoring

- SCL4A Monitoring Well
- Background Monitoring Well

0 1,000 2,000 3,000
Feet

NOTE(S)
1.) ALL BOUNDARIES AND LOCATIONS ARE APPROXIMATE.

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	MNH

PROJECT NO.	CONTROL	REV.	FIGURE
153140602	1240	0	1

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

1 in
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PATH: G:\Projects\150 Projects\1531405 - Ameren GW Monitoring Program - MO\Phase 0003 - Sioux Energy\800 - FIGURES-DRAWINGS\PRODUCTION\2019 Annual Report\Figure 1 - SCL4A.mxd PRINTED ON: 2021-01-15 AT: 5:02:57 PM

APPENDIX A

Laboratory Analytical Data

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

January 13, 2020

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

RE: Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60325633

Dear Jeffrey Ingram:
Enclosed are the analytical results for sample(s) received by the laboratory on January 04, 2020. 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

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

CERTIFICATIONS

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60325633

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

Pace Analytical Services, LLC
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SAMPLE SUMMARY

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60325633

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60325633001	**S-TMW-2**	Water	01/02/20 15:10	01/04/20 02:17
60325633002	**S-UG-3**	Water	01/02/20 12:00	01/04/20 02:17
60325633003	**S-SCL4A-DUP-1**	Water	01/02/20 08:00	01/04/20 02:17
60325633004	**S-SCL4A-FB-1**	Water	01/03/20 12:05	01/04/20 02:17

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60325633

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60325633001	**S-TMW-2**	SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	2	PASI-K
60325633002	**S-UG-3**	SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	2	PASI-K
60325633003	**S-SCL4A-DUP-1**	SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	2	PASI-K
60325633004	**S-SCL4A-FB-1**	SM 2540C	BLA	1	PASI-K
		EPA 300.0	CNB	2	PASI-K

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60325633

Sample: S-TMW-2 **Lab ID: 60325633001** Collected: 01/02/20 15:10 Received: 01/04/20 02:17 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**513**	mg/L	10.0	10.0	1		01/09/20 07:02		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4.7**	mg/L	1.0	0.39	1		01/07/20 22:30	16887-00-6	
Sulfate	**85.8**	mg/L	5.0	1.4	5		01/07/20 22:46	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60325633

Sample: S-UG-3 **Lab ID: 60325633002** Collected: 01/02/20 12:00 Received: 01/04/20 02:17 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**576**	mg/L	10.0	10.0	1		01/09/20 07:02		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**45.9**	mg/L	10.0	3.9	10		01/07/20 23:02	16887-00-6	
Sulfate	**66.2**	mg/L	10.0	2.8	10		01/07/20 23:02	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60325633

Sample: S-SCL4A-DUP-1 **Lab ID: 60325633003** Collected: 01/02/20 08:00 Received: 01/04/20 02:17 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**502**	mg/L	10.0	10.0	1		01/09/20 07:02		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**4.8**	mg/L	1.0	0.39	1		01/08/20 19:11	16887-00-6	
Sulfate	**83.3**	mg/L	5.0	1.4	5		01/07/20 23:49	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60325633

Sample: S-SCL4A-FB-1 **Lab ID: 60325633004** Collected: 01/03/20 12:05 Received: 01/04/20 02:17 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C								
Total Dissolved Solids	**<5.0**	mg/L	5.0	5.0	1		01/09/20 07:03		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0								
Chloride	**<0.39**	mg/L	1.0	0.39	1		01/08/20 00:05	16887-00-6	
Sulfate	**<0.28**	mg/L	1.0	0.28	1		01/08/20 00:05	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60325633

QC Batch: 632004 Analysis Method: SM 2540C
QC Batch Method: SM 2540C Analysis Description: 2540C Total Dissolved Solids
Associated Lab Samples: 60325633001, 60325633002, 60325633003, 60325633004

METHOD BLANK: 2573527 Matrix: Water
Associated Lab Samples: 60325633001, 60325633002, 60325633003, 60325633004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	01/09/20 07:01	

LABORATORY CONTROL SAMPLE: 2573528

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	969	97	80-120	

SAMPLE DUPLICATE: 2573529

Parameter	Units	60325647001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	844	817	3	10	

SAMPLE DUPLICATE: 2573530

Parameter	Units	60325711001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	747	771	3	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 SCL4A
Pace Project No.: 60325633

QC Batch: 631850 Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 Analysis Description: 300.0 IC Anions
Associated Lab Samples: 60325633001, 60325633002, 60325633003, 60325633004

METHOD BLANK: 2572919 Matrix: Water
Associated Lab Samples: 60325633001, 60325633002, 60325633003, 60325633004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	01/07/20 09:46	
Sulfate	mg/L	<0.28	1.0	0.28	01/07/20 09:46	

METHOD BLANK: 2573742 Matrix: Water
Associated Lab Samples: 60325633001, 60325633002, 60325633003, 60325633004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	01/08/20 17:50	
Sulfate	mg/L	<0.28	1.0	0.28	01/08/20 17:50	

LABORATORY CONTROL SAMPLE: 2572920

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	94	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

LABORATORY CONTROL SAMPLE: 2573743

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	95	90-110	
Sulfate	mg/L	5	4.7	94	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2572921 2572922

Parameter	Units	60325631002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	168	25	25	196	195	112	107	80-120	1	15	E
Sulfate	mg/L	67.6	25	25	94.3	93.9	106	105	80-120	0	15	

MATRIX SPIKE SAMPLE: 2572923

Parameter	Units	60325600002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	3.7	5	8.6	99	80-120	

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 SCL4A
Pace Project No.: 60325633

MATRIX SPIKE SAMPLE: 2572923

Parameter	Units	60325600002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	141	50	195	109	80-120	

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

QUALIFIERS

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60325633

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.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60325633

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60325633001	**S-TMW-2**	SM 2540C	632004		
60325633002	**S-UG-3**	SM 2540C	632004		
60325633003	**S-SCL4A-DUP-1**	SM 2540C	632004		
60325633004	**S-SCL4A-FB-1**	SM 2540C	632004		
60325633001	**S-TMW-2**	EPA 300.0	631850		
60325633002	**S-UG-3**	EPA 300.0	631850		
60325633003	**S-SCL4A-DUP-1**	EPA 300.0	631850		
60325633004	**S-SCL4A-FB-1**	EPA 300.0	631850		

Pace Analytical® www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60325633

60325633

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 ☑ Ziplc

Thermometer Used: T298 **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): **As-read** 1.2 **Corr. Factor** +0.0 **Corrected** 1.2

Date and initials of person examining contents: VB 1/3/2020 VB 1/4/2020

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: _____

Jasmi Church 1/6/20

Project Manager Review: _____ Date: _____

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: 2 of 1

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	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:		Pace Profile #:	9285

REGULATORY AGENCY: NPDES, GROUND WATER, DRINKING WATER, UST, RCRA, OTHER _____

Site Location STATE: MO

Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WP; AR; OT; TS

ITEM #	Section D Required Client Information: SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	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.
																		Y/N	N	N	N	N	N	N		60325633
1	S-TMW-2	WT	G			1/2/20	1510		1	/											1		1	1		001
2	S-LG-3	WT	G			1/3/20	1200		1	/											1		1	1		002
3	SCL4A-Dup-1	WT	G			1/2/20	—		1	/											1		1	1		003
4	SCL4A-FB-1	WT	G			1/3/20	1205		1	/											1		1	1		004
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	1/3/2020	1420	[signature]	1/3/20	1444				
	Angelo [signature]	1/3/20	1444	[signature] / Pace	1/4/2020	0217	1.2	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 1/3/2020

MEMORANDUM

DATE January 23, 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 – SCL4A – DATA PACKAGE 60325633

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

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 - SCL4A
Project Number: 153140601
Reviewer: T Goodwin
Validation Date: 1/23/2020

Laboratory: Pace Analytical - KS
SDG #: 60325633
Analytical Method (type and no.): SM 2540C (TDS); EPA 300.0 (Anions)
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐ _____
Sample Names S-TMW-2, S-UG-3, S-SCL4A-DUP-1, S-SCL4A-FB-1

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			1/2-3/2020
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)?	☒	☐	☐	See Notes
b) Were field dup. precision criteria met (note RPD)?	☒	☐	☐	See Notes
c) Were lab duplicates analyzed (note original and duplicate samples)?	☐	☒	☐	Unrelated Sample
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?	☐	☐	☒	Unrelated Sample
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
b) Was MSD accuracy criteria met?	☐	☐	☒	Unrelated Sample
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
c) Were MS/MSD precision criteria met?	☐	☐	☒	Unrelated Sample

Comments/Notes:

DUP-1 @ S-TMW-2; FB-1 @ S-UG-3

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

Max Field Duplicate RPD: 3% (Limit 20%)

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
None				

Signature: Tommy J. Hooker Jr Date: 1/23/2020

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

June 03, 2020

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

RE: Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory between April 24, 2020 and April 29, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Kansas City

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
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Lenexa, KS 66219
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CERTIFICATIONS

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

Pace Analytical Services Kansas
9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Inorganic Drinking Water Certification #: 10090
Arkansas Drinking Water
Arkansas Certification #: 20-020-0
Arkansas Drinking Water
Illinois Certification #: 200030
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 #: KS000212019-9
Illinois Certification #: 004592
Kansas Field Laboratory Accreditation: # E-92587
Missouri SEKS Micro Certification: 10070

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

SAMPLE SUMMARY

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60335360003	**S-TMW-1**	Water	04/27/20 10:45	04/29/20 03:12
60335360004	**S-TMW-2**	Water	04/27/20 11:35	04/29/20 03:12
60335360005	**S-TMW-3**	Water	04/27/20 12:30	04/29/20 03:12
60335360006	**S-SCL4A-DUP-1**	Water	04/27/20 08:00	04/29/20 03:12
60335360007	**S-SCL4A-FB-1**	Water	04/27/20 12:45	04/29/20 03:12
60335364016	**S-UG-3**	Water	04/27/20 13:25	04/29/20 03:12
60335364013	**S-BMW-1S**	Water	04/22/20 14:55	04/24/20 02:40
60335364014	**S-BMW-3S**	Water	04/22/20 13:40	04/24/20 02:40

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

SAMPLE ANALYTE COUNT

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60335360003	**S-TMW-1**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	MGS	1	PASI-K
		SM 2540C	CNB	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
60335360004	**S-TMW-2**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	MGS	1	PASI-K
		SM 2540C	CNB	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
60335360005	**S-TMW-3**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	MGS	1	PASI-K
		SM 2540C	CNB	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
60335360006	**S-SCL4A-DUP-1**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	MGS	1	PASI-K
		SM 2540C	CNB	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
60335360007	**S-SCL4A-FB-1**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	MGS	1	PASI-K
		SM 2540C	CNB	1	PASI-K
		EPA 300.0	MJK	3	PASI-K
60335364016	**S-UG-3**	EPA 200.7	JLH	7	PASI-K
		SM 2320B	MGS	1	PASI-K
		SM 2540C	CNB	1	PASI-K
		EPA 300.0	JWR	3	PASI-K
60335364013	**S-BMW-1S**	EPA 200.7	JLH	7	PASI-K
		SM 2320B	MGS	1	PASI-K
		SM 2540C	CNB	1	PASI-K
		EPA 300.0	JWR, LDB	3	PASI-K
60335364014	**S-BMW-3S**	EPA 200.7	JLH	7	PASI-K
		SM 2320B	MGS	1	PASI-K
		SM 2540C	CNB	1	PASI-K
		EPA 300.0	JWR, LDB	3	PASI-K

PASI-K = Pace Analytical Services - Kansas City

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

ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

Sample: S-TMW-1 **Lab ID: 60335360003** Collected: 04/27/20 10:45 Received: 04/29/20 03:12 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 Pace Analytical Services - Kansas City								
Boron	**72.3J**	ug/L	100	11.7	1	05/04/20 10:20	05/05/20 15:24	7440-42-8	
Calcium	**111000**	ug/L	200	32.4	1	05/04/20 10:20	05/05/20 15:24	7440-70-2	
Iron	**<26.8**	ug/L	50.0	26.8	1	05/04/20 10:20	05/05/20 15:24	7439-89-6	
Magnesium	**20500**	ug/L	50.0	19.7	1	05/04/20 10:20	05/05/20 15:24	7439-95-4	
Manganese	**18.3**	ug/L	5.0	0.97	1	05/04/20 10:20	05/05/20 15:24	7439-96-5	
Potassium	**5760**	ug/L	500	189	1	05/04/20 10:20	05/05/20 15:24	7440-09-7	
Sodium	**3130**	ug/L	500	107	1	05/04/20 10:20	05/05/20 15:24	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**352**	mg/L	20.0	8.4	1		05/06/20 19:43		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**399**	mg/L	10.0	10.0	1		04/30/20 14:27		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**1.5**	mg/L	1.0	0.39	1		05/08/20 15:12	16887-00-6	
Fluoride	**0.40**	mg/L	0.20	0.075	1		05/08/20 15:12	16984-48-8	
Sulfate	**33.8**	mg/L	5.0	1.4	5		05/08/20 13:49	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 SCL4A
Pace Project No.: 60335360

Sample: S-TMW-2 **Lab ID: 60335360004** Collected: 04/27/20 11:35 Received: 04/29/20 03:12 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 Pace Analytical Services - Kansas City								
Boron	**91.5J**	ug/L	100	11.7	1	05/04/20 10:20	05/05/20 15:39	7440-42-8	
Calcium	**122000**	ug/L	200	32.4	1	05/04/20 10:20	05/05/20 15:39	7440-70-2	
Iron	**39.6J**	ug/L	50.0	26.8	1	05/04/20 10:20	05/05/20 15:39	7439-89-6	
Magnesium	**23800**	ug/L	50.0	19.7	1	05/04/20 10:20	05/05/20 15:39	7439-95-4	
Manganese	**105**	ug/L	5.0	0.97	1	05/04/20 10:20	05/05/20 15:39	7439-96-5	
Potassium	**5560**	ug/L	500	189	1	05/04/20 10:20	05/05/20 15:39	7440-09-7	
Sodium	**3620**	ug/L	500	107	1	05/04/20 10:20	05/05/20 15:39	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**363**	mg/L	20.0	8.4	1		05/06/20 19:54		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**505**	mg/L	10.0	10.0	1		04/30/20 14:27		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**3.8**	mg/L	1.0	0.39	1		05/08/20 16:02	16887-00-6	
Fluoride	**0.40**	mg/L	0.20	0.075	1		05/08/20 16:02	16984-48-8	
Sulfate	**60.5**	mg/L	5.0	1.4	5		05/08/20 16:18	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

Sample: S-TMW-3 **Lab ID: 60335360005** Collected: 04/27/20 12:30 Received: 04/29/20 03:12 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 Pace Analytical Services - Kansas City								
Boron	**84.0J**	ug/L	100	11.7	1	05/04/20 10:20	05/05/20 15:41	7440-42-8	
Calcium	**121000**	ug/L	200	32.4	1	05/04/20 10:20	05/05/20 15:41	7440-70-2	
Iron	**113**	ug/L	50.0	26.8	1	05/04/20 10:20	05/05/20 15:41	7439-89-6	
Magnesium	**22800**	ug/L	50.0	19.7	1	05/04/20 10:20	05/05/20 15:41	7439-95-4	
Manganese	**96.8**	ug/L	5.0	0.97	1	05/04/20 10:20	05/05/20 15:41	7439-96-5	
Potassium	**5650**	ug/L	500	189	1	05/04/20 10:20	05/05/20 15:41	7440-09-7	
Sodium	**4300**	ug/L	500	107	1	05/04/20 10:20	05/05/20 15:41	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**374**	mg/L	20.0	8.4	1		05/06/20 20:00		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**437**	mg/L	10.0	10.0	1		04/30/20 15:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**1.6**	mg/L	1.0	0.39	1		05/08/20 16:35	16887-00-6	
Fluoride	**0.34**	mg/L	0.20	0.075	1		05/08/20 16:35	16984-48-8	
Sulfate	**33.9**	mg/L	5.0	1.4	5		05/08/20 16:51	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

Sample: S-SCL4A-DUP-1 **Lab ID: 60335360006** Collected: 04/27/20 08:00 Received: 04/29/20 03:12 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 Pace Analytical Services - Kansas City								
Boron	**91.5J**	ug/L	100	11.7	1	05/04/20 10:20	05/05/20 15:43	7440-42-8	
Calcium	**126000**	ug/L	200	32.4	1	05/04/20 10:20	05/05/20 15:43	7440-70-2	
Iron	**39.7J**	ug/L	50.0	26.8	1	05/04/20 10:20	05/05/20 15:43	7439-89-6	
Magnesium	**24300**	ug/L	50.0	19.7	1	05/04/20 10:20	05/05/20 15:43	7439-95-4	
Manganese	**108**	ug/L	5.0	0.97	1	05/04/20 10:20	05/05/20 15:43	7439-96-5	
Potassium	**5720**	ug/L	500	189	1	05/04/20 10:20	05/05/20 15:43	7440-09-7	
Sodium	**3680**	ug/L	500	107	1	05/04/20 10:20	05/05/20 15:43	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**363**	mg/L	20.0	8.4	1		05/07/20 12:27		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**468**	mg/L	5.0	5.0	1		04/30/20 15:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**3.8**	mg/L	1.0	0.39	1		05/08/20 17:57	16887-00-6	
Fluoride	**0.40**	mg/L	0.20	0.075	1		05/08/20 17:57	16984-48-8	
Sulfate	**60.6**	mg/L	5.0	1.4	5		05/08/20 17:08	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

Sample: S-SCL4A-FB-1 **Lab ID: 60335360007** Collected: 04/27/20 12:45 Received: 04/29/20 03:12 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 Pace Analytical Services - Kansas City								
Boron	**<11.7**	ug/L	100	11.7	1	05/04/20 10:20	05/05/20 15:45	7440-42-8	
Calcium	**78.0J**	ug/L	200	32.4	1	05/04/20 10:20	05/05/20 15:45	7440-70-2	
Iron	**<26.8**	ug/L	50.0	26.8	1	05/04/20 10:20	05/05/20 15:45	7439-89-6	
Magnesium	**<19.7**	ug/L	50.0	19.7	1	05/04/20 10:20	05/05/20 15:45	7439-95-4	
Manganese	**<0.97**	ug/L	5.0	0.97	1	05/04/20 10:20	05/05/20 15:45	7439-96-5	
Potassium	**<189**	ug/L	500	189	1	05/04/20 10:20	05/05/20 15:45	7440-09-7	
Sodium	**147J**	ug/L	500	107	1	05/04/20 10:20	05/05/20 15:45	7440-23-5	B
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**<8.4**	mg/L	20.0	8.4	1		05/07/20 12:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**6.5**	mg/L	5.0	5.0	1		04/30/20 15:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**<0.39**	mg/L	1.0	0.39	1		05/08/20 18:14	16887-00-6	
Fluoride	**<0.075**	mg/L	0.20	0.075	1		05/08/20 18:14	16984-48-8	
Sulfate	**<0.28**	mg/L	1.0	0.28	1		05/08/20 18:14	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

Sample: S-UG-3 **Lab ID: 60335364016** Collected: 04/27/20 13:25 Received: 04/29/20 03:12 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 Pace Analytical Services - Kansas City								
Boron	**313**	ug/L	100	11.7	1	05/04/20 10:20	05/05/20 12:00	7440-42-8	
Calcium	**129000**	ug/L	200	32.4	1	05/04/20 10:20	05/05/20 12:00	7440-70-2	
Iron	**<26.8**	ug/L	50.0	26.8	1	05/04/20 10:20	05/05/20 12:00	7439-89-6	
Magnesium	**24800**	ug/L	50.0	19.7	1	05/04/20 10:20	05/05/20 12:00	7439-95-4	
Manganese	**706**	ug/L	5.0	0.97	1	05/04/20 10:20	05/05/20 12:00	7439-96-5	
Potassium	**5550**	ug/L	500	189	1	05/04/20 10:20	05/05/20 12:00	7440-09-7	
Sodium	**31800**	ug/L	500	107	1	05/04/20 10:20	05/05/20 12:00	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**346**	mg/L	20.0	8.4	1		05/06/20 19:19		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**579**	mg/L	10.0	10.0	1		04/30/20 14:27		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**51.6**	mg/L	5.0	1.9	5		05/19/20 13:06	16887-00-6	
Fluoride	**0.39**	mg/L	0.20	0.075	1		05/19/20 12:17	16984-48-8	
Sulfate	**68.2**	mg/L	5.0	1.4	5		05/19/20 13:06	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

Sample: S-BMW-1S **Lab ID: 60335364013** Collected: 04/22/20 14:55 Received: 04/24/20 02:40 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 Pace Analytical Services - Kansas City								
Boron	**114**	ug/L	100	11.7	1	04/29/20 13:20	04/30/20 17:01	7440-42-8	
Calcium	**150000**	ug/L	200	32.4	1	04/29/20 13:20	04/30/20 17:01	7440-70-2	
Iron	**<26.8**	ug/L	50.0	26.8	1	04/29/20 13:20	04/30/20 17:01	7439-89-6	
Magnesium	**31500**	ug/L	50.0	19.7	1	04/29/20 13:20	04/30/20 17:01	7439-95-4	
Manganese	**434**	ug/L	5.0	0.97	1	04/29/20 13:20	04/30/20 17:01	7439-96-5	
Potassium	**378J**	ug/L	500	189	1	04/29/20 13:20	04/30/20 17:01	7440-09-7	
Sodium	**4980**	ug/L	500	107	1	04/29/20 13:20	04/30/20 17:01	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**438**	mg/L	20.0	8.4	1		05/01/20 15:49		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**565**	mg/L	10.0	10.0	1		04/28/20 14:16		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**8.0**	mg/L	1.0	0.39	1		05/19/20 02:22	16887-00-6	
Fluoride	**0.37**	mg/L	0.20	0.075	1		05/19/20 02:22	16984-48-8	
Sulfate	**27.0**	mg/L	2.0	0.56	2		05/19/20 15:30	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

Sample: S-BMW-3S **Lab ID: 60335364014** Collected: 04/22/20 13:40 Received: 04/24/20 02:40 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 Pace Analytical Services - Kansas City								
Boron	**95.9J**	ug/L	100	11.7	1	04/29/20 13:20	04/30/20 17:03	7440-42-8	
Calcium	**134000**	ug/L	200	32.4	1	04/29/20 13:20	04/30/20 17:03	7440-70-2	
Iron	**<26.8**	ug/L	50.0	26.8	1	04/29/20 13:20	04/30/20 17:03	7439-89-6	
Magnesium	**26000**	ug/L	50.0	19.7	1	04/29/20 13:20	04/30/20 17:03	7439-95-4	
Manganese	**318**	ug/L	5.0	0.97	1	04/29/20 13:20	04/30/20 17:03	7439-96-5	
Potassium	**490J**	ug/L	500	189	1	04/29/20 13:20	04/30/20 17:03	7440-09-7	
Sodium	**5470**	ug/L	500	107	1	04/29/20 13:20	04/30/20 17:03	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**395**	mg/L	20.0	8.4	1		05/01/20 15:54		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**472**	mg/L	10.0	10.0	1		04/29/20 09:58		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**13.2**	mg/L	1.0	0.39	1		05/19/20 03:20	16887-00-6	
Fluoride	**0.43**	mg/L	0.20	0.075	1		05/19/20 03:20	16984-48-8	
Sulfate	**29.6**	mg/L	2.0	0.56	2		05/19/20 15:45	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

QC Batch: 651902
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Total
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60335364013, 60335364014

METHOD BLANK: 2644795 Matrix: Water
Associated Lab Samples: 60335364013, 60335364014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<11.7	100	11.7	04/30/20 16:27	
Calcium	ug/L	<32.4	200	32.4	04/30/20 16:27	
Iron	ug/L	<26.8	50.0	26.8	04/30/20 16:27	
Magnesium	ug/L	<19.7	50.0	19.7	04/30/20 16:27	
Manganese	ug/L	<0.97	5.0	0.97	04/30/20 16:27	
Potassium	ug/L	<189	500	189	04/30/20 16:27	
Sodium	ug/L	<107	500	107	04/30/20 16:27	

LABORATORY CONTROL SAMPLE: 2644796

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	1000	100	85-115	
Calcium	ug/L	10000	10100	101	85-115	
Iron	ug/L	10000	9960	100	85-115	
Magnesium	ug/L	10000	10500	105	85-115	
Manganese	ug/L	1000	1020	102	85-115	
Potassium	ug/L	10000	10100	101	85-115	
Sodium	ug/L	10000	10300	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2644797 2644798

Parameter	Units	60335364006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	1030	1000	1000	2080	2060	106	103	70-130	1	20	
Calcium	ug/L	83300	10000	10000	94300	93000	109	96	70-130	1	20	
Iron	ug/L	<26.8	10000	10000	10200	10100	102	101	70-130	1	20	
Magnesium	ug/L	20800	10000	10000	31800	31500	110	107	70-130	1	20	
Manganese	ug/L	64.9	1000	1000	1100	1090	104	102	70-130	1	20	
Potassium	ug/L	6980	10000	10000	17400	17200	104	102	70-130	1	20	
Sodium	ug/L	24300	10000	10000	34900	34500	106	102	70-130	1	20	

MATRIX SPIKE SAMPLE: 2644799

Parameter	Units	60335364014 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	95.9J	1000	1100	101	70-130	
Calcium	ug/L	134000	10000	145000	109	70-130	

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 SCL4A
Pace Project No.: 60335360

MATRIX SPIKE SAMPLE: 2644799

Parameter	Units	60335364014 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	<26.8	10000	9910	99	70-130	
Magnesium	ug/L	26000	10000	36400	105	70-130	
Manganese	ug/L	318	1000	1330	102	70-130	
Potassium	ug/L	490J	10000	10600	101	70-130	
Sodium	ug/L	5470	10000	15700	103	70-130	

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 SCL4A
Pace Project No.: 60335360

QC Batch: 652405
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Total
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60335360003, 60335360004, 60335360005, 60335360006, 60335360007

METHOD BLANK: 2646770 Matrix: Water
Associated Lab Samples: 60335360003, 60335360004, 60335360005, 60335360006, 60335360007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<11.7	100	11.7	05/05/20 15:22	
Calcium	ug/L	<32.4	200	32.4	05/05/20 15:22	
Iron	ug/L	<26.8	50.0	26.8	05/05/20 15:22	
Magnesium	ug/L	<19.7	50.0	19.7	05/05/20 15:22	
Manganese	ug/L	<0.97	5.0	0.97	05/05/20 15:22	
Potassium	ug/L	<189	500	189	05/05/20 15:22	
Sodium	ug/L	307J	500	107	05/05/20 15:22	

LABORATORY CONTROL SAMPLE: 2646771

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	992	99	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Iron	ug/L	10000	10200	102	85-115	
Magnesium	ug/L	10000	10200	102	85-115	
Manganese	ug/L	1000	1010	101	85-115	
Potassium	ug/L	10000	10100	101	85-115	
Sodium	ug/L	10000	10400	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2646772 2646773

Parameter	Units	60335360003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	72.3J	1000	1000	1080	1070	101	100	70-130	1	20	
Calcium	ug/L	111000	10000	10000	121000	123000	98	114	70-130	1	20	
Iron	ug/L	<26.8	10000	10000	9930	9940	99	99	70-130	0	20	
Magnesium	ug/L	20500	10000	10000	30500	30400	100	99	70-130	0	20	
Manganese	ug/L	18.3	1000	1000	1020	1010	100	99	70-130	2	20	
Potassium	ug/L	5760	10000	10000	15800	15900	100	102	70-130	1	20	
Sodium	ug/L	3130	10000	10000	13300	13200	101	101	70-130	1	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2646774 2646775

Parameter	Units	60335359004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	149	1000	1000	1150	1140	100	99	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2646774 2646775

Parameter	Units	60335359004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	104000	10000	10000	113000	113000	83	88	70-130	0	20	
Iron	ug/L	<26.8	10000	10000	9700	9820	97	98	70-130	1	20	
Magnesium	ug/L	23700	10000	10000	33600	33400	98	96	70-130	1	20	
Manganese	ug/L	27.1	1000	1000	1020	1000	99	98	70-130	1	20	
Potassium	ug/L	4030	10000	10000	13900	14000	98	100	70-130	1	20	
Sodium	ug/L	10400	10000	10000	20300	20300	100	100	70-130	0	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

QC Batch: 652406
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Total
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60335364016

METHOD BLANK: 2646777 Matrix: Water
Associated Lab Samples: 60335364016

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<11.7	100	11.7	05/05/20 10:55	
Calcium	ug/L	<32.4	200	32.4	05/05/20 10:55	
Iron	ug/L	<26.8	50.0	26.8	05/05/20 10:55	
Magnesium	ug/L	<19.7	50.0	19.7	05/05/20 10:55	
Manganese	ug/L	<0.97	5.0	0.97	05/05/20 10:55	
Potassium	ug/L	<189	500	189	05/05/20 10:55	
Sodium	ug/L	<107	500	107	05/05/20 10:55	

LABORATORY CONTROL SAMPLE: 2646778

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	956	96	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Iron	ug/L	10000	10100	101	85-115	
Magnesium	ug/L	10000	9940	99	85-115	
Manganese	ug/L	1000	975	97	85-115	
Potassium	ug/L	10000	9900	99	85-115	
Sodium	ug/L	10000	10300	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2646779 2646780

Parameter	Units	60335363005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	30400	1000	1000	32300	32200	187	179	70-130	0	20	M1
Calcium	ug/L	254000	10000	10000	268000	267000	143	132	70-130	0	20	M1
Iron	ug/L	1170	10000	10000	11200	11100	100	100	70-130	0	20	
Magnesium	ug/L	10000	10000	10000	19600	19500	96	95	70-130	1	20	
Manganese	ug/L	707	1000	1000	1710	1710	101	100	70-130	0	20	
Potassium	ug/L	18000	10000	10000	28200	28000	101	100	70-130	0	20	
Sodium	ug/L	88600	10000	10000	99100	98800	105	101	70-130	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2646781 2646782

Parameter	Units	60335361003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	111	1000	1000	1090	1100	98	99	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2646781 2646782

Parameter	Units	60335361003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Calcium	ug/L	142000	10000	10000	151000	150000	88	71	70-130	1	20	
Iron	ug/L	865	10000	10000	10800	10800	100	100	70-130	0	20	
Magnesium	ug/L	38600	10000	10000	47600	47200	90	87	70-130	1	20	
Manganese	ug/L	403	1000	1000	1370	1380	96	97	70-130	1	20	
Potassium	ug/L	7390	10000	10000	17300	17100	99	97	70-130	1	20	
Sodium	ug/L	11900	10000	10000	21700	21500	98	96	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

QC Batch: 652429
QC Batch Method: SM 2320B
Analysis Method: SM 2320B
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60335364013, 60335364014

METHOD BLANK: 2646871 Matrix: Water
Associated Lab Samples: 60335364013, 60335364014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<8.4	20.0	8.4	05/01/20 14:04	

LABORATORY CONTROL SAMPLE: 2646872

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	513	103	90-110	

SAMPLE DUPLICATE: 2646873

Parameter	Units	60335791001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	271	280	3	10	

SAMPLE DUPLICATE: 2646874

Parameter	Units	60335363001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	350	345	1	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

QC Batch: 653257 | Analysis Method: SM 2320B
QC Batch Method: SM 2320B | Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60335360003, 60335360004, 60335360005, 60335364016

METHOD BLANK: 2649868 Matrix: Water
Associated Lab Samples: 60335360003, 60335360004, 60335360005, 60335364016

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<8.4	20.0	8.4	05/06/20 17:28	

LABORATORY CONTROL SAMPLE: 2649869

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	497	99	90-110	

SAMPLE DUPLICATE: 2649870

Parameter	Units	60335571008 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	567	540	5	10	

SAMPLE DUPLICATE: 2649871

Parameter	Units	60335360003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	352	351	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

QC Batch: 653258
QC Batch Method: SM 2320B
Analysis Method: SM 2320B
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60335360006, 60335360007

METHOD BLANK: 2649872 Matrix: Water
Associated Lab Samples: 60335360006, 60335360007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<8.4	20.0	8.4	05/07/20 11:53	

LABORATORY CONTROL SAMPLE: 2649873

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	500	100	90-110	

SAMPLE DUPLICATE: 2649874

Parameter	Units	60335361003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	459	439	5	10	

SAMPLE DUPLICATE: 2649875

Parameter	Units	60335359004 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	315	333	6	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

QC Batch: 651545
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60335364013

METHOD BLANK: 2643651 Matrix: Water
Associated Lab Samples: 60335364013

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	04/28/20 14:10	

LABORATORY CONTROL SAMPLE: 2643652

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	995	100	80-120	

SAMPLE DUPLICATE: 2643653

Parameter	Units	60335395021 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	178	178	0	10	

SAMPLE DUPLICATE: 2643654

Parameter	Units	60335247005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	213	216	1	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

QC Batch: 651780
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60335364014

METHOD BLANK: 2644351 Matrix: Water
Associated Lab Samples: 60335364014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	04/29/20 09:57	

LABORATORY CONTROL SAMPLE: 2644352

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	993	99	80-120	

SAMPLE DUPLICATE: 2644353

Parameter	Units	60335364014 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	472	471	0	10	

SAMPLE DUPLICATE: 2644354

Parameter	Units	60335364006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	412	420	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

QC Batch: 652054
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60335360003, 60335360004, 60335364016

METHOD BLANK: 2645321 Matrix: Water
Associated Lab Samples: 60335360003, 60335360004, 60335364016

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	04/30/20 14:23	

LABORATORY CONTROL SAMPLE: 2645322

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	991	99	80-120	

SAMPLE DUPLICATE: 2645323

Parameter	Units	60335416002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	196	191	3	10	

SAMPLE DUPLICATE: 2645324

Parameter	Units	60335360003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	399	395	1	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

QC Batch: 652118
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60335360005, 60335360006, 60335360007

METHOD BLANK: 2645590 Matrix: Water
Associated Lab Samples: 60335360005, 60335360006, 60335360007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	04/30/20 15:16	

LABORATORY CONTROL SAMPLE: 2645591

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	993	99	80-120	

SAMPLE DUPLICATE: 2645592

Parameter	Units	60335361003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	576	588	2	10	

SAMPLE DUPLICATE: 2645593

Parameter	Units	60335359004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	430	428	0	10	

SAMPLE DUPLICATE: 2645594

Parameter	Units	60335571008 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1370	1390	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

QC Batch: 653569
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60335360003, 60335360004, 60335360005, 60335360006, 60335360007

METHOD BLANK: 2651339 Matrix: Water
Associated Lab Samples: 60335360003, 60335360004, 60335360005, 60335360006, 60335360007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	05/08/20 09:30	
Fluoride	mg/L	<0.075	0.20	0.075	05/08/20 09:30	
Sulfate	mg/L	<0.28	1.0	0.28	05/08/20 09:30	

METHOD BLANK: 2652710 Matrix: Water
Associated Lab Samples: 60335360003, 60335360004, 60335360005, 60335360006, 60335360007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	05/11/20 09:21	
Fluoride	mg/L	<0.075	0.20	0.075	05/11/20 09:21	
Sulfate	mg/L	<0.28	1.0	0.28	05/11/20 09:21	

METHOD BLANK: 2653309 Matrix: Water
Associated Lab Samples: 60335360003, 60335360004, 60335360005, 60335360006, 60335360007

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	05/12/20 09:16	
Fluoride	mg/L	<0.075	0.20	0.075	05/12/20 09:16	
Sulfate	mg/L	<0.28	1.0	0.28	05/12/20 09:16	

LABORATORY CONTROL SAMPLE: 2651340

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	2.5	101	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

LABORATORY CONTROL SAMPLE: 2652711

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	94	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

LABORATORY CONTROL SAMPLE: 2653310

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.5	91	90-110	
Fluoride	mg/L	2.5	2.4	98	90-110	
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2651341 2651342

Parameter	Units	60335360003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	1.5	5	5	6.0	6.1	89	92	80-120	2	15	
Fluoride	mg/L	0.40	2.5	2.5	2.9	2.9	99	100	80-120	2	15	
Sulfate	mg/L	33.8	25	25	58.2	58.1	98	97	80-120	0	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2651343 2651344

Parameter	Units	60335359004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.2	5	5	10.1	10.2	98	99	80-120	1	15	
Fluoride	mg/L	0.28	2.5	2.5	2.7	2.8	98	99	80-120	1	15	
Sulfate	mg/L	58.3	25	25	83.0	82.3	99	96	80-120	1	15	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

QC Batch: 655383
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60335364013, 60335364014

METHOD BLANK: 2658521 Matrix: Water
Associated Lab Samples: 60335364013, 60335364014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	05/18/20 11:43	
Fluoride	mg/L	<0.075	0.20	0.075	05/18/20 11:43	
Sulfate	mg/L	<0.28	1.0	0.28	05/18/20 11:43	

METHOD BLANK: 2659286 Matrix: Water
Associated Lab Samples: 60335364013, 60335364014

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	05/19/20 09:16	
Fluoride	mg/L	<0.075	0.20	0.075	05/19/20 09:16	
Sulfate	mg/L	<0.28	1.0	0.28	05/19/20 09:16	

LABORATORY CONTROL SAMPLE: 2658522

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	101	90-110	
Fluoride	mg/L	2.5	2.4	95	90-110	
Sulfate	mg/L	5	5.4	108	90-110	

LABORATORY CONTROL SAMPLE: 2659287

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	2.3	93	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

MATRIX SPIKE SAMPLE: 2658523

Parameter	Units	60335416011 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5.8	250	963	383	80-120	M1
Fluoride	mg/L	0.50	125	139	111	80-120	
Sulfate	mg/L	8.8	250	359	140	80-120	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2658524 2658525

Parameter	Units	60335364006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	20.4	10	10	31.0	31.8	106	114	80-120	3	15	
Fluoride	mg/L	0.44	2.5	2.5	2.8	2.9	95	97	80-120	2	15	
Sulfate	mg/L	106	50	50	153	160	95	110	80-120	5	15	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

QC Batch: 655521
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60335364016

METHOD BLANK: 2658959 Matrix: Water
Associated Lab Samples: 60335364016

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	05/19/20 09:19	
Fluoride	mg/L	<0.075	0.20	0.075	05/19/20 09:19	
Sulfate	mg/L	<0.28	1.0	0.28	05/19/20 09:19	

METHOD BLANK: 2660762 Matrix: Water
Associated Lab Samples: 60335364016

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	05/20/20 09:31	
Fluoride	mg/L	<0.075	0.20	0.075	05/20/20 09:31	
Sulfate	mg/L	<0.28	1.0	0.28	05/20/20 09:31	

METHOD BLANK: 2660856 Matrix: Water
Associated Lab Samples: 60335364016

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	05/21/20 09:26	
Fluoride	mg/L	<0.075	0.20	0.075	05/21/20 09:26	
Sulfate	mg/L	<0.28	1.0	0.28	05/21/20 09:26	

LABORATORY CONTROL SAMPLE: 2658960

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	2.5	101	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

LABORATORY CONTROL SAMPLE: 2660763

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.7	95	90-110	
Fluoride	mg/L	2.5	2.6	103	90-110	
Sulfate	mg/L	5	5.0	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 SCL4A
Pace Project No.: 60335360

LABORATORY CONTROL SAMPLE: 2660857

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	2.6	103	90-110	
Sulfate	mg/L	5	4.9	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2658961 2658962

Parameter	Units	60335364016 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	51.6	25	25	78.3	78.2	107	106	80-120	0	15	
Fluoride	mg/L	0.39	2.5	2.5	2.9	3.0	99	104	80-120	4	15	
Sulfate	mg/L	68.2	25	25	93.9	93.7	103	102	80-120	0	15	

MATRIX SPIKE SAMPLE: 2658963

Parameter	Units	60335364024 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	7.7	5	13.4	114	80-120	
Fluoride	mg/L	0.30	2.5	3.0	110	80-120	
Sulfate	mg/L	86.1	50	142	111	80-120	

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

QUALIFIERS

Project: AMEREN SIOUX ENERGY CTR SCL4A
Pace Project No.: 60335360

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.

ANALYTE QUALIFIERS

B	Analyte was detected in the associated method blank.
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 SCL4A
Pace Project No.: 60335360

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60335364013	**S-BMW-1S**	EPA 200.7	651902	EPA 200.7	651984
60335364014	**S-BMW-3S**	EPA 200.7	651902	EPA 200.7	651984
60335364016	**S-UG-3**	EPA 200.7	652406	EPA 200.7	652606
60335360003	**S-TMW-1**	EPA 200.7	652405	EPA 200.7	652604
60335360004	**S-TMW-2**	EPA 200.7	652405	EPA 200.7	652604
60335360005	**S-TMW-3**	EPA 200.7	652405	EPA 200.7	652604
60335360006	**S-SCL4A-DUP-1**	EPA 200.7	652405	EPA 200.7	652604
60335360007	**S-SCL4A-FB-1**	EPA 200.7	652405	EPA 200.7	652604
60335364013	**S-BMW-1S**	SM 2320B	652429		
60335364014	**S-BMW-3S**	SM 2320B	652429		
60335364016	**S-UG-3**	SM 2320B	653257		
60335360003	**S-TMW-1**	SM 2320B	653257		
60335360004	**S-TMW-2**	SM 2320B	653257		
60335360005	**S-TMW-3**	SM 2320B	653257		
60335360006	**S-SCL4A-DUP-1**	SM 2320B	653258		
60335360007	**S-SCL4A-FB-1**	SM 2320B	653258		
60335364013	**S-BMW-1S**	SM 2540C	651545		
60335364014	**S-BMW-3S**	SM 2540C	651780		
60335364016	**S-UG-3**	SM 2540C	652054		
60335360003	**S-TMW-1**	SM 2540C	652054		
60335360004	**S-TMW-2**	SM 2540C	652054		
60335360005	**S-TMW-3**	SM 2540C	652118		
60335360006	**S-SCL4A-DUP-1**	SM 2540C	652118		
60335360007	**S-SCL4A-FB-1**	SM 2540C	652118		
60335364013	**S-BMW-1S**	EPA 300.0	655383		
60335364014	**S-BMW-3S**	EPA 300.0	655383		
60335364016	**S-UG-3**	EPA 300.0	655521		
60335360003	**S-TMW-1**	EPA 300.0	653569		
60335360004	**S-TMW-2**	EPA 300.0	653569		
60335360005	**S-TMW-3**	EPA 300.0	653569		
60335360006	**S-SCL4A-DUP-1**	EPA 300.0	653569		
60335360007	**S-SCL4A-FB-1**	EPA 300.0	653569		

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Sample Condition Upon Receipt

WO# : 60335360

60335360

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 ☑ 2pk

Thermometer Used: T-296 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): As-read 2.0, 18.2 Corr. Factor +0.1 Corrected 2.1, 18.3

Date and initials of person examining contents: 4/24/20 JD

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) Lot # 603173	☑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 4/24/20 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: 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 Dr, Ste 260	Copy To:	Eric Schnieder, Ryan Feldman	Company Name:	Golder Associates Inc
	Ballwin, MO 63021			Address:	
Email To:	jeffrey_ingram@golder.com	Purchase Order No.:	COC #11 SLL4A	Pace Quote Reference:	
Phone:	636-724-9191 Fax: 636-724-9323	Project Name:	Ameren Sioux Energy Center ~~SCPB~~	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153140602.0003 F	Pace Profile #:	9285, line 3

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	Chloride/Fluoride/Sulfate	App III and Cat/An Metals	Alkalinity	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N		60333560
1	S-LMW-1S	WT	G																					
2	S-LMW-2S	WT	G																					
3	S-LMW-3S	WT	G																					
4	S-LMW-4S	WT	G																					
5	S-LMW-5S	WT	G																					
6	S-LMW-6S	WT	G																					
7	S-LMW-7S	WT	G																					
8	S-LMW-8S	WT	G																					
9	S-LMW-9S (ES)	WT	G																					
10	S-BMW-1S	WT	G			4/22/20	1455		2	1		1							X	X	X	X		
11	S-BMW-2S 3	WT	G			↓	1340		↓	↓		↓							↓	↓	↓	↓		
12	~~S-LMW-DUP-1~~ (ES)	WT	G																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
App III and Cat/An Metals - EPA 200.7: Fe, Mg, Mn, K, Na, Ca, B	Golder	4/23/20	1800	E Brackett / Pace	4/24/20	0240	2.1	Y	Y	Y

SAMPLER NAME AND SIGNATURE		Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
PRINT Name of SAMPLER:	Eric Schnieder				
SIGNATURE of SAMPLER:					
DATE Signed (MM/DD/YY):	04/23/20				

*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

Sample Condition Upon Receipt

WO# : 60335360

60335360

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 ☒ Zplc

Thermometer Used: T298 Type of Ice: (Wet) Blue None

Cooler Temperature (°C): As-read 0.5 Corr. Factor +0.1 Corrected 0.6

Date and initials of person examining contents: 4.29.20 AA

Temperature should be above freezing to 6°C 21.4, 20.2, 0.6, 0.8, 0.1, 1.4 21.5, 20.3, 0.7, 0.9, 0.2, 1.5

Chain of Custody present:	☒Yes ☐No ☐N/A	
Chain of Custody relinquished	☒Yes ☐No ☐N/A	All coolers out of temp had only Radium
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) Lot # 603175	☒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: _____

Jami Church 4/29/20

Project Manager Review: _____ Date: _____

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.

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:	Eric Schnieder, Ryan Feldman
Purchase Order No.:	COC #11
Project Name:	Ameren Sioux Energy Center SCL4A
Project Number:	153140602.0003D

Section C Invoice Information:

Attention:	
Company Name:	Golder Associates Inc
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	9285, line 3

REGULATORY AGENCY

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

Site Location STATE: MO

Section D Required Client Information

Valid Matrix Codes

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

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

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	Chloride/Fluoride/Sulfate	App III and Cat/An Metals*	Alkalinity	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Y/N	N	N	N	N		
1	S-UG-3	WT	G			4/27/20	1325		2	1		1							X	X	X	X		
2	S-TMW-1	WT	G				1045																	
3	S-TMW-2	WT	G				1135																	
4	S-TMW-3	WT	G				1230																	
5	S-SCL4A-DUP-1	WT	G				—																	
6	S-SCL4A-FB-1	WT	G				1245																	
7	S-SCL4A-MS-1	WT	G				1045																	S-TMW-1-MS-1
8	S-SCL4A-MSD-1	WT	G				1045																	S-TMW-1-MSD-1
9	S-BMW-1S	WT	G																					
10	S-BMW-3S	WT	G																					
11		WT	G																					
12		WT	G																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
App III and Cat/An Metals - EPA 200.7: Fe, Mg, Mn, K, Na, Ca, B		4/28/20	1600		4/28/20	1600	
		4/28/20	1202		4/29/2020212		0.6 / 0.7 / 0.9 / 0.2 / 1.5 — Y — N — Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schnieder

SIGNATURE of SAMPLER: _____ DATE Signed (MM/DD/YY): 04/28/20

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.

MEMORANDUM

DATE July 1, 2020 **Project No.** 153140602

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Annie Muehlfarth **EMAIL AMuehlfarth@golder.com**

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCL4A – DETECTION - DATA PACKAGE 60335360

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 blank (i.e. method, field), and the blank comparison criterion was not met, associated sample results were qualified as non-detects (U).
- 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 Inc.
Project Manager: J. Ingram
Project Name: Ameren - SEC - SCL4A
Project Number: 153140602
Reviewer: A. Muehlfarth
Validation Date: 06/29/2020

Laboratory: Pace Analytical
SDG #: 60335360
Analytical Method (type and no.): EPA 200.7 (Total Metals); SM2320B (Alkalinity); SM2540C (TDS); EPA 300.0 (Anions)
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐
Sample Names S-TMW-1, S-TMW-2, S-TMW-3, S-SCL4A-DUP-1, S-SCL4A-FB-1, S-UG-3, 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?	x			04/22 - 04/27/2020
b) Sampling team indicated?	x			
c) Sample location noted?	x			
d) Sample depth indicated (Soils)?			x	
e) Sample type indicated (grab/composite)?	x			Grab
f) Field QC noted?	x			See Notes
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			See Notes

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)?	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)?	x			S-SCL4A-DUP-1 @ S-TMW-2
b) Were field dup. precision criteria met (note RPD)?	x			
c) Were lab duplicates analyzed (note original and duplicate samples)?	x			
d) Were lab dup. precision criteria met (note RPD)?	x			

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		
Recovery could not be calculated since sample contained high concentration of analyte?			x	
b) Was MSD accuracy criteria met?		x		
Recovery could not be calculated since sample contained high concentration of analyte?			x	
c) Were MS/MSD precision criteria met?	x			

Comments/Notes:

Some coolers were outside of temperature limits, however they contained only Radium samples.

Chloride and Sulfate were diluted in several samples, no qualification necessary.

MB: 2646770: Sodium (307 J), associated with samples -60003 through -60007

FB: S-SCL4A-FB-1 @ S-TMW-3: Calcium (78.0 J), Sodium (147 J), TDS (6.5) detections in sample > 10x the blank result, no qualification necessary.

QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

Comments/Notes:

MS/MSD: 2646779, 2646780: MS/MSD % recovery high for Boron, Calcium, associated with sample 60335363005 (unrelated sample).

2658523: MS % recovery high for Chloride, Sulfate, associated with sample 60335416011 (unrelated sample).

QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-SCL4A-FB-1	Sodium	500	U	Detected in Method Blank

Signature: Ann Muhlfarth Date: 06/29/2020

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

July 27, 2020

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

RE: Project: AMEREN SCL4A-VS
Pace Project No.: 60340573

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory between June 17, 2020 and June 19, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Kansas City

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 SCL4A-VS
Pace Project No.: 60340573

Pace Analytical Services Kansas
9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Inorganic Drinking Water Certification #: 10090
Arkansas Drinking Water
Arkansas Certification #: 20-020-0
Arkansas Drinking Water
Illinois Certification #: 200030
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 #: KS000212019-9
Illinois Certification #: 004592
Kansas Field Laboratory Accreditation: # E-92587
Missouri SEKS Micro Certification: 10070

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Lenexa, KS 66219
(913)599-5665

SAMPLE SUMMARY

Project: AMEREN SCL4A-VS
Pace Project No.: 60340573

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60340573001	**S-TMW-2**	Water	06/18/20 11:15	06/19/20 04:22
60340573002	**S-SCL4A-FB-1**	Water	06/18/20 11:25	06/19/20 04:22
60340573003	**S-SCL4A-DUP-1**	Water	06/18/20 08:00	06/19/20 04:22
60340199012	**S-UG-3**	Water	06/16/20 11:31	06/17/20 04:48

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SAMPLE ANALYTE COUNT

Project: AMEREN SCL4A-VS
Pace Project No.: 60340573

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60340573001	**S-TMW-2**	SM 2540C	CNB	1	PASI-K
		EPA 300.0	JWR	2	PASI-K
60340573002	**S-SCL4A-FB-1**	EPA 300.0	JWR	1	PASI-K
60340573003	**S-SCL4A-DUP-1**	SM 2540C	CNB	1	PASI-K
		EPA 300.0	JWR	1	PASI-K
60340199012	**S-UG-3**	EPA 300.0	JWR	1	PASI-K

PASI-K = Pace Analytical Services - Kansas City

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SCL4A-VS
Pace Project No.: 60340573

Sample: S-TMW-2 **Lab ID: 60340573001** Collected: 06/18/20 11:15 Received: 06/19/20 04:22 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**420**	mg/L	10.0	10.0	1		06/23/20 08:34		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Fluoride	**0.38**	mg/L	0.20	0.075	1		06/23/20 14:15	16984-48-8	
Sulfate	**45.3**	mg/L	5.0	1.4	5		06/23/20 15:05	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SCL4A-VS
Pace Project No.: 60340573

Sample: S-SCL4A-FB-1 **Lab ID: 60340573002** Collected: 06/18/20 11:25 Received: 06/19/20 04:22 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Fluoride	**<0.075**	mg/L	0.20	0.075	1		06/23/20 15:54	16984-48-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SCL4A-VS
Pace Project No.: 60340573

Sample: S-SCL4A-DUP-1 **Lab ID: 60340573003** Collected: 06/18/20 08:00 Received: 06/19/20 04:22 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**419**	mg/L	10.0	10.0	1		06/23/20 08:34		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Sulfate	**45.9**	mg/L	5.0	1.4	5		06/23/20 16:11	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SCL4A-VS
Pace Project No.: 60340573

Sample: S-UG-3 **Lab ID: 60340199012** Collected: 06/16/20 11:31 Received: 06/17/20 04:48 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Fluoride	**0.38**	mg/L	0.20	0.075	1		06/22/20 22:40	16984-48-8	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SCL4A-VS
Pace Project No.: 60340573

QC Batch: 661576
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60340573001, 60340573003

METHOD BLANK: 2681980 Matrix: Water
Associated Lab Samples: 60340573001, 60340573003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	06/23/20 08:32	

LABORATORY CONTROL SAMPLE: 2681981

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

SAMPLE DUPLICATE: 2681982

Parameter	Units	60340569001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	568	572	1	10	

SAMPLE DUPLICATE: 2681983

Parameter	Units	60340573001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	420	424	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

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

QUALITY CONTROL DATA

Project: AMEREN SCL4A-VS
Pace Project No.: 60340573

QC Batch: 661408
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60340199012

METHOD BLANK: 2681574 Matrix: Water
Associated Lab Samples: 60340199012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	<0.075	0.20	0.075	06/22/20 09:39	

METHOD BLANK: 2683038 Matrix: Water
Associated Lab Samples: 60340199012

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	<0.075	0.20	0.075	06/23/20 17:02	

LABORATORY CONTROL SAMPLE: 2681575

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.5	101	90-110	

LABORATORY CONTROL SAMPLE: 2683039

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.4	95	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2681576 2681577

Parameter	Units	60340564001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	ND	12.5	12.5	13.8	13.8	104	104	80-120	0	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2681578 2681579

Parameter	Units	60340199010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.32	2.5	2.5	2.8	2.8	100	100	80-120	1	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

QUALITY CONTROL DATA

Project: AMEREN SCL4A-VS
Pace Project No.: 60340573

QC Batch: 661608 | Analysis Method: EPA 300.0
QC Batch Method: EPA 300.0 | Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60340573001, 60340573002, 60340573003

METHOD BLANK: 2682113 Matrix: Water
Associated Lab Samples: 60340573001, 60340573002, 60340573003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	<0.075	0.20	0.075	06/23/20 09:24	
Sulfate	mg/L	<0.28	1.0	0.28	06/23/20 09:24	

METHOD BLANK: 2684011 Matrix: Water
Associated Lab Samples: 60340573001, 60340573002, 60340573003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Fluoride	mg/L	<0.075	0.20	0.075	06/24/20 17:55	
Sulfate	mg/L	<0.28	1.0	0.28	06/24/20 17:55	

LABORATORY CONTROL SAMPLE: 2682114

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.5	102	90-110	
Sulfate	mg/L	5	4.9	99	90-110	

LABORATORY CONTROL SAMPLE: 2684012

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	2.6	102	90-110	
Sulfate	mg/L	5	5.5	109	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2682115 2682116

Parameter	Units	60340572001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.61J	12.5	12.5	13.3	13.3	101	101	80-120	0	15	
Sulfate	mg/L	43.9	25	25	69.8	69.4	104	102	80-120	1	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

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QUALITY CONTROL DATA

Project: AMEREN SCL4A-VS
Pace Project No.: 60340573

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2682117 2682118

Parameter	Units	60340573001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.38	2.5	2.5	2.8	2.9	96	101	80-120	5	15	
Sulfate	mg/L	45.3	25	25	71.0	71.4	103	104	80-120	0	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2682119 2682120

Parameter	Units	60340574001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Fluoride	mg/L	0.37	2.5	2.5	2.8	2.8	97	98	80-120	2	15	
Sulfate	mg/L	38.5	5	5	43.8	43.9	106	107	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
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALIFIERS

Project: AMEREN SCL4A-VS
Pace Project No.: 60340573

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.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SCL4A-VS
Pace Project No.: 60340573

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60340573001	**S-TMW-2**	SM 2540C	661576		
60340573003	**S-SCL4A-DUP-1**	SM 2540C	661576		
60340199012	**S-UG-3**	EPA 300.0	661408		
60340573001	**S-TMW-2**	EPA 300.0	661608		
60340573002	**S-SCL4A-FB-1**	EPA 300.0	661608		
60340573003	**S-SCL4A-DUP-1**	EPA 300.0	661608		

Pace Analytical
www.pacelabs.com

Sample Condition Upon Receipt

WO# : 60340573

60340573

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 ☑ ZPLC

Thermometer Used: T299 **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): As-read 2.2 Corr. Factor +0.1 Corrected 2.3

Date and initials of person examining contents: 060920 MK

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) LOT#	☐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: _____

6/22/20

Project Manager Review: Jasmi Chunk 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: 1 of 1

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 SCL4A-VS	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	153140602	Pace Profile #:	9285

REGULATORY AGENCY

NPDES / GROUND WATER DRINKING WATER

UST RCRA OTHER _____

Site Location STATE: MO

Valid Matrix Codes: DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WP; AR; OT; TS

ITEM #	Section D Required Client Information: SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	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	Y/N	Analysis Test: 200.7 Calcium	Fluoride	Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
																		Requested Analysis Filtered (Y/N)	N	N	N	N		60345573
1	S-TMW-2	WT	G			6/18/20	1115		1	1										/	/			
2	S-SCL4A-FB-1	WT	G				1125		1	1									/					
3	S-SCL4A-DUP-1	WT	G				—		1	1										/	/			
4	S-SCL4A-MS-1	WT	G				1115		1	1									/	/	/			S-TMW-2-MS-1
5	S-SCL4A-MSD-1	WT	G				1115		1	1									/	/	/			S-TMW-2-MSD-1
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)
	Eric Schneider/Golder	6/18/20	1320	Angie McManus	6/18/20	1325				
	Angie McManus	6/18/20	1325	MKeller/Pace	6/19/20	0422	2.3	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Eric Schneider

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 06/18/20

MEMORANDUM

DATE July 27, 2020 **Project No.** 153140602

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Annie Muehlfarth **EMAIL AMuehlfarth@golder.com**

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCL4A – VERIFICATION SAMPLING - DATA PACKAGE 60340573

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 Inc.
Project Manager: J. Ingram
Project Name: Ameren - SEC - SCL4A
Project Number: 153140602
Reviewer: A. Muehlfarth
Validation Date: 07/27/2020

Laboratory: Pace Analytical Services, LLC
SDG #: 60340573
Analytical Method (type and no.): SM 2540C (TDS); EPA 300.0 (Anions)
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐ _____
Sample Names S-TMW-2, S-SCL4A-FB-1, S-SCL4A-DUP-1, S-UG-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			06/16/2020 - 06/18/2020
b) Sampling team indicated?	x			
c) Sample location noted?	x			
d) Sample depth indicated (Soils)?			x	
e) Sample type indicated (grab/composite)?	x			Grab
f) Field QC noted?	x			See Notes
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)?	☐	☒	☐	S-SCL4A-FB-1 @ S-TMW-2
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)?				S-SCL4A-DUP-1 @ S-TMW-2
	☒	☐	☐	
b) Were field dup. precision criteria met (note RPD)?	☒	☐	☐	Max RPD: 1.3% (<20%)
c) Were lab duplicates analyzed (note original and duplicate samples)?				
	☒	☐	☐	
d) Were lab dup. precision criteria met (note RPD)?	☒	☐	☐	Max RPD: 1% (<10%)

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:

Sulfate was diluted in several samples, no qualification necessary.

QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason

Signature: _____ Ann Muehlfarth _____ Date: 07/27/2020

Pace Analytical Services, LLC
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December 28, 2020

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

RE: Project: AMEREN SCL4A
Pace Project No.: 60354705

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory on November 18, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Kansas City

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

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CERTIFICATIONS

Project: AMEREN SCL4A
Pace Project No.: 60354705

Pace Analytical Services Kansas
9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Inorganic Drinking Water Certification #: 10090
Arkansas Drinking Water
Arkansas Certification #: 20-020-0
Arkansas Drinking Water
Illinois Certification #: 200030
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 #: KS000212019-9
Illinois Certification #: 004592
Kansas Field Laboratory Accreditation: # E-92587
Missouri SEKS Micro Certification: 10070

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SAMPLE SUMMARY

Project: AMEREN SCL4A
Pace Project No.: 60354705

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60354705001	**S-TMW-1**	Water	11/17/20 14:35	11/18/20 04:15
60354705002	**S-TMW-2**	Water	11/17/20 13:45	11/18/20 04:15
60354705003	**S-TMW-3**	Water	11/17/20 12:50	11/18/20 04:15
60354705004	**S-SCL4A-DUP-1**	Water	11/17/20 08:00	11/18/20 04:15
60354705005	**S-SCL4A-FB-1**	Water	11/17/20 14:40	11/18/20 04:15
60354369022	**S-UG-3**	Water	11/17/20 15:40	11/18/20 04:15
60354369018	**S-BMW-1S**	Water	11/16/20 14:50	11/18/20 04:15
60354369011	**S-BMW-3S**	Water	11/16/20 12:20	11/18/20 04:15

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SAMPLE ANALYTE COUNT

Project: AMEREN SCL4A
Pace Project No.: 60354705

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60354705001	**S-TMW-1**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	BLA	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60354705002	**S-TMW-2**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	BLA	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60354705003	**S-TMW-3**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	BLA	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60354705004	**S-SCL4A-DUP-1**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	BLA	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60354705005	**S-SCL4A-FB-1**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	BLA	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60354369022	**S-UG-3**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	BLA	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60354369018	**S-BMW-1S**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	BLA	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60354369011	**S-BMW-3S**	EPA 200.7	HKC	7	PASI-K
		SM 2320B	BLA	1	PASI-K
		SM 2540C	MAP	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K

PASI-K = Pace Analytical Services - Kansas City

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60354705

Sample: S-TMW-1 **Lab ID: 60354705001** Collected: 11/17/20 14:35 Received: 11/18/20 04:15 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 Pace Analytical Services - Kansas City								
Boron	**65.7J**	ug/L	100	11.7	1	12/06/20 11:13	12/08/20 16:20	7440-42-8	
Calcium	**119000**	ug/L	200	32.4	1	12/06/20 11:13	12/08/20 16:20	7440-70-2	
Iron	**29.2J**	ug/L	50.0	26.8	1	12/06/20 11:13	12/08/20 16:20	7439-89-6	
Magnesium	**20500**	ug/L	50.0	19.7	1	12/06/20 11:13	12/08/20 16:20	7439-95-4	
Manganese	**194**	ug/L	5.0	0.97	1	12/06/20 11:13	12/08/20 16:20	7439-96-5	
Potassium	**5430**	ug/L	500	189	1	12/06/20 11:13	12/08/20 16:20	7440-09-7	
Sodium	**3300**	ug/L	500	107	1	12/06/20 11:13	12/08/20 16:20	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**330**	mg/L	20.0	8.4	1		11/23/20 14:04		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**398**	mg/L	5.0	5.0	1		11/19/20 08:38		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**1.8**	mg/L	1.0	0.39	1		12/09/20 14:00	16887-00-6	
Fluoride	**0.43**	mg/L	0.20	0.075	1		12/09/20 14:00	16984-48-8	
Sulfate	**37.1**	mg/L	5.0	1.4	5		12/09/20 14:15	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60354705

Sample: S-TMW-2 **Lab ID: 60354705002** Collected: 11/17/20 13:45 Received: 11/18/20 04:15 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 Pace Analytical Services - Kansas City								
Boron	**87.9J**	ug/L	100	11.7	1	12/06/20 11:13	12/08/20 16:23	7440-42-8	
Calcium	**128000**	ug/L	200	32.4	1	12/06/20 11:13	12/08/20 16:23	7440-70-2	M1
Iron	**217**	ug/L	50.0	26.8	1	12/06/20 11:13	12/08/20 16:23	7439-89-6	
Magnesium	**23400**	ug/L	50.0	19.7	1	12/06/20 11:13	12/08/20 16:23	7439-95-4	
Manganese	**551**	ug/L	5.0	0.97	1	12/06/20 11:13	12/08/20 16:23	7439-96-5	
Potassium	**5850**	ug/L	500	189	1	12/06/20 11:13	12/08/20 16:23	7440-09-7	
Sodium	**3720**	ug/L	500	107	1	12/06/20 11:13	12/08/20 16:23	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**355**	mg/L	20.0	8.4	1		11/23/20 14:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**673**	mg/L	10.0	10.0	1		11/20/20 09:36		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**3.3**	mg/L	1.0	0.36	1		12/09/20 11:09	16887-00-6	
Fluoride	**0.34**	mg/L	0.20	0.085	1		12/09/20 11:09	16984-48-8	
Sulfate	**46.3**	mg/L	5.0	2.1	5		12/09/20 11:56	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60354705

Sample: S-TMW-3 **Lab ID: 60354705003** Collected: 11/17/20 12:50 Received: 11/18/20 04:15 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 Pace Analytical Services - Kansas City								
Boron	**88.5J**	ug/L	100	11.7	1	12/06/20 11:13	12/08/20 16:28	7440-42-8	
Calcium	**130000**	ug/L	200	32.4	1	12/06/20 11:13	12/08/20 16:28	7440-70-2	
Iron	**1340**	ug/L	50.0	26.8	1	12/06/20 11:13	12/08/20 16:28	7439-89-6	
Magnesium	**23700**	ug/L	50.0	19.7	1	12/06/20 11:13	12/08/20 16:28	7439-95-4	
Manganese	**677**	ug/L	5.0	0.97	1	12/06/20 11:13	12/08/20 16:28	7439-96-5	
Potassium	**6080**	ug/L	500	189	1	12/06/20 11:13	12/08/20 16:28	7440-09-7	
Sodium	**4350**	ug/L	500	107	1	12/06/20 11:13	12/08/20 16:28	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**377**	mg/L	20.0	8.4	1		11/23/20 14:21		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**433**	mg/L	10.0	10.0	1		11/19/20 08:38		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**2.1**	mg/L	1.0	0.39	1		12/09/20 14:31	16887-00-6	
Fluoride	**0.37**	mg/L	0.20	0.075	1		12/09/20 14:31	16984-48-8	
Sulfate	**37.6**	mg/L	5.0	1.4	5		12/09/20 14:47	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60354705

Sample: S-SCL4A-DUP-1 **Lab ID: 60354705004** Collected: 11/17/20 08:00 Received: 11/18/20 04:15 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 Pace Analytical Services - Kansas City								
Boron	**67.2J**	ug/L	100	11.7	1	12/06/20 11:13	12/08/20 16:30	7440-42-8	
Calcium	**95800**	ug/L	200	32.4	1	12/06/20 11:13	12/08/20 16:30	7440-70-2	
Iron	**1050**	ug/L	50.0	26.8	1	12/06/20 11:13	12/08/20 16:30	7439-89-6	
Magnesium	**17700**	ug/L	50.0	19.7	1	12/06/20 11:13	12/08/20 16:30	7439-95-4	
Manganese	**494**	ug/L	5.0	0.97	1	12/06/20 11:13	12/08/20 16:30	7439-96-5	
Potassium	**4530**	ug/L	500	189	1	12/06/20 11:13	12/08/20 16:30	7440-09-7	
Sodium	**3320**	ug/L	500	107	1	12/06/20 11:13	12/08/20 16:30	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**373**	mg/L	20.0	8.4	1		11/23/20 14:27		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**467**	mg/L	10.0	10.0	1		11/20/20 09:37		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**2.1**	mg/L	1.0	0.39	1		12/09/20 15:02	16887-00-6	
Fluoride	**0.37**	mg/L	0.20	0.075	1		12/09/20 15:02	16984-48-8	
Sulfate	**37.5**	mg/L	5.0	1.4	5		12/09/20 15:18	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60354705

Sample: S-SCL4A-FB-1 **Lab ID: 60354705005** Collected: 11/17/20 14:40 Received: 11/18/20 04:15 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 Pace Analytical Services - Kansas City								
Boron	**<11.7**	ug/L	100	11.7	1	12/06/20 11:13	12/08/20 16:33	7440-42-8	
Calcium	**43.5J**	ug/L	200	32.4	1	12/06/20 11:13	12/08/20 16:33	7440-70-2	
Iron	**<26.8**	ug/L	50.0	26.8	1	12/06/20 11:13	12/08/20 16:33	7439-89-6	
Magnesium	**<19.7**	ug/L	50.0	19.7	1	12/06/20 11:13	12/08/20 16:33	7439-95-4	
Manganese	**<0.97**	ug/L	5.0	0.97	1	12/06/20 11:13	12/08/20 16:33	7439-96-5	
Potassium	**<189**	ug/L	500	189	1	12/06/20 11:13	12/08/20 16:33	7440-09-7	
Sodium	**<107**	ug/L	500	107	1	12/06/20 11:13	12/08/20 16:33	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**<8.4**	mg/L	20.0	8.4	1		11/23/20 14:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**9.0**	mg/L	5.0	5.0	1		11/20/20 09:37		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**<0.39**	mg/L	1.0	0.39	1		12/09/20 15:34	16887-00-6	
Fluoride	**<0.075**	mg/L	0.20	0.075	1		12/09/20 15:34	16984-48-8	
Sulfate	**<0.28**	mg/L	1.0	0.28	1		12/09/20 15:34	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60354705

Sample: S-UG-3 **Lab ID: 60354369022** Collected: 11/17/20 15:40 Received: 11/18/20 04:15 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 Pace Analytical Services - Kansas City								
Boron	**188**	ug/L	100	11.7	1	12/06/20 12:00	12/08/20 19:56	7440-42-8	
Calcium	**119000**	ug/L	200	32.4	1	12/06/20 12:00	12/08/20 19:56	7440-70-2	
Iron	**<26.8**	ug/L	50.0	26.8	1	12/06/20 12:00	12/08/20 19:56	7439-89-6	
Magnesium	**23300**	ug/L	50.0	19.7	1	12/06/20 12:00	12/08/20 19:56	7439-95-4	
Manganese	**574**	ug/L	5.0	0.97	1	12/06/20 12:00	12/08/20 19:56	7439-96-5	
Potassium	**5330**	ug/L	500	189	1	12/06/20 12:00	12/08/20 19:56	7440-09-7	
Sodium	**19100**	ug/L	500	107	1	12/06/20 12:00	12/08/20 19:56	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**337**	mg/L	20.0	8.4	1		11/19/20 16:40		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**473**	mg/L	10.0	10.0	1		11/19/20 15:06		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**16.5**	mg/L	1.0	0.39	1		12/08/20 02:01	16887-00-6	
Fluoride	**0.34**	mg/L	0.20	0.075	1		12/08/20 02:01	16984-48-8	
Sulfate	**69.5**	mg/L	5.0	1.4	5		12/08/20 02:16	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60354705

Sample: S-BMW-1S **Lab ID: 60354369018** Collected: 11/16/20 14:50 Received: 11/18/20 04:15 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 Pace Analytical Services - Kansas City								
Boron	**75.1J**	ug/L	100	11.7	1	12/06/20 12:00	12/08/20 19:46	7440-42-8	
Calcium	**141000**	ug/L	200	32.4	1	12/06/20 12:00	12/08/20 19:46	7440-70-2	
Iron	**52.0**	ug/L	50.0	26.8	1	12/06/20 12:00	12/08/20 19:46	7439-89-6	
Magnesium	**27800**	ug/L	50.0	19.7	1	12/06/20 12:00	12/08/20 19:46	7439-95-4	
Manganese	**1240**	ug/L	5.0	0.97	1	12/06/20 12:00	12/08/20 19:46	7439-96-5	
Potassium	**366J**	ug/L	500	189	1	12/06/20 12:00	12/08/20 19:46	7440-09-7	B
Sodium	**4800**	ug/L	500	107	1	12/06/20 12:00	12/08/20 19:46	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**422**	mg/L	20.0	8.4	1		11/19/20 16:19		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**505**	mg/L	10.0	10.0	1		11/19/20 15:05		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**7.0**	mg/L	1.0	0.39	1		12/07/20 22:38	16887-00-6	
Fluoride	**0.34**	mg/L	0.20	0.075	1		12/07/20 22:38	16984-48-8	
Sulfate	**24.8**	mg/L	2.0	0.56	2		12/07/20 22:52	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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(913)599-5665

ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60354705

Sample: S-BMW-3S **Lab ID: 60354369011** Collected: 11/16/20 12:20 Received: 11/18/20 04:15 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 Pace Analytical Services - Kansas City								
Boron	**66.3J**	ug/L	100	11.7	1	12/06/20 12:00	12/08/20 19:19	7440-42-8	
Calcium	**125000**	ug/L	200	32.4	1	12/06/20 12:00	12/08/20 19:19	7440-70-2	
Iron	**35.3J**	ug/L	50.0	26.8	1	12/06/20 12:00	12/08/20 19:19	7439-89-6	
Magnesium	**23000**	ug/L	50.0	19.7	1	12/06/20 12:00	12/08/20 19:19	7439-95-4	
Manganese	**344**	ug/L	5.0	0.97	1	12/06/20 12:00	12/08/20 19:19	7439-96-5	
Potassium	**440J**	ug/L	500	189	1	12/06/20 12:00	12/08/20 19:19	7440-09-7	B
Sodium	**5250**	ug/L	500	107	1	12/06/20 12:00	12/08/20 19:19	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**378**	mg/L	20.0	8.4	1		11/19/20 15:40		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**455**	mg/L	10.0	10.0	1		11/19/20 15:05		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**11.4**	mg/L	1.0	0.39	1		12/08/20 14:12	16887-00-6	
Fluoride	**0.40**	mg/L	0.20	0.075	1		12/08/20 14:12	16984-48-8	
Sulfate	**30.6**	mg/L	2.0	0.56	2		12/07/20 17:18	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60354705

QC Batch: 693106
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Total
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60354369011, 60354369018, 60354369022

METHOD BLANK: 2799492 Matrix: Water
Associated Lab Samples: 60354369011, 60354369018, 60354369022

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<11.7	100	11.7	12/08/20 18:54	
Calcium	ug/L	47.9J	200	32.4	12/08/20 18:54	
Iron	ug/L	<26.8	50.0	26.8	12/08/20 18:54	
Magnesium	ug/L	<19.7	50.0	19.7	12/08/20 18:54	
Manganese	ug/L	<0.97	5.0	0.97	12/08/20 18:54	
Potassium	ug/L	224J	500	189	12/08/20 18:54	
Sodium	ug/L	378J	500	107	12/08/20 18:54	

LABORATORY CONTROL SAMPLE: 2799493

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	967	97	85-115	
Calcium	ug/L	10000	10100	101	85-115	
Iron	ug/L	10000	10000	100	85-115	
Magnesium	ug/L	10000	10100	101	85-115	
Manganese	ug/L	1000	1010	101	85-115	
Potassium	ug/L	10000	10400	104	85-115	
Sodium	ug/L	10000	10400	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2799494 2799495

Parameter	Units	60354702003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	86.3J	1000	1000	1050	1070	96	98	70-130	2	20	
Calcium	ug/L	147000	10000	10000	151000	155000	39	77	70-130	2	20	M1
Iron	ug/L	<26.8	10000	10000	9650	9840	96	98	70-130	2	20	
Magnesium	ug/L	36300	10000	10000	44400	45000	81	87	70-130	1	20	
Manganese	ug/L	804	1000	1000	1750	1760	94	96	70-130	1	20	
Potassium	ug/L	8290	10000	10000	17900	18300	96	100	70-130	2	20	
Sodium	ug/L	28900	10000	10000	37600	38400	87	95	70-130	2	20	

MATRIX SPIKE SAMPLE: 2799496

Parameter	Units	60354369012 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	66.8J	1000	1020	96	70-130	
Calcium	ug/L	98100	10000	108000	102	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60354705

MATRIX SPIKE SAMPLE: 2799496

Parameter	Units	60354369012 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	5380	10000	14900	95	70-130	
Magnesium	ug/L	22100	10000	32000	100	70-130	
Manganese	ug/L	382	1000	1370	99	70-130	
Potassium	ug/L	3660	10000	13700	100	70-130	
Sodium	ug/L	5190	10000	15100	99	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60354705

QC Batch: 693107
QC Batch Method: EPA 200.7
Analysis Method: EPA 200.7
Analysis Description: 200.7 Metals, Total
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60354705001, 60354705002, 60354705003, 60354705004, 60354705005

METHOD BLANK: 2799497 Matrix: Water
Associated Lab Samples: 60354705001, 60354705002, 60354705003, 60354705004, 60354705005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<11.7	100	11.7	12/08/20 15:50	
Calcium	ug/L	<32.4	200	32.4	12/08/20 15:50	
Iron	ug/L	<26.8	50.0	26.8	12/08/20 15:50	
Magnesium	ug/L	<19.7	50.0	19.7	12/08/20 15:50	
Manganese	ug/L	<0.97	5.0	0.97	12/08/20 15:50	
Potassium	ug/L	<189	500	189	12/08/20 15:50	
Sodium	ug/L	<107	500	107	12/08/20 15:50	

LABORATORY CONTROL SAMPLE: 2799498

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	961	96	85-115	
Calcium	ug/L	10000	10400	104	85-115	
Iron	ug/L	10000	10600	106	85-115	
Magnesium	ug/L	10000	10100	101	85-115	
Manganese	ug/L	1000	1010	101	85-115	
Potassium	ug/L	10000	10200	102	85-115	
Sodium	ug/L	10000	10700	107	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2799499 2799500

Parameter	Units	60354704006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	77.4J	1000	1000	1050	1010	97	93	70-130	4	20	
Calcium	ug/L	132000	10000	10000	147000	140000	154	84	70-130	5	20	M1
Iron	ug/L	<26.8	10000	10000	9970	9860	100	98	70-130	1	20	
Magnesium	ug/L	42000	10000	10000	54000	50500	119	84	70-130	7	20	
Manganese	ug/L	518	1000	1000	1520	1440	101	93	70-130	5	20	
Potassium	ug/L	8100	10000	10000	18700	17600	106	95	70-130	6	20	
Sodium	ug/L	35400	10000	10000	47200	44800	118	93	70-130	5	20	

MATRIX SPIKE SAMPLE: 2799501

Parameter	Units	60354705002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	87.9J	1000	1010	93	70-130	
Calcium	ug/L	128000	10000	129000	8	70-130	M1

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60354705

MATRIX SPIKE SAMPLE: 2799501

Parameter	Units	60354705002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	217	10000	9830	96	70-130	
Magnesium	ug/L	23400	10000	31000	76	70-130	
Manganese	ug/L	551	1000	1450	90	70-130	
Potassium	ug/L	5850	10000	14900	91	70-130	
Sodium	ug/L	3720	10000	13300	96	70-130	

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60354705

QC Batch: 690355 | Analysis Method: SM 2320B
QC Batch Method: SM 2320B | Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60354369011, 60354369018, 60354369022

METHOD BLANK: 2788858 Matrix: Water
Associated Lab Samples: 60354369011, 60354369018, 60354369022

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<8.4	20.0	8.4	11/19/20 14:53	

LABORATORY CONTROL SAMPLE: 2788859

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

SAMPLE DUPLICATE: 2788860

Parameter	Units	60354702003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	460	461	0	10	

SAMPLE DUPLICATE: 2788861

Parameter	Units	60354369012 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	310	309	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60354705

QC Batch: 690813 | Analysis Method: SM 2320B
QC Batch Method: SM 2320B | Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60354705001, 60354705002, 60354705003, 60354705004, 60354705005

METHOD BLANK: 2791510 Matrix: Water
Associated Lab Samples: 60354705001, 60354705002, 60354705003, 60354705004, 60354705005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<8.4	20.0	8.4	11/23/20 12:47	

LABORATORY CONTROL SAMPLE: 2791511

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	495	99	90-110	

SAMPLE DUPLICATE: 2791512

Parameter	Units	60354704006 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	457	472	3	10	

SAMPLE DUPLICATE: 2791513

Parameter	Units	60354705002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	355	363	2	10	

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60354705

QC Batch: 690324
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60354705001, 60354705003

METHOD BLANK: 2788738 Matrix: Water
Associated Lab Samples: 60354705001, 60354705003

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/19/20 08:34	

LABORATORY CONTROL SAMPLE: 2788739

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	981	98	80-120	

SAMPLE DUPLICATE: 2788740

Parameter	Units	60354595009 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1250	1250	1	10	

SAMPLE DUPLICATE: 2788741

Parameter	Units	60354704006 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	637	633	1	10	

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60354705

QC Batch: 690481
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60354369011, 60354369018, 60354369022

METHOD BLANK: 2789436 Matrix: Water
Associated Lab Samples: 60354369011, 60354369018, 60354369022

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/19/20 15:03	

LABORATORY CONTROL SAMPLE: 2789437

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

SAMPLE DUPLICATE: 2789438

Parameter	Units	60354702003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	628	606	4	10	

SAMPLE DUPLICATE: 2789439

Parameter	Units	60354369012 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	396	412	4	10	

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60354705

QC Batch: 690585
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60354705002, 60354705004, 60354705005

METHOD BLANK: 2790001 Matrix: Water
Associated Lab Samples: 60354705002, 60354705004, 60354705005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/20/20 09:35	

LABORATORY CONTROL SAMPLE: 2790002

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1050	105	80-120	

SAMPLE DUPLICATE: 2790003

Parameter	Units	60354705002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	673	695	3	10	

SAMPLE DUPLICATE: 2790004

Parameter	Units	60354811001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	2790	2270	21	10	D6

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60354705

QC Batch: 693100
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60354369011, 60354369018, 60354369022

METHOD BLANK: 2799457 Matrix: Water
Associated Lab Samples: 60354369011, 60354369018, 60354369022

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	12/07/20 08:24	
Fluoride	mg/L	<0.075	0.20	0.075	12/07/20 08:24	
Sulfate	mg/L	<0.28	1.0	0.28	12/07/20 08:24	

METHOD BLANK: 2802268 Matrix: Water
Associated Lab Samples: 60354369011, 60354369018, 60354369022

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	12/08/20 08:14	
Fluoride	mg/L	<0.075	0.20	0.075	12/08/20 08:14	
Sulfate	mg/L	<0.28	1.0	0.28	12/08/20 08:14	

LABORATORY CONTROL SAMPLE: 2799458

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	99	90-110	
Fluoride	mg/L	2.5	2.5	101	90-110	
Sulfate	mg/L	5	4.7	95	90-110	

LABORATORY CONTROL SAMPLE: 2802269

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	2.6	102	90-110	
Sulfate	mg/L	5	5.1	102	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2799459 2799460

Parameter	Units	60354369012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	13.4	5	5	17.6	17.9	84	91	80-120	2	15	
Fluoride	mg/L	0.34	2.5	2.5	2.3	2.5	79	86	80-120	7	15	
Sulfate	mg/L	38.1	10	10	50.9	54.3	128	162	80-120	7	15	E

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60354705

MATRIX SPIKE SAMPLE: 2799461

Parameter	Units	60354369019 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	76.7	50	125	96	80-120	
Fluoride	mg/L	0.16J	2.5	2.4	90	80-120	
Sulfate	mg/L	462	250	705	97	80-120	

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60354705

QC Batch: 693762
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60354705001, 60354705003, 60354705004, 60354705005

METHOD BLANK: 2801621 Matrix: Water
Associated Lab Samples: 60354705001, 60354705003, 60354705004, 60354705005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	12/09/20 08:45	
Fluoride	mg/L	<0.075	0.20	0.075	12/09/20 08:45	
Sulfate	mg/L	<0.28	1.0	0.28	12/09/20 08:45	

METHOD BLANK: 2803421 Matrix: Water
Associated Lab Samples: 60354705001, 60354705003, 60354705004, 60354705005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	12/09/20 08:45	
Fluoride	mg/L	<0.075	0.20	0.075	12/09/20 08:45	
Sulfate	mg/L	<0.28	1.0	0.28	12/09/20 08:45	

METHOD BLANK: 2803443 Matrix: Water
Associated Lab Samples: 60354705001, 60354705003, 60354705004, 60354705005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	12/10/20 10:44	
Fluoride	mg/L	<0.075	0.20	0.075	12/10/20 10:44	
Sulfate	mg/L	<0.28	1.0	0.28	12/10/20 10:44	

METHOD BLANK: 2804050 Matrix: Water
Associated Lab Samples: 60354705001, 60354705003, 60354705004, 60354705005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.39	1.0	0.39	12/10/20 10:44	
Fluoride	mg/L	<0.075	0.20	0.075	12/10/20 10:44	
Sulfate	mg/L	<0.28	1.0	0.28	12/10/20 10:44	

LABORATORY CONTROL SAMPLE: 2801622

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Fluoride	mg/L	2.5	2.5	98	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 SCL4A
Pace Project No.: 60354705

LABORATORY CONTROL SAMPLE: 2801622

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.0	100	90-110	

LABORATORY CONTROL SAMPLE: 2803422

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Fluoride	mg/L	2.5	2.5	98	90-110	
Sulfate	mg/L	5	5.0	100	90-110	

LABORATORY CONTROL SAMPLE: 2803444

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Fluoride	mg/L	2.5	2.4	98	90-110	
Sulfate	mg/L	5	5.0	99	90-110	

LABORATORY CONTROL SAMPLE: 2804051

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Fluoride	mg/L	2.5	2.4	98	90-110	
Sulfate	mg/L	5	5.0	99	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2801623 2801624

Parameter	Units	60354704006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	68.5	25	25	95.8	94.7	109	105	80-120	1	15	
Fluoride	mg/L	0.41	2.5	2.5	2.9	3.4	101	119	80-120	14	15	
Sulfate	mg/L	37.1	25	25	62.0	61.2	100	97	80-120	1	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
9608 Loiret Blvd.
Lenexa, KS 66219
(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60354705

QC Batch: 693765
QC Batch Method: EPA 300.0
Analysis Method: EPA 300.0
Analysis Description: 300.0 IC Anions
Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60354705002

METHOD BLANK: 2801629 Matrix: Water
Associated Lab Samples: 60354705002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.36	1.0	0.36	12/09/20 10:37	
Fluoride	mg/L	<0.085	0.20	0.085	12/09/20 10:37	
Sulfate	mg/L	<0.42	1.0	0.42	12/09/20 10:37	

METHOD BLANK: 2804054 Matrix: Water
Associated Lab Samples: 60354705002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.36	1.0	0.36	12/10/20 10:44	
Fluoride	mg/L	<0.085	0.20	0.085	12/10/20 10:44	
Sulfate	mg/L	<0.42	1.0	0.42	12/10/20 10:44	

METHOD BLANK: 2804297 Matrix: Water
Associated Lab Samples: 60354705002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.36	1.0	0.36	12/11/20 09:28	
Fluoride	mg/L	<0.085	0.20	0.085	12/11/20 09:28	
Sulfate	mg/L	<0.42	1.0	0.42	12/11/20 09:28	

LABORATORY CONTROL SAMPLE: 2801630

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.1	102	90-110	
Fluoride	mg/L	2.5	2.5	102	90-110	
Sulfate	mg/L	5	5.0	99	90-110	

LABORATORY CONTROL SAMPLE: 2804055

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.8	97	90-110	
Fluoride	mg/L	2.5	2.4	98	90-110	
Sulfate	mg/L	5	5.0	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 SCL4A
Pace Project No.: 60354705

LABORATORY CONTROL SAMPLE: 2804298

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	2.4	95	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2801631 2801632

Parameter	Units	60354705002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	3.3	5	5	8.0	8.0	94	93	80-120	1	15	
Fluoride	mg/L	0.34	2.5	2.5	2.7	2.7	94	94	80-120	0	15	
Sulfate	mg/L	46.3	25	25	73.8	74.9	110	114	80-120	2	15	

MATRIX SPIKE SAMPLE: 2801633

Parameter	Units	60355901001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	0.58J	5	5.0	88	80-120	
Fluoride	mg/L	<0.085	2.5	2.4	97	80-120	
Sulfate	mg/L	9.4	5	14.6	103	80-120	

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: AMEREN SCL4A
Pace Project No.: 60354705

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.

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

Pace Analytical Services, LLC
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(913)599-5665

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SCL4A
Pace Project No.: 60354705

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60354369011	**S-BMW-3S**	EPA 200.7	693106	EPA 200.7	693137
60354369018	**S-BMW-1S**	EPA 200.7	693106	EPA 200.7	693137
60354369022	**S-UG-3**	EPA 200.7	693106	EPA 200.7	693137
60354705001	**S-TMW-1**	EPA 200.7	693107	EPA 200.7	693138
60354705002	**S-TMW-2**	EPA 200.7	693107	EPA 200.7	693138
60354705003	**S-TMW-3**	EPA 200.7	693107	EPA 200.7	693138
60354705004	**S-SCL4A-DUP-1**	EPA 200.7	693107	EPA 200.7	693138
60354705005	**S-SCL4A-FB-1**	EPA 200.7	693107	EPA 200.7	693138
60354369011	**S-BMW-3S**	SM 2320B	690355		
60354369018	**S-BMW-1S**	SM 2320B	690355		
60354369022	**S-UG-3**	SM 2320B	690355		
60354705001	**S-TMW-1**	SM 2320B	690813		
60354705002	**S-TMW-2**	SM 2320B	690813		
60354705003	**S-TMW-3**	SM 2320B	690813		
60354705004	**S-SCL4A-DUP-1**	SM 2320B	690813		
60354705005	**S-SCL4A-FB-1**	SM 2320B	690813		
60354369011	**S-BMW-3S**	SM 2540C	690481		
60354369018	**S-BMW-1S**	SM 2540C	690481		
60354369022	**S-UG-3**	SM 2540C	690481		
60354705001	**S-TMW-1**	SM 2540C	690324		
60354705002	**S-TMW-2**	SM 2540C	690585		
60354705003	**S-TMW-3**	SM 2540C	690324		
60354705004	**S-SCL4A-DUP-1**	SM 2540C	690585		
60354705005	**S-SCL4A-FB-1**	SM 2540C	690585		
60354369011	**S-BMW-3S**	EPA 300.0	693100		
60354369018	**S-BMW-1S**	EPA 300.0	693100		
60354369022	**S-UG-3**	EPA 300.0	693100		
60354705001	**S-TMW-1**	EPA 300.0	693762		
60354705002	**S-TMW-2**	EPA 300.0	693765		
60354705003	**S-TMW-3**	EPA 300.0	693762		
60354705004	**S-SCL4A-DUP-1**	EPA 300.0	693762		
60354705005	**S-SCL4A-FB-1**	EPA 300.0	693762		

Pace Analytical
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Sample Condition Upon Receipt

WO# : 60354705

60354705

Client Name: Golder

Courier: FedEx ☐ UPS ☐ VIA ☐ 11.18.20 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 ☒ Ice pic

Thermometer Used: T289 **Type of Ice:** Wet Blue None

Cooler Temperature (°C): **As-read** 0.6 **Corr. Factor** +0.2 **Corrected** 0.8

Date and initials of person examining contents: 11.18.2020 JG

Temperature should be above freezing to 6°C 0.1, 2.2, 0.6 0.3, 2.4, 0.8

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) LOT# 602173	☒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

REVIEWED
By jchurch at 7:55 am, 11/19/20

Project Manager Revie Date:

Pace Analytical
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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:	Ryan Feldmann/Eric Schneider
Purchase Order No.:	
Project Name:	Ameren SCL4A Sioux Energy Center
Project Number:	153-140602.0003D

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: Chloride/Fluoride/Sulfate	App III and Cat/An Metals	Alkalinity	TDS	Appendix IV Metals **	Mercury	Radium 226	Radium 228	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-TMW-1	WT	G				1435		1	1		1						N	N	N	N						60554705
2	S-TMW-2	WT	G				1345		1	1		1															
3	S-TMW-3	WT	G			11/17/20	1250		2	2		1															
4	S-UG-3	WT	G				1546			1																	
5	S-SCL4A-DUP-1	WT	G				—			1																	
6	S-SCL4A-FB-1	WT	G				1440			1																	
7	S-SCL4A-MS-1	WT	G				1345			1																	
8	S-SCL4A-MSD-1	WT	G				1345			1																	
9	S-BMW-1S	WT	G			11/16/20	1450			1																	
10	S-BMW-3S	WT	G				1220			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: Fe, Mg, Mn, K, Na, Ca, B	Brendan Talbert / Golder	11/17/20	1645	Angela McManus	11/17	1650				
	Angela McManus	11/17	1650	via FedEx	11-18-20	0415	0.8	Y	Y	Y
							0.3			
							2.4			
							0.8			

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Brendan Talbert

SIGNATURE of SAMPLER: Brendan Talbert DATE Signed (MM/DD/YY): 11/17/2020

*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 December 29, 2020 **Project No.** 153140602

TO Project File
Golder Associates

CC Amanda Derhake, Jeff Ingram

FROM Annie Muehlfarth **EMAIL AMuehlfarth@golder.com**

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SEC-SCL4A – DETECTION MONITORING - DATA PACKAGE 60354705

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).
- When duplicate criterion was not met, the associated sample result was qualified as an estimate (J for detects, UJ for non-detects).
- When matrix spike/matrix spike duplicate (MS/MSD) criterion was not met, the associated sample result was qualified as an estimate (J).

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Ballwin, Missouri, USA 63021

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QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Golder Associates
Project Manager: J. Ingram
Project Name: Ameren- Sioux - SCL4A
Project Number: 153140602
Reviewer: A. Muehlfarth
Validation Date: 12/29/2020

Laboratory: Pace Analytical - KS
SDG #: 60354705
Analytical Method (type and no.): EPA 200.7 (Total Metals); SM2540C (TDS); SM2320B (Alkalinity); EPA 300.0 (Anions)
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐
Sample Names S-TMW-1, S-TMW-2, S-TMW-3, S-SCL4A-DUP-1, S-SCL4A-FB-1, S-UG-3, 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?	x			11/16/2020 - 11/17/2020
b) Sampling team indicated?	x			BTT
c) Sample location noted?	x			
d) Sample depth indicated (Soils)?			x	
e) Sample type indicated (grab/composite)?	x			Grab
f) Field QC noted?	x			See Notes
g) Field parameters collected (note types)?	x			pH, S.Cond., Turb, Temp, DO, ORP
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			See Notes

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Blanks	YES	NO	NA	COMMENTS
a) Were analytes detected in the method blank(s)?	x			
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)?	x			S-SCL4A-DUP-1 @ S-TMW-3
b) Were field dup. precision criteria met (note RPD)?		x		See Notes
c) Were lab duplicates analyzed (note original and duplicate samples)?	x			See Notes
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:

Sulfate was diluted in several samples, no qualification necessary.

Method Blanks:

2799492: Calcium (47.9J), Potassium (224J), Sodium (378J), associated with samples -011, -018, -022. Ror results in associated samples that were >10x blank result, no qualification was necessary.

QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

Comments/Notes:

Field Blank:

S-SCL4A-FB-1 @ S-TMW-1: Calcium (43.5J), TDS (9.0). Sample results >10x the blank result, no qualification necessary.

Duplicates:

S-SCL4A-DUP-1: RPD exceeds limit (20%) for Boron (27.4%), Calcium (30.3%), Iron (24.3%), Magnesium (29.0%), Manganese (31.2%), Sodium (26.9%).

2790004: RPD exceeds limit (10%) for TDS (21%). Associated with unrelated sample, no qualification necessary.

MS/MSD:

2799494/2799495: MS % recovery low for Calcium. MS/MSD performed on unrelated sample, no qualification necessary.

2799499/2799500: MS % recovery high for Calcium. MS/MSD performed on unrelated sample, no qualification necessary.

2799501: MS % recovery low for Calcium. Associated with sample -002.

2799459/2799460: MS % recovery low for Fluoride, MS/MSD % recovery high for Sulfate. MS/MSD performed on unrelated sample, no qualification necessary.

QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-BMW-1S	Potassium	500	U	Detected in MB, sample result <PQL
S-BMW-3S	"	500	U	"
S-TMW-3	Boron	88.5	J	DUP RPD exceeds limits
"	Calcium	130000	J	"
"	Iron	1340	J	"
"	Magnesium	23700	J	"
"	Manganese	677	J	"
"	Sodium	4350	J	"
S-SCL4A-DUP-1	Boron	67.2	J	"
"	Calcium	95800	J	"
"	Iron	1050	J	"
"	Magnesium	17700	J	"
"	Manganese	494	J	"
"	Sodium	3320	J	"
S-TMW-2	Calcium	128000	J	MS % recovery outside control limits

Signature: _____ Ann Muhlfeith _____ Date: 12/29/2020

APPENDIX B

Alternative Source Demonstration – November 2019 Sampling Event

REPORT

SCL4A - Alternative Source Demonstration

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

Submitted to:

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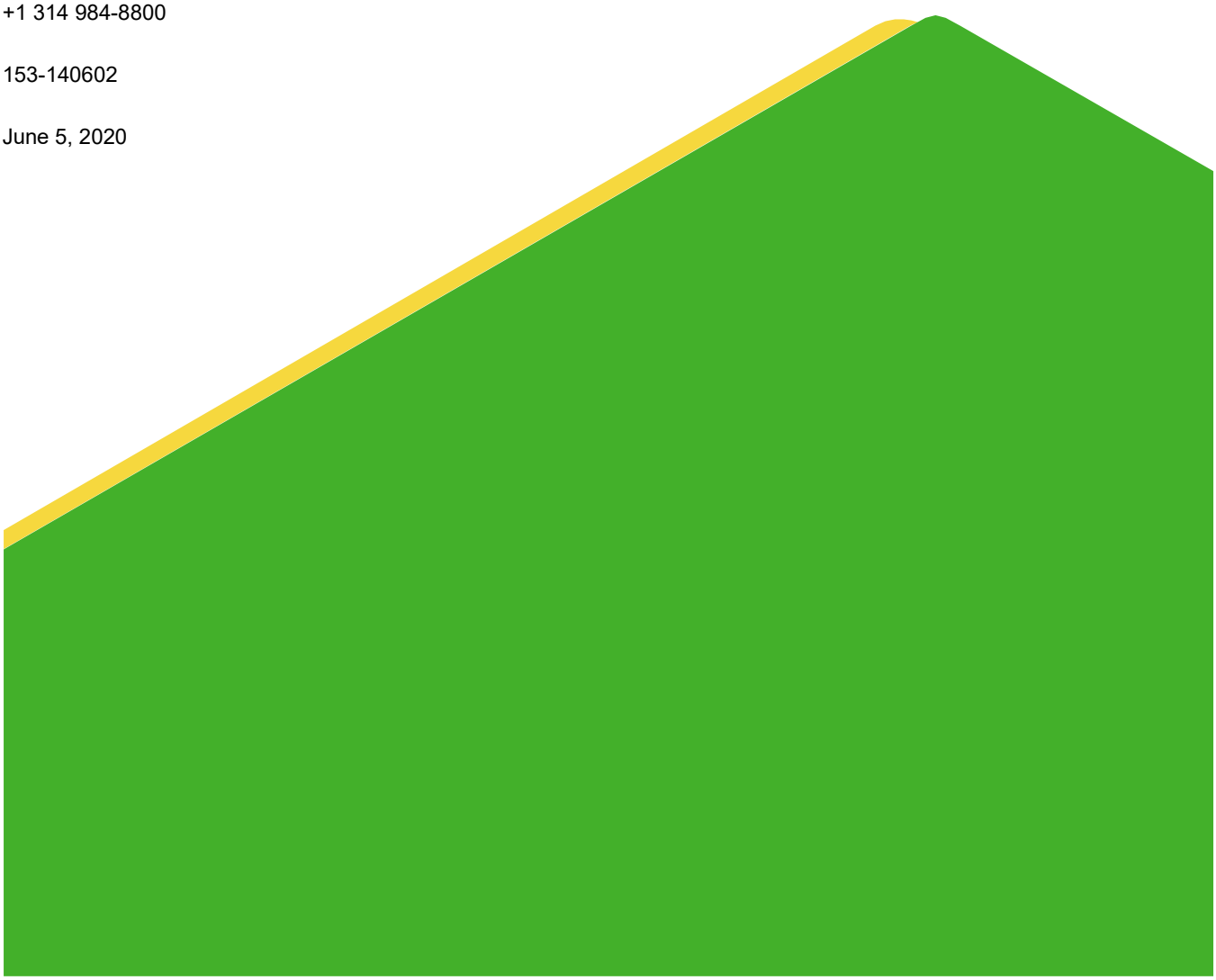
June 5, 2020



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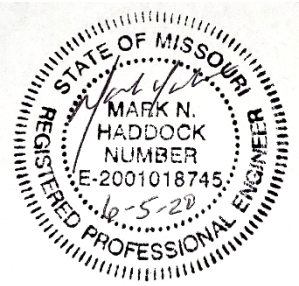
1.0 CERTIFICATION STATEMENT

This *SCL4A – 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 *SCL4A – 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 SCL4A – Alternative Source Demonstration has been prepared to document an Alternative Source Demonstration (ASD) for Statistically Significant Increases (SSIs) identified for Ameren Missouri's (Ameren) Sioux Energy Center (SEC), Utility Waste Landfill (UWL) Cell 4A - SCL4A. 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 the SSIs and that the apparent SSIs were 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 the SCL4A. 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 SCL4A 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 unconformably 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 4A – SCL4A

UWL Cell 4A is referred to by Ameren as the SCL4A, or "Landfill Cell 4A." The SCL4A is approximately 15 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 including "fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels" (Gredell and Reitz & Jens, 2014). These wastes are managed using a dry disposal process and are moisture conditioned (30-40% moisture content) to minimize dust and ease in disposal. The CCR waste is trucked across Highway 94 from the plant and disposed of in the SCL4A.

The SCL4A 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 a 60-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 Sioux UWL was issued July 30, 2010 (permit #0918301) for the SCPC (Cell 1). Nine (9) sampling events were performed prior to July 30, 2010 and represent groundwater quality prior to CCR placement in the SCPC. The SCL4A was the second cell that was constructed at this UWL. The SCL4A construction was not completed until 2014 and no CCR was placed in the unit until after the final revisions to the Proposed Construction Permit Modification on August 16, 2014. 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 eight (8) baseline groundwater sampling events were completed for all Appendix III and Appendix IV parameters of the CCR Rule.

The groundwater monitoring system for the SCL4A consists of six (6) monitoring wells screened in the uppermost aquifer (Alluvial Aquifer) as shown on **Figure 1**. One (1) existing monitoring well (UG-3) was installed by Gredell Engineering Resources, Inc., in December 2007 as a part of the state UWL monitoring program. The remaining monitoring wells (TMW-1, TMW-2, TMW-3, BMW-1S, and BMW-3S) were installed by Golder in 2015 and 2016 for CCR Rule groundwater monitoring purposes. More information on the design and installation of the monitoring wells is provided in the SCL4A GMP and the SCL4A 2017 Annual Report.

Between May 2016 and June 2017, eight (8) baseline sampling events were completed for the SCL4A. After baseline sampling, the first Detection Monitoring event was completed in November 2017 and Detection Monitoring has continued on a semi-annual basis thereafter. Laboratory testing was performed for the following Appendix III constituents 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). After the August 2019 sampling event, the UPLs were updated with at least four (4) new results at each well as outlined in the statistical analysis plan. These UPLs have been compared to the Detection Monitoring results from each semiannual Detection Monitoring event. If results from Detection Monitoring were higher than the calculated UPL, it is considered an initial exceedance, in which case a verification sample is then collected and tested in accordance with the SCL4A Statistical Analysis Plan.

During the November 2019 Detection Monitoring event, five (5) initial exceedances were identified including sulfate and TDS at UG-3 and sulfate, TDS, and chloride at TMW-2. Verification sampling did not confirm the SSIs of sulfate and TDS at UG-3, however, the initial exceedances for chloride, sulfate and TDS were confirmed at TMW-2. Results from the November 2019 Detection Monitoring event and the subsequent verification event are included in **Table 1**.

4.0 REVIEW OF THE STATISTICALLY SIGNIFICANT INCREASES

As indicated above, monitoring well TMW-2 had thee confirmed SSIs during the November 2019 sampling event (chloride, sulfate, and TDS). The results from these SSIs are displayed on **Table 1**. TMW-2 is screened in the upper portion of the Alluvial Aquifer, just below the average seasonal low for groundwater. As shown on **Figure 1**, TMW-2 is located to the south of the SCL4A, south of Highway 94, the generating plant, and the two (2) 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 (8) CCR-rule baseline events, it was concluded that the groundwater at the SCL4A contained low-level impacts from CCR that pre-dated construction and operation of the SCL4A. As a result of these pre-existing impacts, the SCL4A 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.

The intrawell UPLs for the SSIs in question are provided below in **Table 2**. This table also displays the range of values obtained during baseline sampling and the values obtained since baseline sampling as a part of the Detection Monitoring program.

Table 2: Review of Statistically Significant Increases

Constituent	Well ID	UPL Based on Baseline Events	August 2019 Updated UPL	Baseline Sampling Event Range (May 2016 - June 2017)	Detection Monitoring Sampling Range (November 2017 - January 2020)	November 2019 Results	January 2020 Results
Chloride (mg/L)	TMW-2	4.151	3.954	2.4 - 3.9	2.2 - 4.7	4.5	4.7
Sulfate (mg/L)		37.9	52.1	30.0 - 35.5	26.4 - 85.8	75.1	85.8
Total Dissolved Solids (mg/L)		476.5	495.8	403 - 450	411 - 721	502	513

Notes:

1) Results in mg/L (milligrams per liter).
2) UPL – upper prediction limit.
3) UPLs calculated using Sanitas™ software.

5.0 EVIDENCE OF SSI FROM ALTERNATIVE SOURCE

Several different lines of evidence indicate that the three SSIs for well TMW-2 are not caused by a release from the SCL4A, but are from an alternative source. The following section describes the different lines of evidence, listed below, that demonstrate this position.

- Review of concentrations in nearby and background monitoring wells.
- Review of concentrations prior to CCR placement in the SCL4A.
- Documentation of the construction of the SCL4A with a 60-mil geomembrane liner and a 2-foot thick clay barrier.
- Impacts from flooding event from March to July, 2019.

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 3** below describes the different types of CCRs and their typical indicator parameters (USEPA 2018, EPRI 2011, EPRI 2012, and EPRI 2017).

Table 3: 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.

As described above, the SCL4A has historically received fly ash and boiler slag/bottom ash. FGD type wastes at the SEC are managed at the SCPC, located to the west of the SCL4A.

5.2 SSIs at TMW-2

5.2.1 Boron Concentrations at TMW-2

Boron is typically the key indicator for fly ash and boiler slag/bottom ash impacts because it is typically present in the leachate from these types of waste, is not a common anthropogenic contaminant, and is non-reactive and mobile in most hydrogeological environments (EPRI 2012). This non-reactive and mobile nature makes boron an early indicator of impacts from a CCR Unit. If groundwater was impacted by the SCL4A, current boron concentrations should be statistically elevated with respect to pre-CCR placement, background monitoring wells, and compared to those in the baseline sampling.

Figure 2 displays historical boron concentrations at TMW-2, as well as background wells BMW-1S and BMW-3S and nearby wells TMW-1 and TMW-2. If the SSIs for chloride, sulfate, and TDS were caused by impacts from the SCL4A, boron concentrations would also be expected to increase as a first indicator of CCR influence on the groundwater. **Figure 2** demonstrates that current boron concentrations are similar to those from previous sampling events and are similar to background levels. This information displays that TMW-2 does not have boron impacts, and therefore, a source other than CCR is likely the cause of SSIs for chloride, sulfate, and TDS at TMW-2.

5.2.2 Sulfate Concentrations

Sulfate, much like boron, can be an indicator of CCR impact, because sulfate is highly mobile in most hydrogeological environments, except where conditions are strongly reducing. The groundwater around the SCL4A does not demonstrate strongly reducing conditions, such as negative oxidation reduction potential (ORP) and dissolved iron concentrations above 1 mg/L. No hydrogen sulfide odors have been reported in the groundwater at the SCL4A. Therefore, if the SSIs for chloride, sulfate, and TDS were caused by impacts from the SCL4A, it would be expected that sulfate values would increase following placement of CCR. Given that boron concentrations are not indicative of CCR impacts, it follows that the elevated sulfate values in well TMW-2 are from an alternative source.

As displayed on **Figure 3**, during baseline sampling at TMW-2, sulfate ranged from 30.0-35.5 milligrams/liter (mg/L). During the November 2019 and January 2020 sampling events, sulfate increased to 75.1 and 85.8 mg/L, respectively. As displayed in **Figure 1**, TMW-1 (west) and TMW-3 (east) are located within 400 feet to the east and west of TMW-2. **Figure 3** shows that sulfate concentrations in wells TMW-1 and TMW-3 have been stable or decreasing since the beginning of sampling in May 2016. Additionally, site background concentrations in BMW-1S and BMW-3S, located approximately 1-mile to the northwest of SCL4A, have ranged from 23.1 to 41.4 mg/L. As shown in **Figure 3**, the concentration of sulfate in well TMW-2 for the April 2020 sampling event has decreased to 60.5 mg/L, which is back within the range of UPLs for the three downgradient monitoring wells at the SCL4A.

As described above, the SEC, including the SCL4A, lies between the Mississippi and Missouri Rivers approximately 12 miles west-northwest of the confluence of the two rivers. TMW-2 is located approximately 4,800 feet north of the Missouri River and approximately 6,600 feet south of the Mississippi River. During the 2006 detailed site investigation, sulfate concentrations were 130 mg/L in the Missouri River and 47 mg/L in the Mississippi River. The magnitudes of these results have been confirmed in additional studies including the following:

1) Concentrations in the Missouri River near Weldon Spring in St. Charles County (upgradient) had an average sulfate concentration of 115 mg/L and ranged from 95 to 180 mg/L (Kleeschulte, 1993).

2) During the 2014 human health risk reporting for the Labadie Energy Center, sulfate concentrations in publicly available Missouri River stations ranged from 51.6 to 157 mg/L (AECOM, 2014).

3) During the 2014 human health risk reporting for the Rush Island Energy Center, sulfate concentrations in publicly available Mississippi River stations ranged from 32.2 to 96.4 mg/L (AECOM, 2014).

4) Samples collected near the Sioux Energy Center reported sulfate concentrations ranging from 188 to 196 mg/L in the Missouri River and 29.9 to 40.5 mg/L in the Mississippi River (Corrective Measures Assessment, Haley and Aldrich, 2019).

Based on these results, sulfate concentrations in the rivers can be higher than those in TMW-2 during the November 2019 sampling event and are typically higher than those in groundwater near the SCL4A. Thus, the Missouri River flooding impacts, which inundated the TMW-2 well, should be considered a potential source for the elevated sulfate concentrations reported recently in well TMW-2.

Sulfate concentrations in the Missouri River are typically higher than those in the Mississippi River, indicating that the wells located closer to the Missouri River may have different baseline sulfate concentrations than those nearer to the Mississippi River. To investigate the geochemical variability of sulfate in this area, a review of the data in the state UWL wells prior to the receipt of CCR was completed. **Figure 4** displays a box and whisker plot of boron concentrations prior to June 2010 in the monitoring wells around the UWL. Based on these results, UG-1A and UG-2 were not be used for this analysis, because those two wells appear to be impacted by CCR influence of the upgradient SCPA during this timeframe.

Figure 5 displays a box and whisker plot of sulfate concentrations during the same timeframe with wells UG-01A and UG-2 removed. **Figure 5** also includes a line denoting the November 2019 sulfate concentration reported for well TMW-2. This figure demonstrates that recent sulfate concentrations in well TMW-2 are within the range of values present prior to any CCR being placed in the UWL. Additionally, as indicated above, to the sulfate concentrations reported in site background wells BMW-1S and BMW-3S, located near the Mississippi River, are much lower than sulfate concentrations reported for the well data displayed on **Figure 5**. Therefore, since increases in sulfate during the November 2019 sampling event are not likely from CCR impacts, the increase in sulfate may be a result of natural variability in the Alluvial Aquifer, because background sulfate concentrations in groundwater located near the UWL and the Missouri River are similar to recent sulfate values reported for well TMW-2.

As discussed in the 2019 Annual Report for the SCP4A, from March through July 2019, monitoring wells within the floodplain that were not on the elevated plant property were submerged by flooding of both the Mississippi and Missouri Rivers. Based on nearby gauges, flooding elevations in the Mississippi River were estimated to have reached approximately 436 feet above mean sea level (feet MSL) and approximately 440 feet MSL for the Missouri River. After the flooding subsided, on July 17, 2019, a post flood survey was completed to determine if any monitoring wells were impacted by flooding conditions. At the UWL, there was evidence of flooding impacts in monitoring wells UG-3, TMW-2, DG-1, and DG-4, and possible flooding impacts at TMW-1 and UG-1A. All these monitoring wells were re-developed prior to the August 2019 sampling event to attempt to remove flooding impacts to the monitoring wells.

Figure 6 is a time series plot of sulfate concentrations from November 2017 through April 2020 in several wells that had possible flooding impacts near the SCL4A. As noted above, sulfate concentrations in the Missouri River have ranged up to 196 mg/L, which is higher than sulfate concentrations present in TMW-2. These results display that two of the monitoring wells, UG-3 and TMW-2, had larger spikes in sulfate after the flooding, while one well (DG-1) displayed a minor increase in sulfate concentrations and three wells (UG-1A, TMW-1, and DG-4) had almost no change. Each of the wells that displayed increased sulfate had strong evidence of impacts from the flood (i.e., mud deposited inside the well protective casings and on the sides of the well seal). Therefore, even though these wells were re-developed prior to sampling, not all of the impact from the flooding may have been removed or river water may have recharged into the aquifer near TMW-2, resulting in elevated sulfate concentrations during subsequent sampling events. As displayed on **Figure 6**, sulfate results reported for the three impacted wells from the April 2020 event are returning to pre-flood levels, suggesting that impacts from the flooding event are decreasing with time. Thus, the Spring 2019 flooding event is considered a likely source for the elevated sulfate concentrations reported recently in well TMW-2.

In addition to increases in sulfate in TMW-2 after the flooding event, changes in redox conditions were also present. As shown in **Figure 7**, the increase in sulfate concentrations after the flooding event corresponds with an increase in alkalinity and a decrease in iron, which would be expected when more oxic river water mixes with the more reduced groundwater.

All of the preceding points indicate that the elevated sulfate concentration in TMW-2 in November 2019 was not caused by a release from the SCL4A, but instead is likely due to flooding impacts. The source of the recent elevated sulfate concentrations in well TMW-2 appear to be a result of natural geochemical variability or intrusion of water during the Spring 2019 flood event.

5.2.3 Chloride Concentrations

Chloride is not known to be a key indicator of fly ash or boiler slag/bottom ash (EPRI 2012) but can be an indicator for FGD type wastes and is commonly found in shallow groundwater systems near salt and brine treated roadways. At the SEC, FGD wastes are managed in the SCPC, located west of the SCL4A (see **Figure 1**). The nearest roadways to TMW-2 are highway 94 approximately 1,400 feet to the north, and Dwiggins Road approximately 1,100 feet to the south.

Chloride concentrations for the November 2019 sampling event and subsequent verification sampling event are 4.5 and 4.7 milligrams per liter (mg/L), respectively. These values are just above the original calculated UPL of 4.151 mg/L for chloride concentrations at TMW-2, which was calculated based on eight baseline sampling events in 2016 and 2017 during which time chloride concentrations ranged from 2.4 to 3.9 mg/L. In August 2019, UPLs were updated, in accordance with the Statistical Analysis Plan, following completion of four (4) new sampling events. The updated UPL is slightly lower than the original UPL at 3.954 mg/L. Nearby monitoring wells TMW-1 and TMW-3, located less than 400 feet to the east and west of TMW-2 have displayed very similar chloride concentrations to those in TMW-2 with concentrations ranging from 1.6 to 3.9 mg/L and UPLs of 4.463 (TMW-1) and 3.1 (TMW-3) mg/L. Chloride concentrations in site background monitoring wells located 1-mile to the northeast of SCL4A (wells BMW-1S and BMW-3S) display concentrations ranging from 6.3 to 12.0 mg/L.

Figure 8 displays chloride results in the monitoring wells south of the SCL4A (TMW-1, TMW-2, and TMW-3) compared to background results from site background wells BMW-1S and BMW-3S. This figure displays that the concentrations of 4.5 and 4.7 mg/L are well below those reported for background wells at 6.3 – 12.0 mg/L and are consistent with those in other monitoring wells located south of the SCL4A. This demonstrates that the results

from TMW-2 are well below those of unimpacted background limits for chloride in the shallow zone of the Alluvial Aquifer. Additionally, **Figure 9** displays a box and whisker plot of chloride concentrations compared to UWL wells prior to the receipt of CCR (June 2010) at all wells except UG-1A and UG-2. This figure clearly demonstrates that the concentrations at TMW-2 are well within chloride concentrations present prior to the receipt of CCR.

As discussed above, values from the Missouri and Mississippi River need to be assessed as a possible alternative source due to the flooding that occurred in 2019. During the 2006 detailed site investigation, chloride concentrations were 21 mg/L in the Missouri River and 20 mg/L in the Mississippi River. The magnitudes of these results have been confirmed in additional studies including the following:

1) Concentrations in the Missouri River near Weldon Spring in St. Charles County (upgradient) had an average chloride concentration of 21 mg/L and ranged from 15 to 27 mg/L (Kleeschulte, 1993).

2) Samples collected near the Sioux Energy Center had chloride concentrations ranging from 23.3 to 23.9 mg/L in the Missouri River and 22.2 to 41.0 mg/L in the Mississippi River (Corrective Measures Assessment, Haley and Aldrich, 2019).

Based on these results, chloride concentrations in the rivers can be higher than those in TMW-2 during the November 2019 sampling event and are typically higher than those in groundwater south of the SCL4A away from roadways that are treated with road salt or brine. Thus, 2019 flooding impacts from these rivers should be considered a potential source for the elevated chloride concentrations reported recently in well TMW-2.

These results indicate that relatively low calculated UPLs for TMW-2 do not reflect the full, natural variability within the Alluvial Aquifer. When November 2019 results from TMW-2 are compared to the background and historical datasets, the results are well within the range of values reported for other monitoring wells in the Alluvial Aquifer both near the Mississippi and Missouri Rivers. In addition to natural geochemical variability, the recent increased concentrations reported for chloride in well TMW-2 are also potentially due to the intrusion of flood waters in the well/aquifer during the spring/summer 2019. Finally, the April 2020 result for chloride in TMW-2 is 3.8 mg/L, which is below the UPL for this well, so the most recent concentration for chloride in well TMW-2 is in compliance.

5.2.4 Total Dissolved Solids (TDS) Concentrations

TDS alone is not a key indicator of CCR or WFGD impacts (EPRI 2017, EPRI 2012). The concentration of TDS is largely based on the concentration of major ions in groundwater (calcium, magnesium, sodium, potassium, carbonates, chloride, sulfate, etc.). Although TDS alone is not a key indicator of CCR impacts, an increase in some of the major ions associated with CCR (calcium, sodium, chloride, sulfate) can represent CCR impacts, and thus increased TDS can be indicative of CCR impact.

As displayed on **Figure 10**, concentrations for the November 2019 and subsequent verification sampling event are 502 and 513 mg/L respectively. These results are lower than the result reported for May 2018 of 721 mg/L, which was flagged as an outlier in the database. Furthermore, these values are just above the calculated UPL of 495.8 mg/L for TDS at TMW-2. This UPL is calculated based on 12 (twelve) sampling events collected from May 2016 through August 2019, during which time TDS concentrations ranged from 403 to 484 mg/L. TMW-2 is not sampled as part of the state UWL sampling program; therefore, no historical data prior to the receipt of CCR in the SCL4A is available from this well. However, TMW-1 and TMW-3, which are located within 400 feet to the east and west of well TMW-2, ranged from 323-493 mg/L during this same timeframe. The UPLs for wells TMW-1 and TMW-3 are 485.1 mg/L and 505.9 mg/L, respectively. As shown in **Figure 10** and described above, the November 2019 result from TMW-2 is within the recent range of TDS concentrations for the area south of the

SCL4A. Therefore, the SSI for TDS is not a result of impacts from the SCL4A, but is likely due to a low UPL for TMW-2 resulting from a limited dataset used for the calculation which is not representative of the full natural variability in groundwater at well TMW-2.

In addition, **Figure 11** displays the TDS concentrations of the background monitoring wells BMW-1S and BMW-3S compared to TMW-2. Background TDS results at monitoring wells BMW-1S and BMW-3S ranged between 409-565 mg/L (with outliers at 721 and 1,170 mg/L) and a calculated UPL of 565 mg/L. This figure demonstrates that TDS concentrations are well within those of background monitoring wells. **Figure 12** displays a box and whisker plot of chloride concentrations compared to UWL wells prior to the receipt of CCR (June 2010) at all wells except UG-1A and UG-2. This figure clearly demonstrates that the concentrations at TMW-2 are well within the range of TDS concentrations present prior to the receipt of CCR.

As discussed above, Missouri and Mississippi River TDS concentrations are a possible alternative source due to the flooding that occurred in 2019. During the 2006 detailed site investigation, TDS concentrations were 420 mg/L in the Missouri river and 330 mg/L in the Mississippi River. The magnitudes of these results have been confirmed in the corrective measures assessment for the SCPA, where TDS values ranged from 465-497 mg/L in the Missouri River and 218-344 mg/L in the Mississippi River (Haley and Aldrich, 2019). Based on these results, TDS concentrations in the rivers are typically at similar levels to those displayed at TMW-2. Thus, like the recent sulfate and chloride increases identified above, the recent increases in TDS in TMW-2 are likely a result of flooding influence on the groundwater. In fact, the increased TDS in TMW-2 is directly related to the increases in sulfate and chloride concentrations, because TDS concentrations are directly dependent on the concentration of dissolved major ions in the solution, including alkalinity, sulfate, chloride, calcium, magnesium, sodium, and potassium. An increase in the major ion concentrations will result in a direct increase in TDS and vice versa.

The information provided in this section demonstrates that the SSI for TDS at TMW-2 was not caused by impacts from the SCL4A, but instead can be attributed to one, two or all of the following alternative sources: natural geochemical variability in the Alluvial Aquifer, the Spring 2019 flooding event, and a statistical impact resulting from a limited background dataset and the resulting lower than expected UPL.

6.0 DEMONSTRATION THAT SSIS WERE NOT CAUSED BY SCL4A IMPACT

Based on the information presented in Section 5 above, the recent SSIs for sulfate, chloride, and TDS in TMW-2 were not caused by impacts from the SCL4A. These SSIs appear to be the result of several possible factors, but are primarily attributed to natural geochemical variability within the Alluvial Aquifer and/or flooding impacts during the Spring 2019.

As described in Section 5.0, after flooding, a post-flood survey of each monitoring well noted that TMW-2 had impacts from the 2019 flooding event. The monitoring well was re-developed after flooding impacts; however, it appears that some of the intruded water in TMW-2 may not have been removed during this process or river water may have recharged into the aquifer near TMW-2. A review of sulfate, and chloride concentrations from the Mississippi and Missouri Rivers displays that flooding impacts would increase these concentrations in TMW-2. A sudden increase in concentrations after flooding, along with a spike in other oxic water conditions, provides evidence that TMW-2 was likely impacted by the flooding.

Additionally, boron concentrations in well TMW-2 did not increase following the flood event and have remained within the range of background levels. Boron is a key indicator of CCR impacts and would almost certainly show

an increase if the noted SSIs were from CCR impacts. Based on the evidence presented above, the SSIs at TMW-2 were not caused by CCR impacts from the SCL4A and no further actions are necessary with respect to these results. SCL4A will remain in Detection Monitoring during the upcoming second semiannual monitoring event of 2020.

7.0 REFERENCES

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Tables

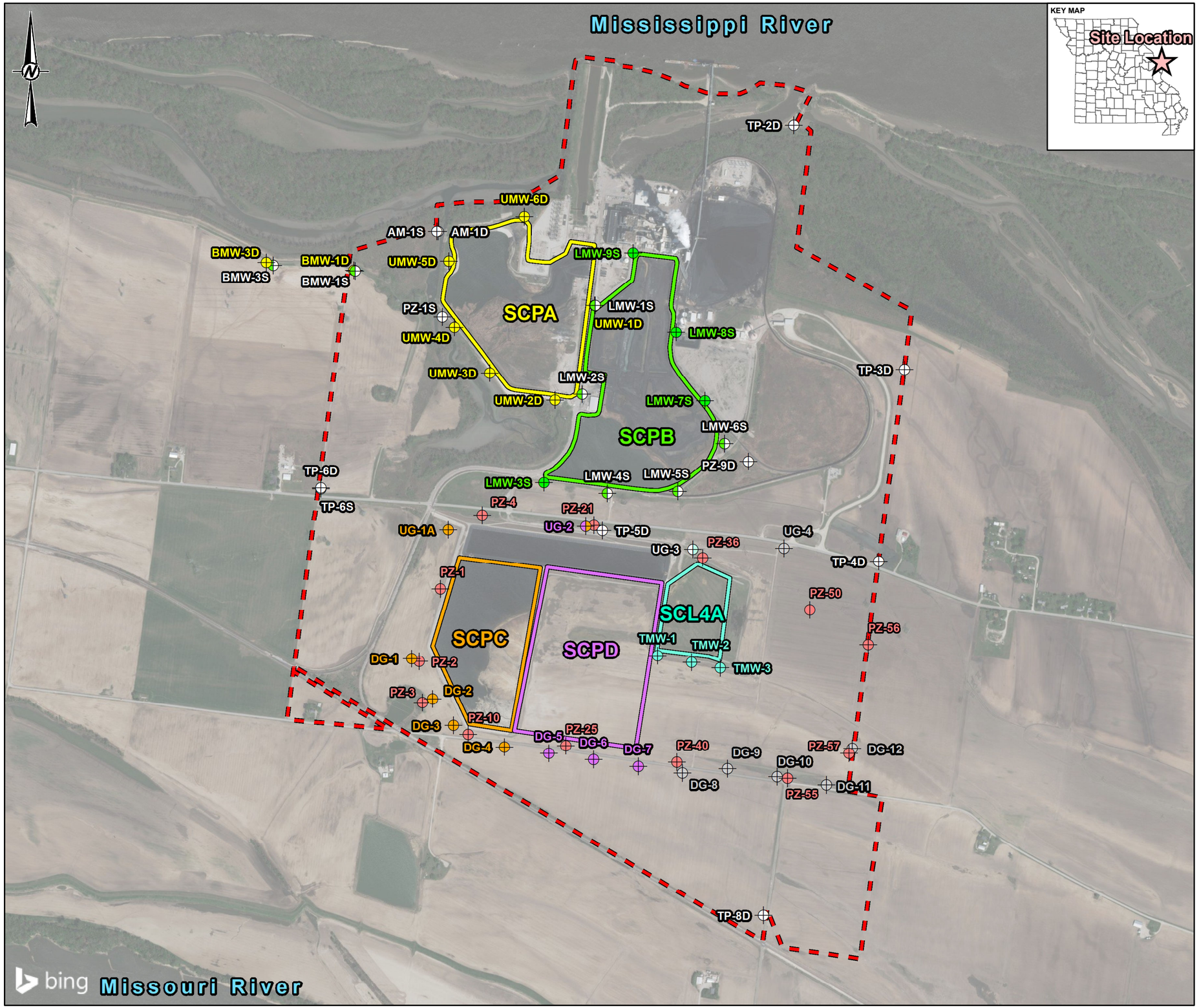
Table 1
November 2019 Detection Monitoring Results
SCL4A - Landfill Cell 4A
Sioux Energy Center, St. Charles County, MO

		BACKGROUND		GROUNDWATER MONITORING WELLS							
ANALYTE	UNITS	BMW-1S	BMW-3S	Prediction Limit UG-3	UG-3	Prediction Limit TMW-1	TMW-1	Prediction Limit TMW-2	TMW-2	Prediction Limit TMW-3	TMW-3
November 2019 Detection Monitoring Event											
DATE	NA	11/15/2019	11/15/2019	NA	11/14/2019	NA	11/14/2019	NA	11/14/2019	NA	11/14/2019
pH	SU	6.88	7.13	6.243-7.648	7.08	6.216-7.528	6.93	6.441-7.519	6.90	6.337-7.638	6.99
BORON, TOTAL	µg/L	118	80.1 J	1,027	976	DQR	79.7 J	DQR	98.1 J	114.8	97.6 J
CALCIUM, TOTAL	µg/L	143,000 J	102,000	160,085	135,000 J	115,800	95,100	134,272	120,000	150,887	116,000
CHLORIDE, TOTAL	mg/L	6.4	7.6	102.2	83.5	4.463	1.8	3.954	4.5	3.1	2.4
FLUORIDE, TOTAL	mg/L	0.28	0.23	0.3772	0.33	0.4264	0.34	0.4061	0.35	0.3573	0.28
SULFATE, TOTAL	mg/L	26.5	34.4	165.7	185 J	50.29	36.9	52.1	75.1	60.9	36.7
TOTAL DISSOLVED SOLIDS	mg/L	551	418	698.7	721	485.1	387	495.8	502	505.9	454
January 2020 Verification Sampling Event											
DATE	NA				1/3/2020				1/2/2020		
pH	SU										
BORON, TOTAL	µg/L										
CALCIUM, TOTAL	µg/L										
CHLORIDE, TOTAL	mg/L								4.7		
FLUORIDE, TOTAL	mg/L										
SULFATE, TOTAL	mg/L				66.2				85.8		
TOTAL DISSOLVED SOLIDS	mg/L				576				513		

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.
4. Prediction Limits calculated using Sanitas Software.
5. Values highlighted in yellow indicate a Statistically Significant Increase (SSI).
6. Values highlighted in green indicate an initial exceedance above the prediction limit that was not confirmed by Verification Sampling (not an SSI).
7. Only analytes/wells that were detected above the prediction limit were tested during Verification Sampling.
8. If all background values are less than the Practical Quantitation Limit (PQL) then the Double Quantification Rule (DQR) is used.

Prepared By: EMS
Checked By: BTT
Reviewed By: SCP

Figures



KEY MAP

LEGEND

- Sioux Energy Center Property Boundary
- SCPA - Bottom Ash Surface Impoundment
- SCPB - Fly Ash Surface Impoundment
- SCPC - Active WFGD Disposal Area
- SCL4A - Active Dry CCR Disposal Area
- SCPD - Proposed WFGD Disposal Area

Monitoring Well Networks

- Corrective Action Monitoring Well
- SCPA Detection and Assessment Monitoring Well
- SCPB Detection Monitoring and Corrective Action Monitoring Well
- SCPB Detection Monitoring Well
- SCPC Detection Monitoring and State UWL Monitoring Well
- Proposed SCPD and SCPC Detection Monitoring and State UWL Monitoring Well
- Proposed SCPD Detection Monitoring and State UWL Monitoring Well
- SCL4A Detection Monitoring, Corrective Action Monitoring, and State UWL Monitoring Well
- SCL4A Detection Monitoring and State UWL Monitoring Well
- 2006 Detailed Site Investigation Piezometer and Sample Locations
- Existing UWL Monitoring Well Not Currently Used for CCR Monitoring

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.
4.) CCR - COAL COMBUSTION RESIDUALS.
5.) UWL BOUNDARIES, DESIGNATIONS AND EXISTING MONITORING WELL LOCATIONS BASED ON DRAWINGS IN THE UWL PROPOSED LANDFILL PERMIT (#0918301).

REFERENCE(S)

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.

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
SITE MONITORING WELL LOCATION AND AERIAL MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2020-05-20
DESIGNED	JSI
PREPARED	JSI
REVIEWED	EMS
APPROVED	MNH

PROJECT NO.	CONTROL	REV.	FIGURE
153140602	1240	1	1

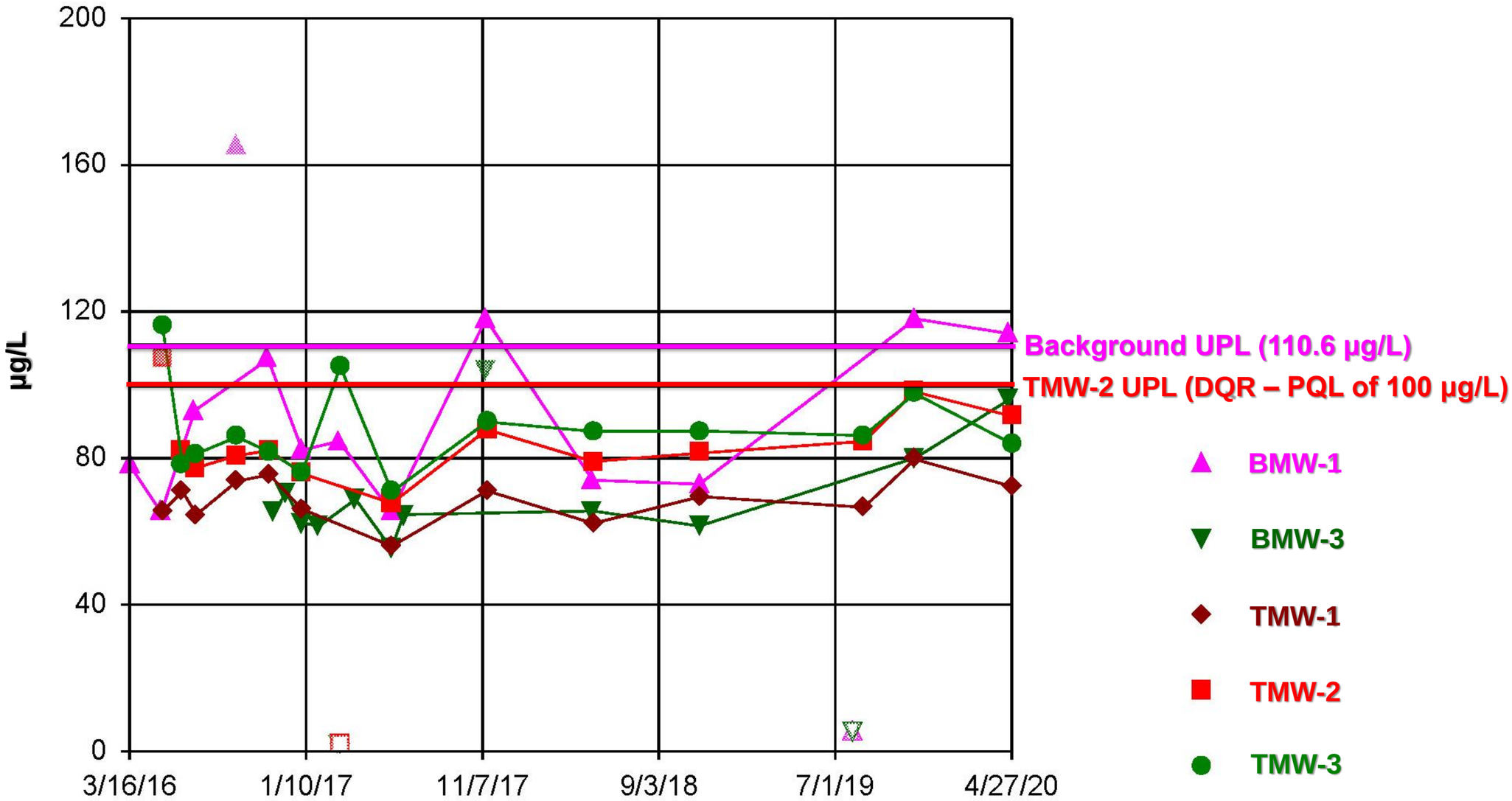
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

1 in

0

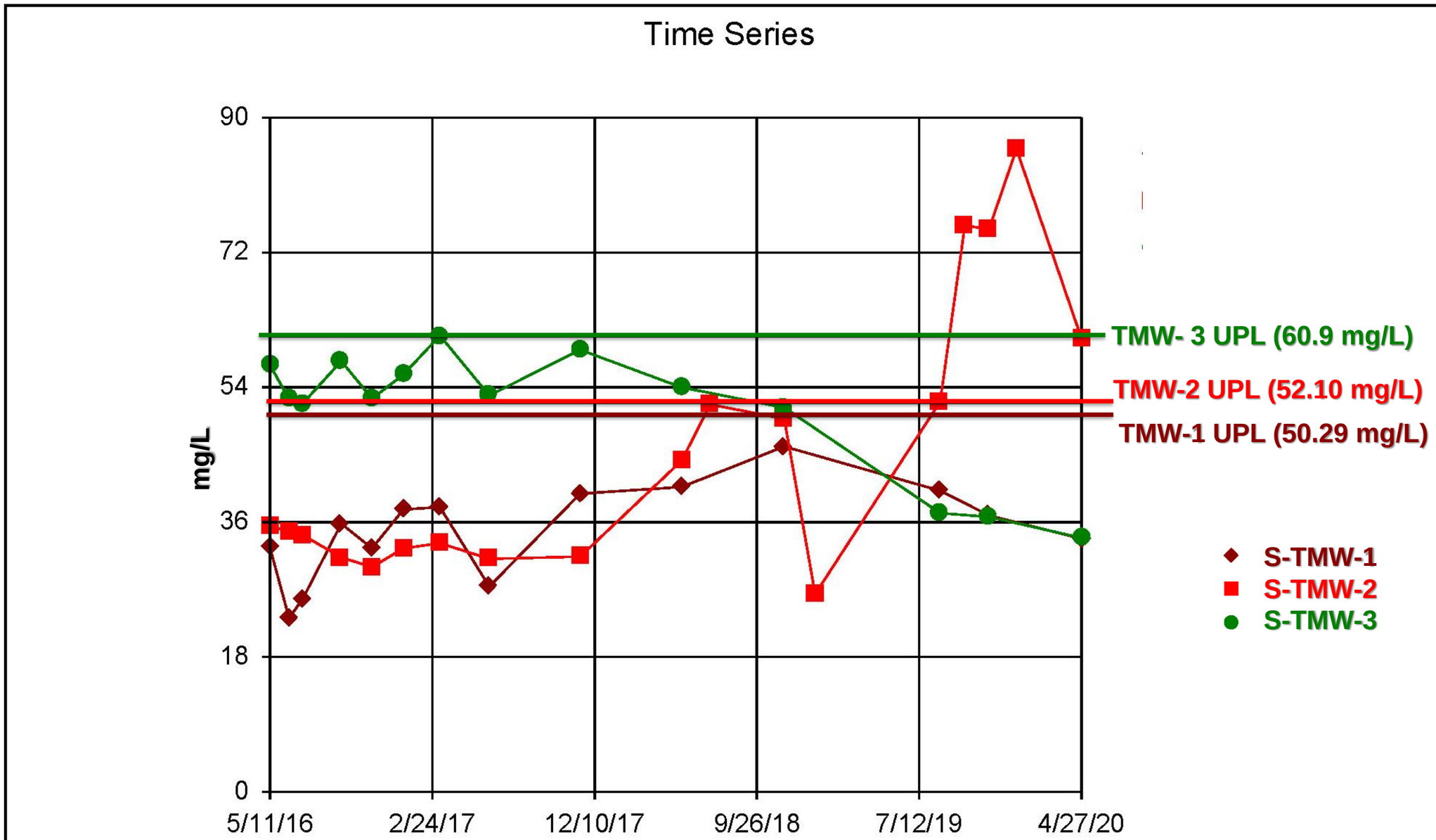
PATH: C:\Users\jingram\Golder Associates\153140601.02 - Ameren CCR GW Monitoring Program 2020 - 1 Proposal and Project Management\5 Technical Work\0003-SEC13.5-Figure-Drawings\PRODUCTION\SCL4A.ASD\Figure 1 - Site Location.mxd PRINTED ON: 2020-05-29 AT: 10:03:38 AM

Time Series



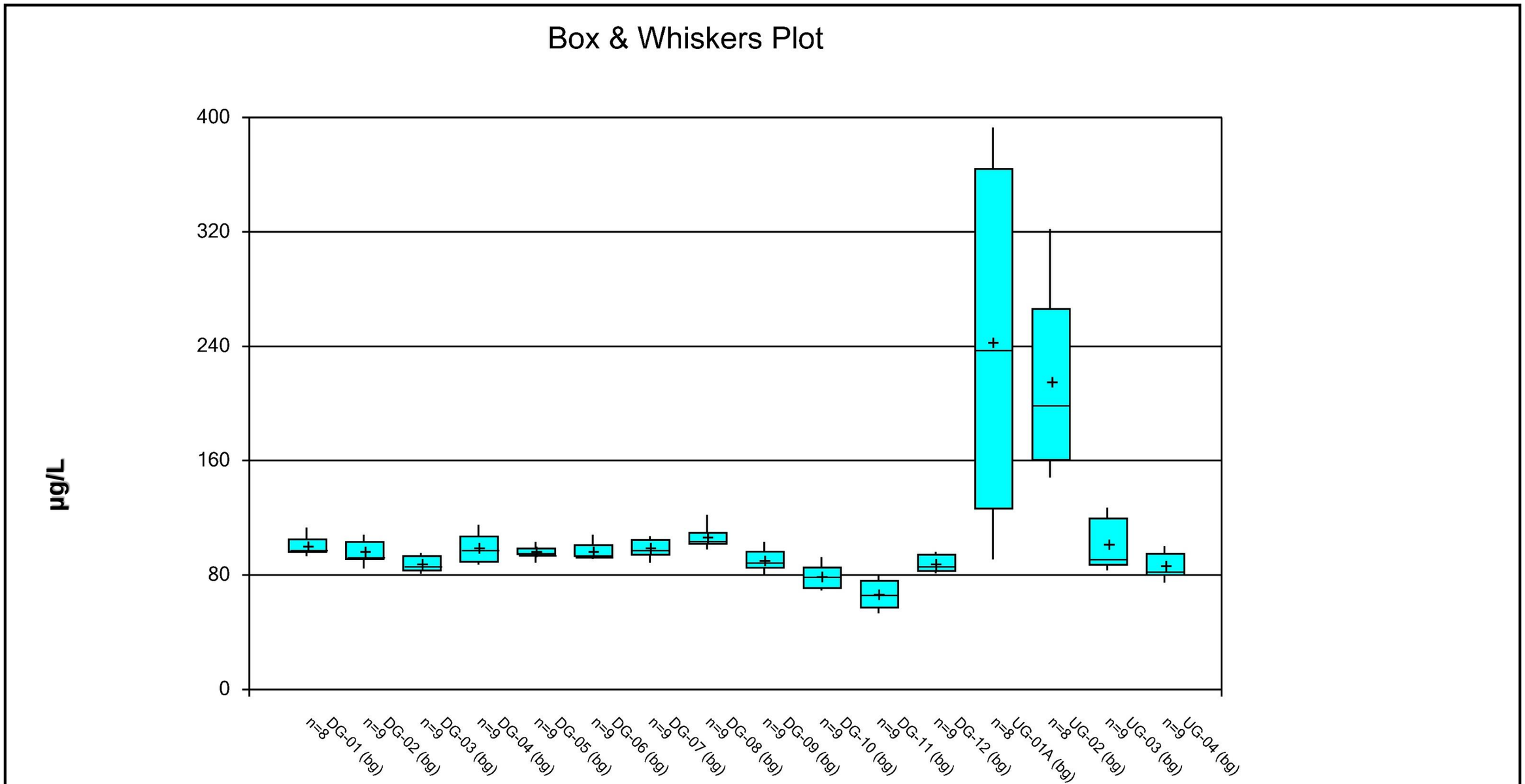
Notes
1) µg/L – micrograms per liter.
2) Data points not connected to a line are outliers.
3) If all background values are less than the Practical Quantitation Limit (PQL) then the Double Quantification Rule (DQR) is used.

CLIENT/PROJECT						TITLE			
AMEREN MISSOURI **SIOUX ENERGY CENTER**				GOLDER		**Time Series Plot for Boron Concentrations**			
DRAWN JSI	CHECKED EMS	REVIEWED MNH	DATE 2020-05-22	SCALE N/A	FILE NO. N/A	JOB NO. 153140602.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **2**



Notes
1) mg/L – milligrams per liter.
2) UPL – Upper Prediction Limit.

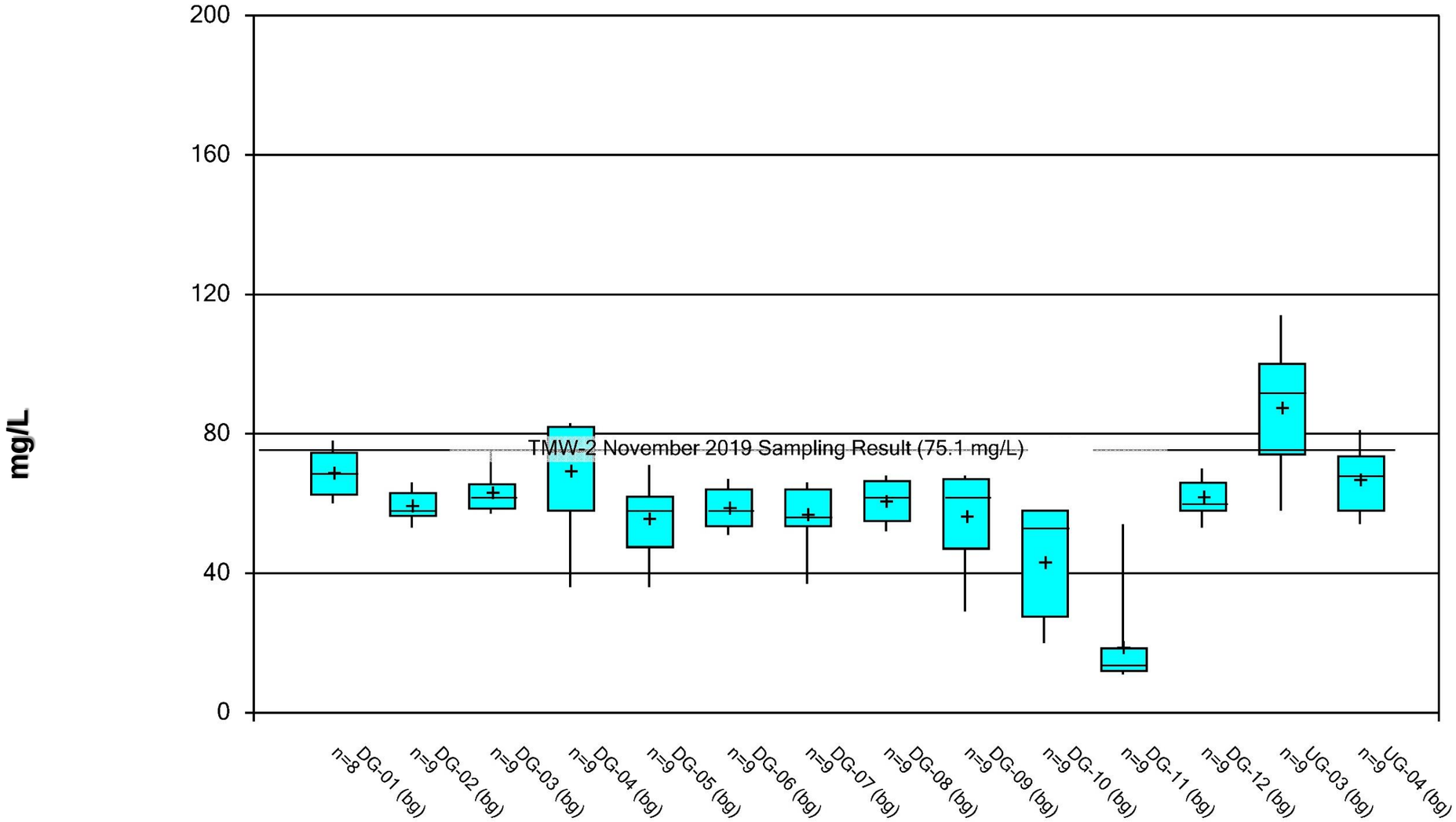
CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**							TITLE **Time Series Plot for Sulfate Concentrations South of the SCL4A**			
DRAWN JSI	CHECKED EMS	REVIEWED MNH	DATE 2020-05-22	SCALE N/A	FILE NO. N/A	JOB NO. 153140602.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **3**



Notes
1) mg/L – milligrams per liter.
2) CCR – Coal Combustion Residuals.
3) Plot displays results prior to the operating permit of the Utility Waste Landfill (June 2010).

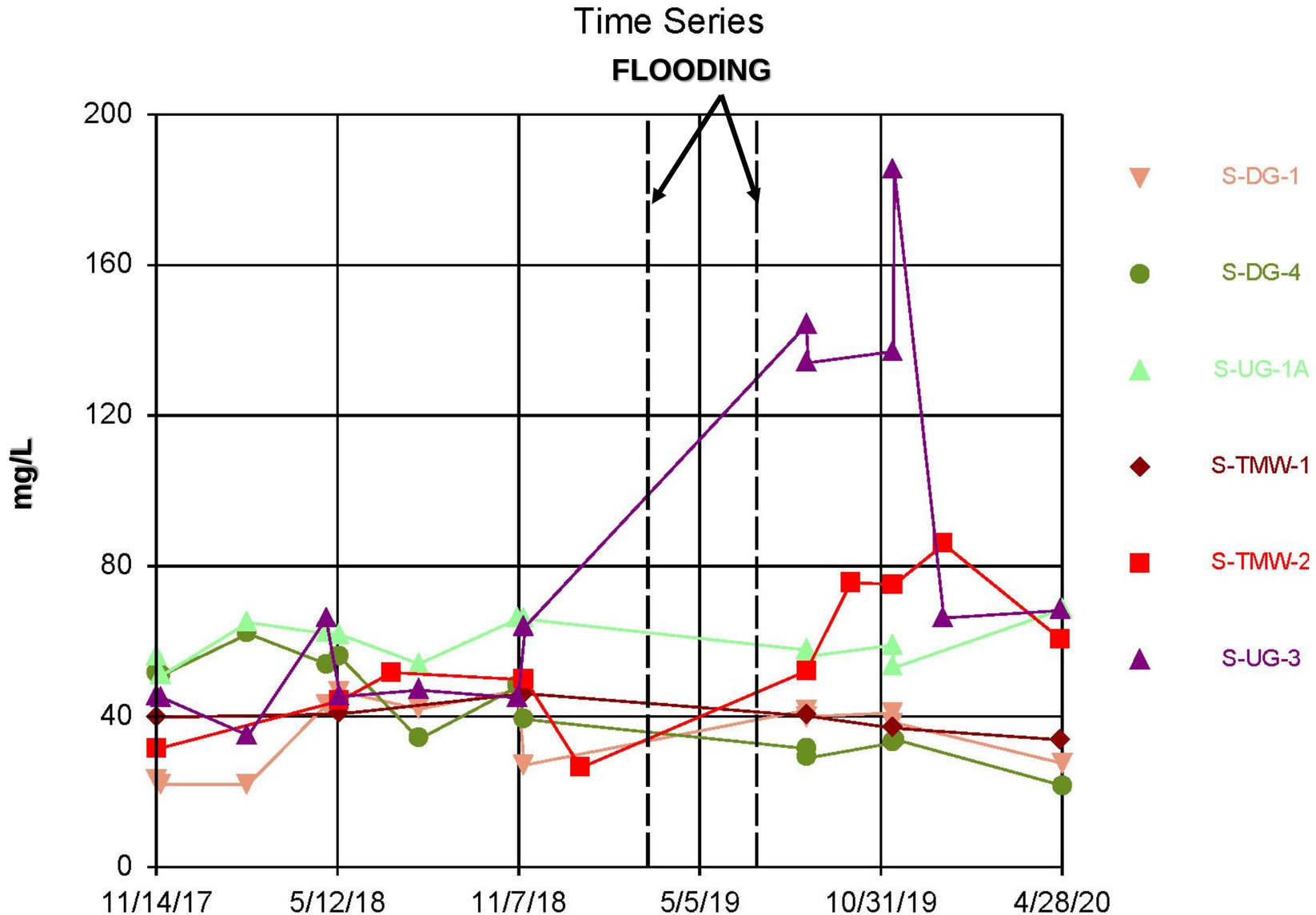
CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**						TITLE **Pre-CCR Boron Plots– Utility Waste Landfill**				
DRAWN JSI	CHECKED EMS	REVIEWED MNH	DATE 2020-05-29	SCALE N/A	FILE NO. N/A	JOB NO. 153140602.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **4**

Box & Whiskers Plot



Notes
1) mg/L – milligrams per liter.
2) CCR – Coal Combustion Residuals.
3) Plot displays results prior to the operating permit of the Utility Waste Landfill (June 2010).

CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**							TITLE **Pre-CCR Sulfate Plots– Utility Waste Landfill**			
DRAWN JSI	CHECKED EMS	REVIEWED MNH	DATE 2020-05-29	SCALE N/A	FILE NO. N/A	JOB NO. 153140602.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **5**



Notes
1) mg/L – milligrams per liter.

CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**							TITLE **Sulfate Concentrations Compared to 2019 Flooding Event**			
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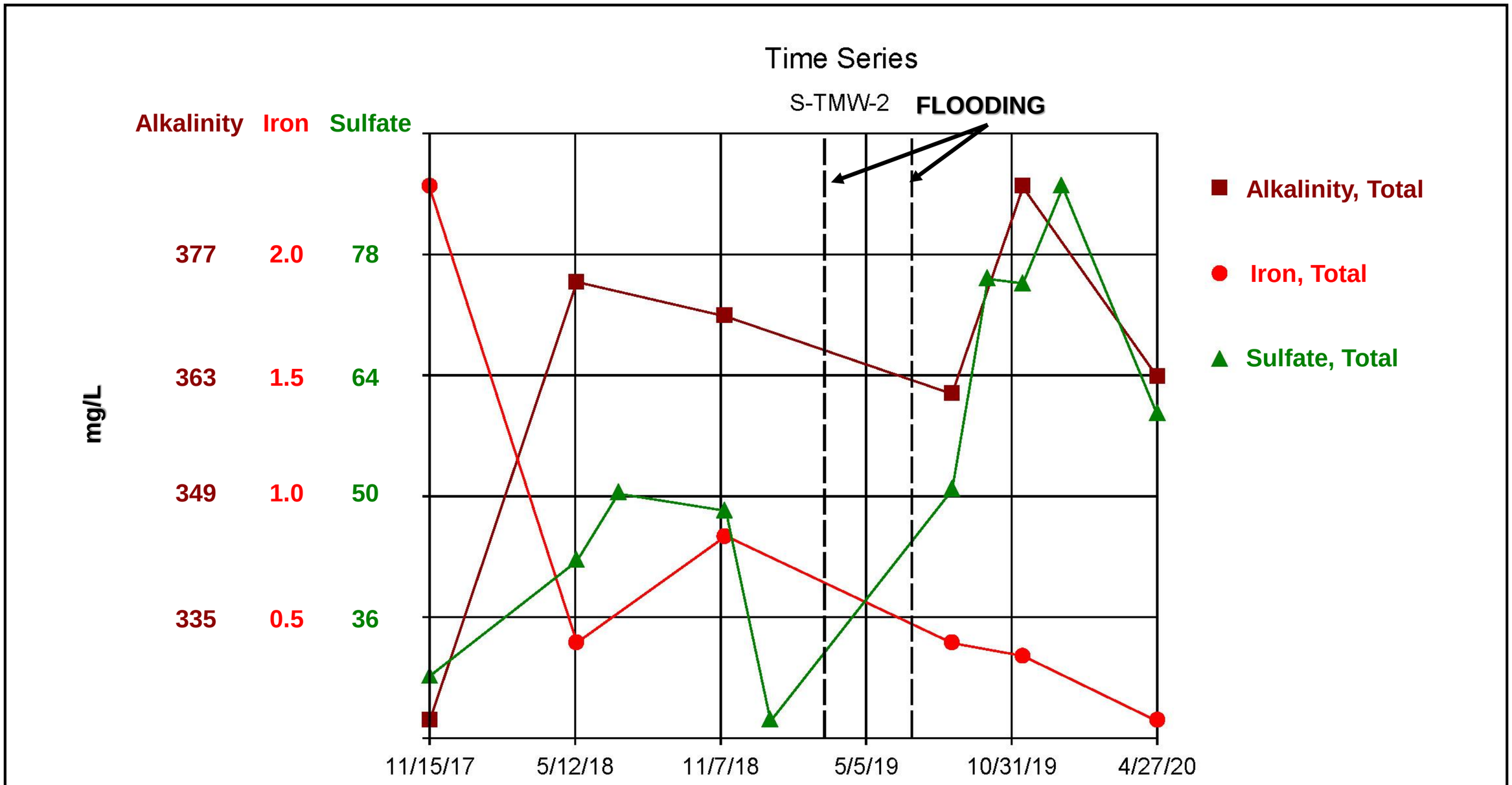

Notes
1) mg/L – milligrams per liter.

CLIENT/PROJECT **AMEREN MISSOURI** **SIOUX ENERGY CENTER**						TITLE **Changes in Redox Constituents**				
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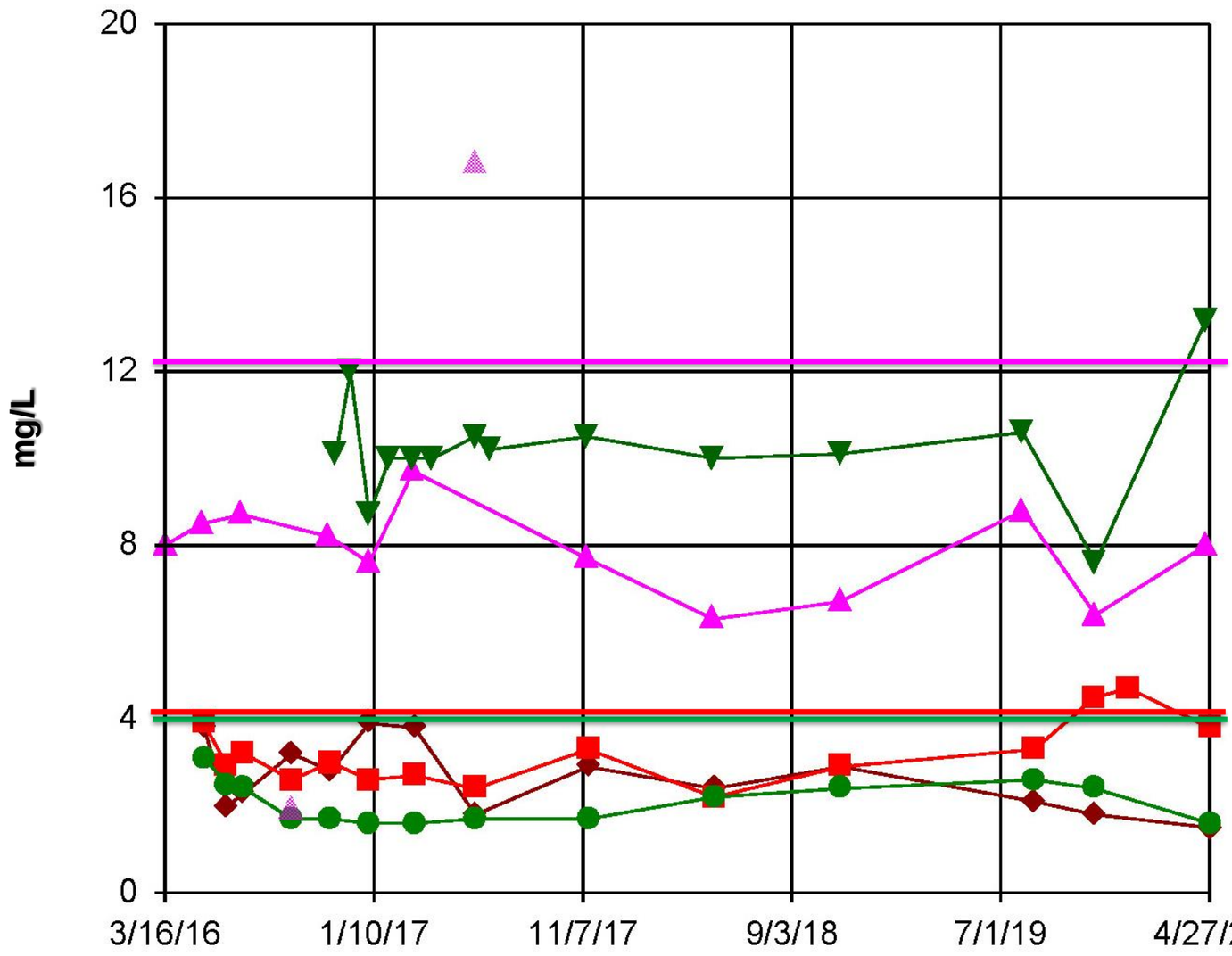
Time Series



Notes
1) mg/L – milligrams per liter.
2) UPL – Upper Prediction Limit.
3) Data points not connected to a line are outliers.

CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**							TITLE **Time Series Plot for Chloride Concentrations**			
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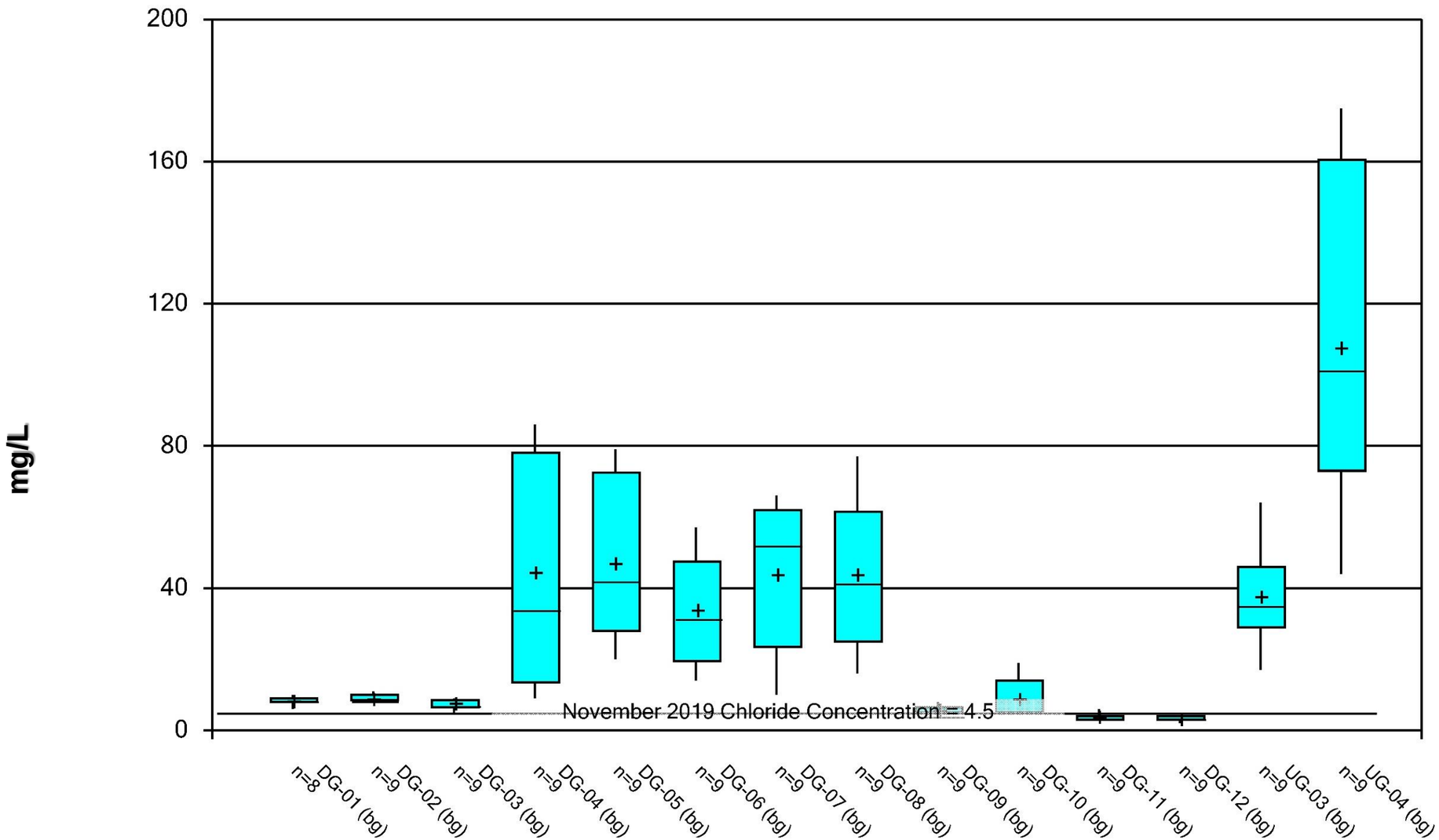
Box & Whiskers Plot



Notes
1) mg/L – milligrams per liter.
2) CCR – Coal Combustion Residuals.
3) Plot displays results prior to the operating permit of the Utility Waste Landfill (June 2010).

CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**							TITLE **Pre-CCR Chloride Plots– Utility Waste Landfill**			
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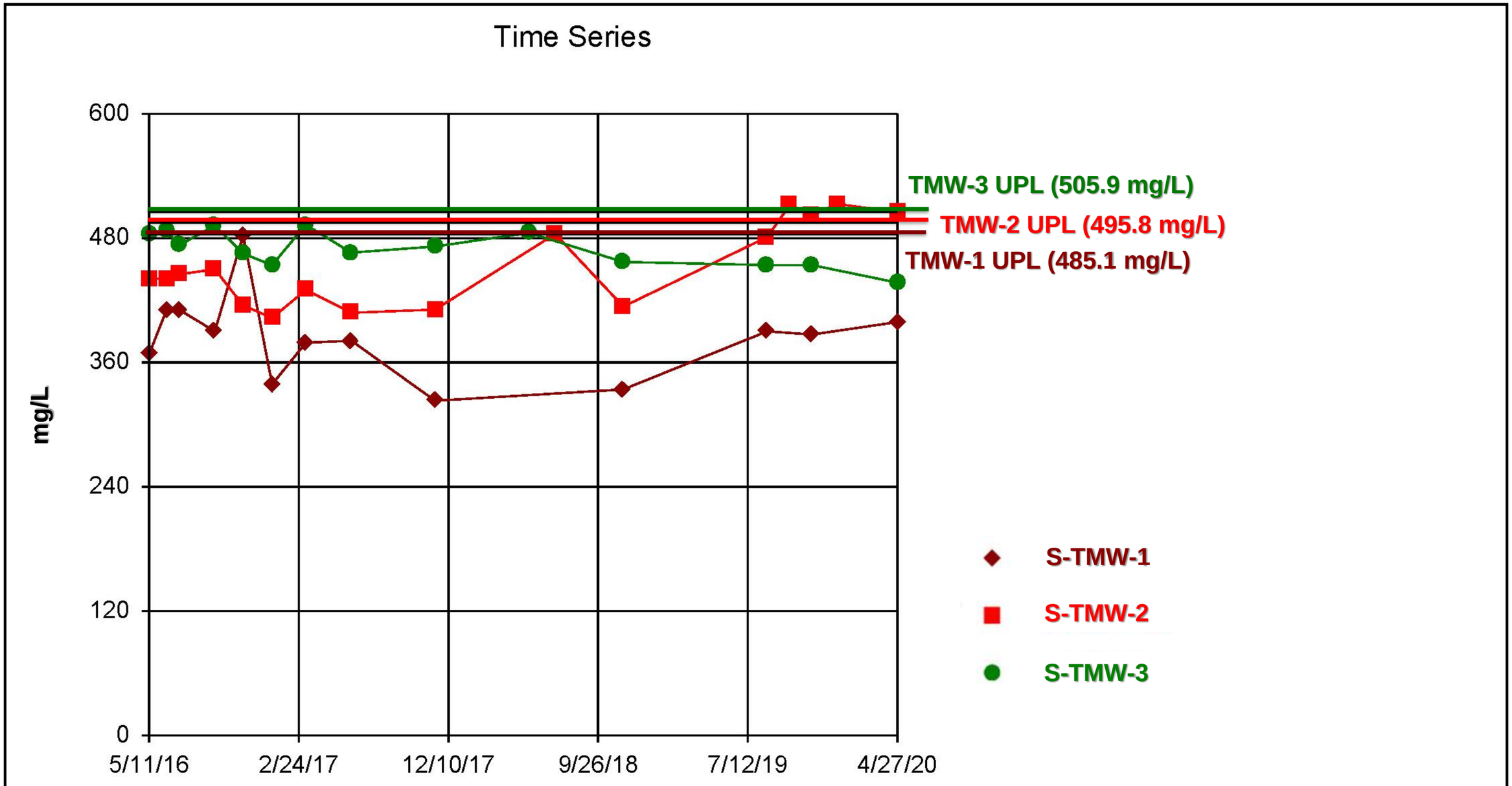
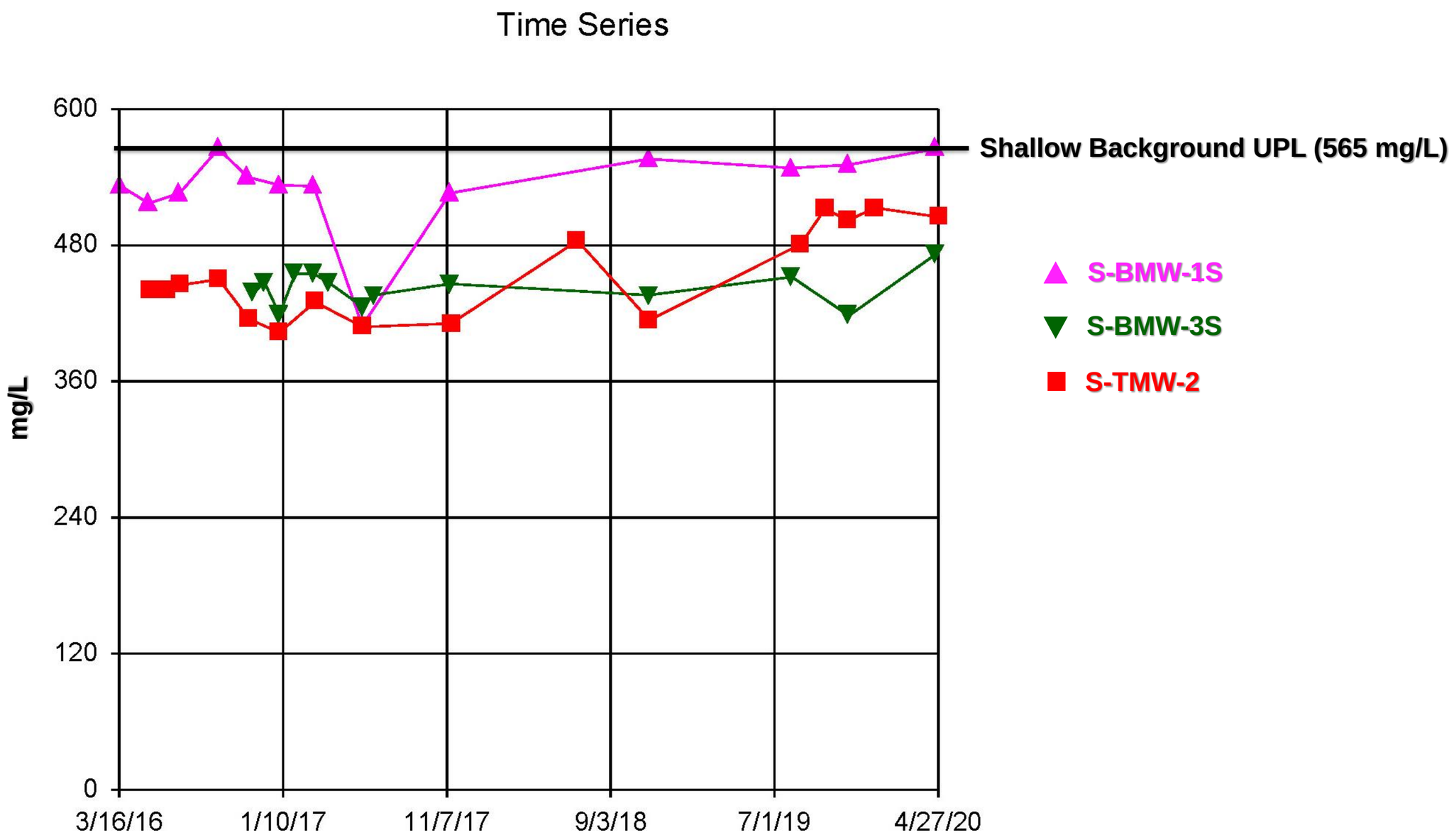


Notes
1) mg/L – milligrams per liter.
2) UPL – Upper Prediction Limit.

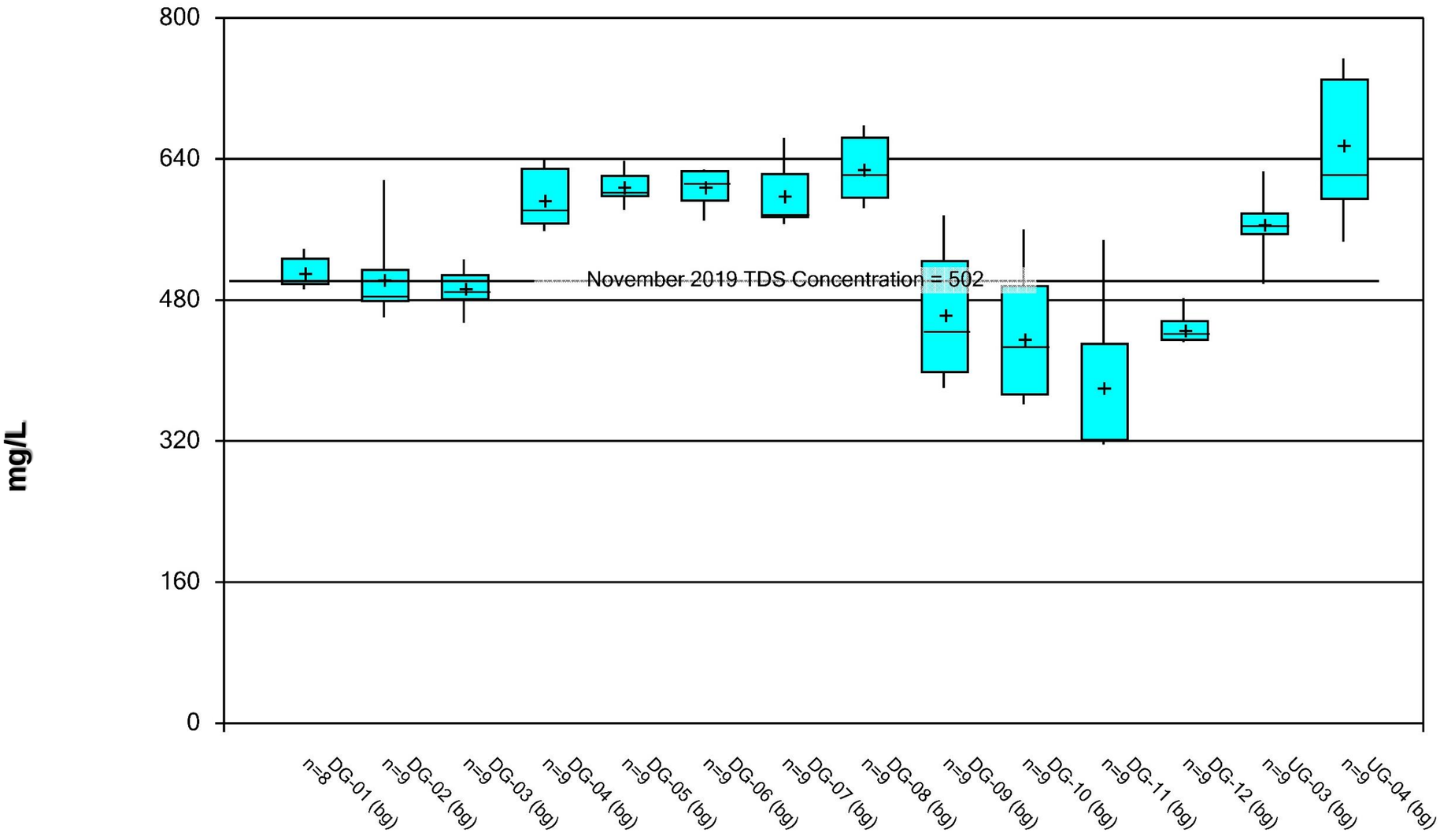
CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**						TITLE **Time Series Plot for Total Dissolved Solids South of the SCL4A**				
DRAWN JSI	CHECKED EMS	REVIEWED MNH	DATE 2020-05-22	SCALE N/A	FILE NO. N/A	JOB NO. 153140602.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **10**



Notes
1) mg/L – milligrams per liter.
2) UPL – Upper Prediction Limit.

CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**							TITLE **Time Series Plot for Total Dissolved Solids at TMW-2 and Background Locations**			
DRAWN JSI	CHECKED EMS	REVIEWED MNH	DATE 2020-05-22	SCALE N/A	FILE NO. N/A	JOB NO. 153140602.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **11**

Box & Whiskers Plot



1) mg/L – milligrams per liter.
2) CCR – Coal Combustion Residuals.
3) Plot displays results prior to the operating permit of the Utility Waste Landfill (June 2010).

CLIENT/PROJECT **AMEREN MISSOURI SIOUX ENERGY CENTER**							TITLE **Pre-CCR Total Dissolved Solids Plots– Utility Waste Landfill**			
DRAWN JSI	CHECKED EMS	REVIEWED MNH	DATE 2020-05-29	SCALE N/A	FILE NO. N/A	JOB NO. 153140602.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **12**

golder.com

APPENDIX C

Alternative Source Demonstration – April 2020 Sampling Event

REPORT

SCL4A - Alternative Source Demonstration

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

Submitted to:

Ameren Missouri

1901 Chouteau Avenue, St. Louis, MO 63103

Submitted by:

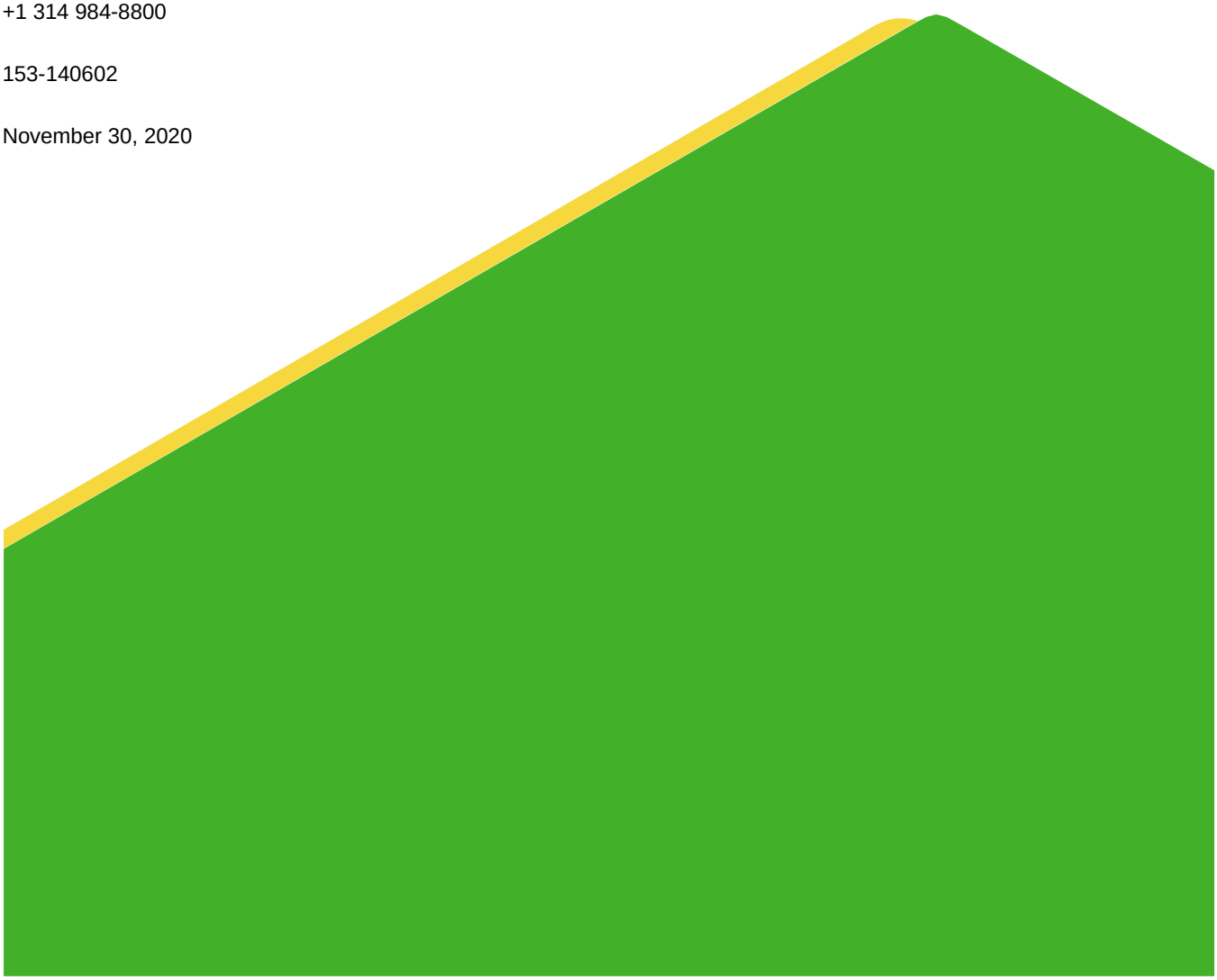
Golder Associates Inc.

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

+1 314 984-8800

153-140602

November 30, 2020



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Figures

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Figure 2 – UG-3 Fluoride Time Series Plot

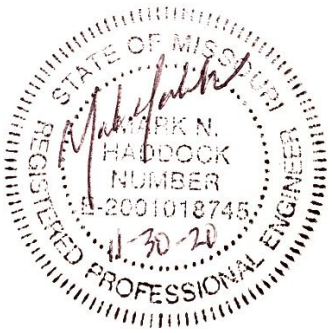
Figure 3 – UG-3 Fluoride Time Series Plot and Pre-CCR Placement UPL

1.0 CERTIFICATION STATEMENT

This *SCL4A – 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 *SCL4A – 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 SCL4A – Alternative Source Demonstration has been prepared to document an Alternative Source Demonstration (ASD) for Statistically Significant Increases (SSIs) identified for Ameren Missouri's (Ameren) Sioux Energy Center (SEC), Utility Waste Landfill (UWL) Cell 4A - SCL4A. 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 the SSIs and that the apparent SSIs were 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 the SCL4A. 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; to the south by a railroad; and to the east and west by agricultural fields.

3.1 Geological and Hydrogeological Setting

Hydrogeologically, the SCL4A 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 unconformably 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 4A – SCL4A

UWL Cell 4A is referred to by Ameren as the SCL4A, or "Landfill Cell 4A." The SCL4A is approximately 15 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 including "fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste generated primarily from the combustion of coal or other fossil fuels" (Gredell and Reitz & Jens, 2014). These wastes are managed using a dry disposal process and are moisture conditioned (30-40% moisture content) to minimize dust and facilitate disposal. The CCR waste is trucked across Highway 94 from the plant and disposed in the SCL4A.

The SCL4A 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 a 60-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 seasonal low elevation for groundwater. Quarterly groundwater samples have been collected in these monitoring wells since June 2008 for the analysis of state required UWL parameters.

The permit for the Sioux UWL was issued July 30, 2010 (permit #0918301) for the SCPC (Cell 1). Nine (9) sampling events were performed prior to July 30, 2010 and represent groundwater quality prior to CCR placement in the SCPC. The SCL4A was the second cell that was constructed at this UWL. The SCL4A construction was not completed until 2014 and no CCR was placed in the unit until after the final revisions to the Proposed Construction Permit Modification on August 16, 2014. 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) the required eight (8) baseline groundwater sampling events were completed for all Appendix III and Appendix IV parameters of the CCR Rule.

The groundwater monitoring system for the SCL4A consists of six (6) monitoring wells screened in the uppermost aquifer (alluvial aquifer) as shown on **Figure 1**. One (1) existing monitoring well (UG-3) was installed by Gredell Engineering Resources, Inc., in December 2007 as a part of the state UWL monitoring program. The remaining monitoring wells (TMW-1, TMW-2, TMW-3, BMW-1S, and BMW-3S) were installed by Golder in 2015 and 2016 for CCR Rule groundwater monitoring purposes. More information on the design and installation of the monitoring wells is provided in the SCL4A GMP and the SCL4A 2017 Annual Report.

Between May 2016 and June 2017, eight (8) baseline sampling events were completed for the SCL4A. After baseline sampling, the first Detection Monitoring event was completed in and Detection Monitoring has continued on a semi-annual basis thereafter. Laboratory testing was performed for the following Appendix III constituents 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 Detection Monitoring were higher than the calculated UPL, it was considered an initial exceedance, in which case a verification sample was then collected and tested in accordance with the SCL4A Statistical Analysis Plan. The following provide a summary of the detection monitoring results to date:

- In November 2017, there were no initial exceedances.
- In May 2018, three (3) initial exceedances were identified including chloride at UG-3; as well as sulfate and TDS at TMW-2. Verification sampling results confirmed all three (3) SSIs. All three (3) SSIs were determined to be from an alternate source and the ASD for the May 2018 sampling event can be found in the 2018 Annual Report for the SCL4A.
- In November 2018, one (1) initial exceedance was identified, sulfate at TMW-2. Verification sampling did not confirm the initial exceedance and no SSIs were identified for the November 2018 event.
- In May 2019, six (6) initial exceedances were identified including boron, calcium, chloride, and TDS at UG-3; as well as sulfate and TDS at TMW-2. Verification sampling results confirmed all six (6) SSIs. All six (6) SSIs were determined to be from an alternate source and the ASD for the May 2019 sampling event can be found in the 2019 Annual Report for the SCL4A.
- In November 2019, five (5) initial exceedances were identified including sulfate and TDS at UG-3; as well as chloride, sulfate, and TDS at TMW-2. Only the initial three (3) exceedances at TMW-2 were verified in the subsequent verification sampling event. All three (3) SSIs were determined to be from an alternative source, as described in the ASD for the November 2019 sampling event, dated June 5, 2020.
- In April 2020, three (3) initial exceedances were identified including fluoride at UG-3; as well as sulfate and TDS at TMW-2. Only fluoride at UG-3 was confirmed by verification sampling.

4.0 REVIEW OF THE STATISTICALLY SIGNIFICANT INCREASE

The SSI for fluoride occurred at monitoring well UG-3. UG-3 is screened in the upper portion of the alluvial aquifer just below the average seasonal low for groundwater. As shown in **Figure 1**, UG-3 is located north of the SCL4A, and south of Highway 94, the generating plant, as well as 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), as well as 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 SCL4A contained low-level pre-existing impacts from CCR that pre-dated SCL4A operation. As a result of these pre-existing impacts, the SCL4A statistical analysis plan uses intrawell upper prediction limits (UPL) 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.

The intrawell UPL for fluoride at UG-3 was 0.3771 milligrams per liter (mg/L) based on the results from the initial 8 baseline sampling events that ranged from 0.28 to 0.35 mg/L, as summarized in **Table 1** and **Figure 2**. The results from this small dataset where normally distributed, and a calculated UPL was used. In August 2019, the baseline data set was expanded to include the next four (4) sampling events, and the UPL changed from 0.3771 to 0.3772 mg/L. During the April 2020 detection monitoring event, a concentration of 0.39 mg/L was reported for

fluoride in UG-3, which was confirmed in June by a verification result of 0.38 mg/L. These values represent an SSI, but it is important to note they are very low (within 0.013 mg/L of the UPLs) and close to the laboratory PQL.

Table 1: Review of Statistically Significant Increase

Constituent	Well ID	UPL Based on Baseline Events	August 2019 Updated UPL	Baseline Sampling Event Range	State UWL Program Sampling Events Range	April 2020 Results	June 2020 Results
Fluoride (mg/L)	UG-3	0.3771	0.3772	0.28-0.35	0.24-0.39	0.39	0.38

Notes:

1) mg/L – milligrams per liter.
2) UPL – upper prediction limit.
3) UPLs calculated using Sanitas^{tm} software.
4) UWL – Utility Waster Landfill.

5.0 EVIDENCE OF SSI FROM ALTERNATIVE SOURCE

Several different lines of evidence indicate that the SSIs at the SCL4A are not caused by a release from the SCL4A, 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 SCL4A operation, especially on the northern side of the SCL4A.
- Review of historical and current fluoride concentrations at UG-3.
- Documentation of the construction of the SCL4A with a 60-mil geomembrane liner and a 2-foot thick clay barrier.

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.

As described above, the SCL4A has historically received fly ash. FGD type wastes at the SEC are managed at the SCPC, located to the west of the SCL4A.

5.1.1 Fluoride Concentrations

As indicated in the table above in Section 5.1, fluoride can be an indicator of CCR impacts for fly ash and bottom ash wastes, because fluoride is mobile in most hydrogeologic environments. However, fluoride is not always present at high concentrations within all CCR wastes. At the Sioux Energy Center, fluoride has been analyzed in the pore-water of both the SCPA and the SCPB. The results of the pore-water testing show that fluoride ranges from 0.22 – 2.9 mg/L in the SCPA and from 1.1 to 2.8 mg/L in the SCPB.

As shown on Figure 3, current fluoride concentrations in monitoring well UG-3 are similar to those reported prior to the operation of the SCL4A. Historical data indicate that fluoride concentrations in well UG-3 ranged from 0.26 – 0.38 mg/L prior to the placement of CCR in the SCL4A and have ranged from 0.24 – 0.39 mg/L since that time. Based on the similarity of variation prior to and after the receipt of CCR materials, as well as the observations reported below, the variability in fluoride concentrations over time is not a result of impacts from the SCL4A, but rather the result of geochemical variability of pre-existing impacts in the alluvial aquifer.

Using only the fluoride results from well UG-3 prior to placement of CCR waste (6/27/2008 – 8/13/2014), a UPL of 0.4063 mg/L is calculated. This value is approximately 0.03 mg/L higher than the UPL calculated for the CCR rule

(see **Table 1**) and 0.01 mg/L higher than the result reported for the April 2020 sampling event (**Figure 3**). Therefore, the prediction limit calculated for fluoride for the CCR Rule was biased low because the results reported during the initial 8 baseline and subsequent CCR Rule sampling rounds were low relative to historical results in this well. If the historical data prior to the placement of CCR are used to calculate the UPL, no SSI would be triggered for fluoride at UG-3.

In addition, the verification sample collected in June 2020 was less than 0.003 mg/L above the baseline UPL of 0.3772 mg/L and 0.0263 mg/L below the UPL calculated using pre-CCR values. This further demonstrates that the concentrations reported for well UG-3 are not an SSI, but rather are due to variability or pre-existing impacts within the alluvial aquifer and/or a result of the statistical method used. In addition, the SSI for fluoride in well UG-3 is a result of variability of testing results near the PQL, which can result in laboratory testing inaccuracy and variability, leading to variability in results.

6.0 DEMONSTRATION THAT SSI WAS NOT CAUSED BY SCL4A IMPACT

Based on the information presented in Section 5 above, the SSI at well UG-3 was not a result of influence from the SCL4A. Instead, the SSI for fluoride in well UG-3 appears to be caused by several factors, but primarily by pre-existing low concentrations of CCR indicators that pre-date the SCL4A, as well as a relatively low calculated UPL resulting from a small dataset that does not reflect the full natural variability of fluoride within the alluvial aquifer. Because only 12 samples were collected prior to updating the UPL, these 12 sampling events do not capture the full extent of the natural spatial and temporal variability in the alluvial aquifer (especially for those results near the laboratory PQL). When results are compared to historical data from the state sampling program, it is apparent that there are no impacts from the SCL4A.

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 at each compliance well around the SCL4A. 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. This value was updated with four more results in August 2019; however, despite the addition to the background, the full extent of the natural spatial and temporal variability is not reflected by the current background data set. Using 25 historical sampling results from the period prior to CCR placement in the SCL4A results in a higher UPL. The recent fluoride results at well UG-3 are in compliance with the higher UPL. In addition, inaccuracy of laboratory testing at low levels near the PQL can produce results higher than the UPL when the baseline dataset is small. Finally, the construction of the SCL4A, which includes a 2-foot compacted clay overlain by a 60-mil HDPE liner, also limits the likelihood that the SSI for fluoride in well UG-3 is a result of groundwater influence from SCL4A.

In summary, there are no indications to support migration of CCR contaminants from the SCL4A. Instead, the data indicate that the cause for the SSIs is due to geochemical variability in the alluvial aquifer, pre-existing CCR impacts from the SCPA, limited data available for the calculation of the UPL, and laboratory variability around the PQL.

7.0 REFERENCES

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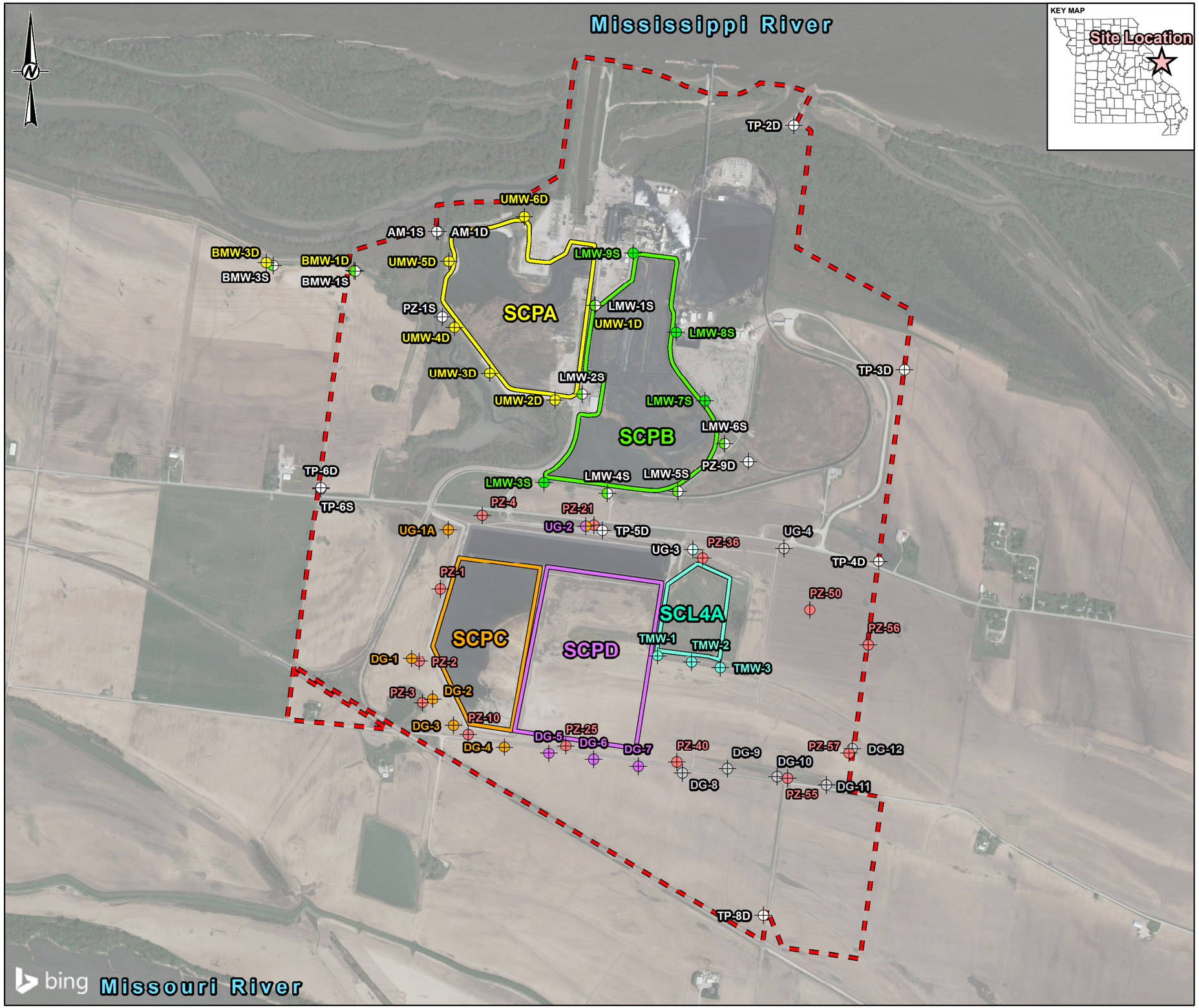
Figures



KEY MAP

LEGEND

- Sioux Energy Center Property Boundary
- SCPA - Bottom Ash Surface Impoundment
- SCPB - Fly Ash Surface Impoundment
- SCPC - Active WFGD Disposal Area
- SCL4A - Active Dry CCR Disposal Area
- SCPD - Proposed WFGD Disposal Area

Monitoring Well Networks

- Corrective Action Monitoring Well
- SCPA Detection and Assessment Monitoring Well
- SCPB Detection Monitoring and Corrective Action Monitoring Well
- SCPB Detection Monitoring Well
- SCPC Detection Monitoring and State UWL Monitoring Well
- Proposed SCPD and SCPC Detection Monitoring and State UWL Monitoring Well
- Proposed SCPD Detection Monitoring and State UWL Monitoring Well
- SCL4A Detection Monitoring, Corrective Action Monitoring, and State UWL Monitoring Well
- SCL4A Detection Monitoring and State UWL Monitoring Well
- 2006 Detailed Site Investigation Piezometer and Sample Locations
- Existing UWL Monitoring Well Not Currently Used for CCR Monitoring

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.
4.) CCR - COAL COMBUSTION RESIDUALS.
5.) UWL BOUNDARIES, DESIGNATIONS AND EXISTING MONITORING WELL LOCATIONS BASED ON DRAWINGS IN THE UWL PROPOSED LANDFILL PERMIT (#0918301).

REFERENCE(S)

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.

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
SITE MONITORING WELL LOCATION AND AERIAL MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2020-05-20
DESIGNED	JSI
PREPARED	JSI
REVIEWED	EMS
APPROVED	MNH

PROJECT NO.	CONTROL	REV.	FIGURE
153140602	1240	1	1

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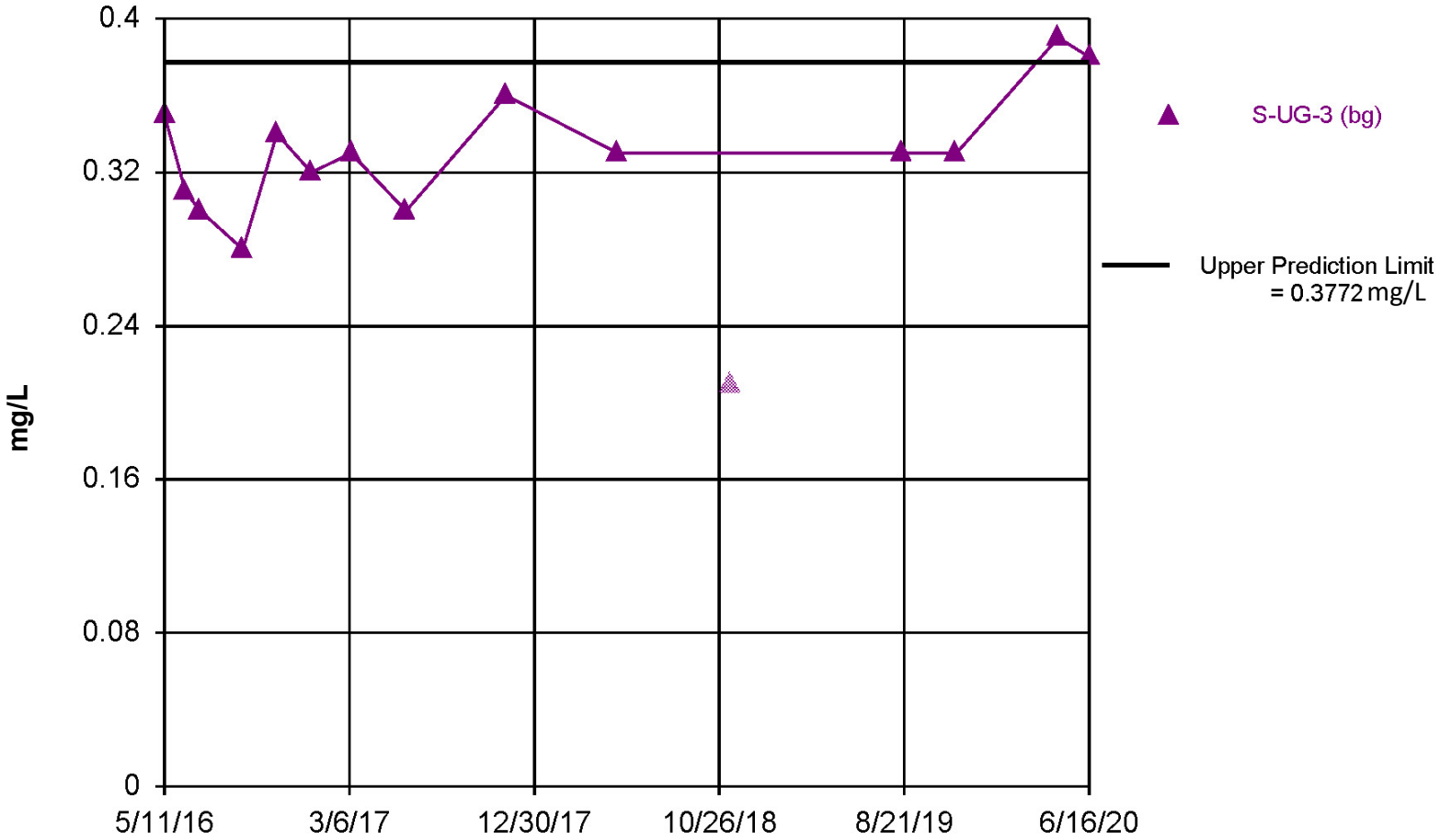


Notes
1) mg/L – Milligrams per liter.
2) Points not connect to the line are considered outliers as specified in the Statistical Analysis Plan for the SCL4A.

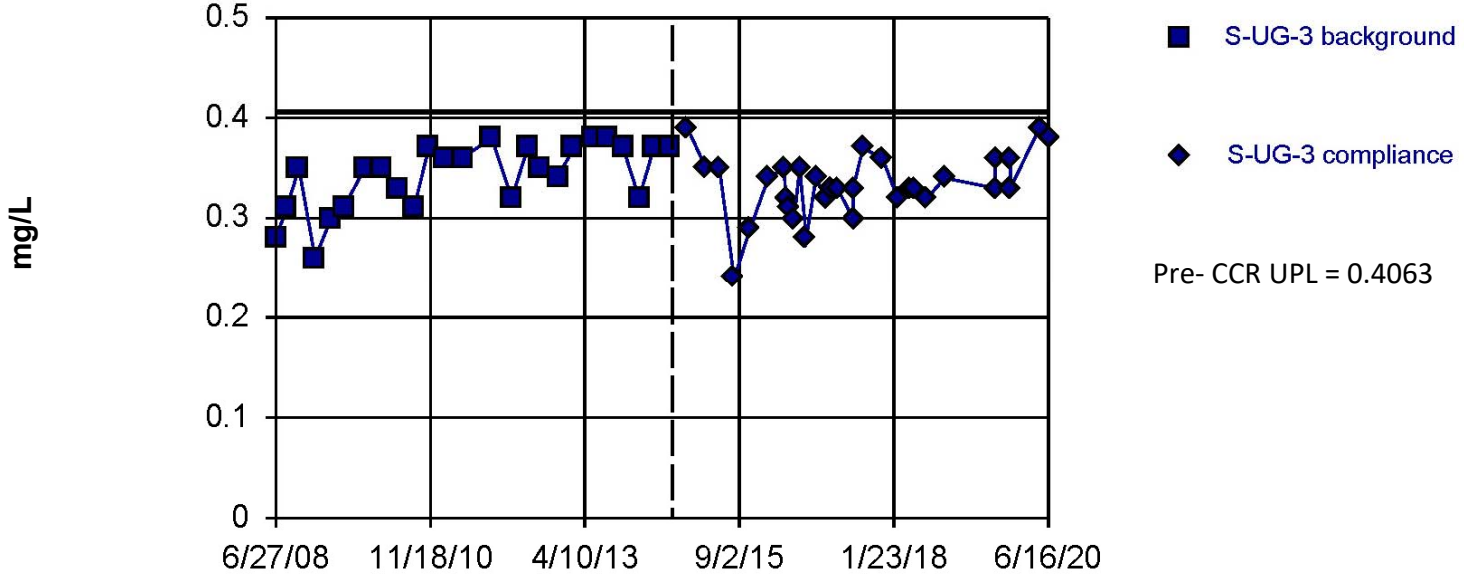
CLIENT/PROJECT							TITLE		
AMEREN MISSOURI **SIOUX ENERGY CENTER**				GOLDER			**UG-3 CCR Rule Fluoride Time Series Plot**		
DRAWN EMS	CHECKED JSI	REVIEWED MNH	DATE 2020-11-02	SCALE N/A	FILE NO. N/A	JOB NO. 153140602.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **2**

Within Limit

Prediction Limit

Intrawell Parametric

Construction Permit Modification – August 16, 2014



Background Data Summary: Mean=0.3424, Std. Dev.=0.0332, n=25. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.897, critical = 0.888. Kappa = 1.924 (c=7, w=4, 1 of 2, event alpha = 0.05132). Report alpha = 0.00188.

Notes
1) mg/L – Milligrams per liter.
2) Prediction limit calculated using Sanitas[tm] software with data collect prior to August 16, 2014.

CLIENT/PROJECT							TITLE		
AMEREN MISSOURI **SIOUX ENERGY CENTER**				GOLDER			**UG-3 Fluoride Time Series Plot and Pre-CCR Placement UPL**		
DRAWN EMS	CHECKED JSI	REVIEWED MNH	DATE 2020-11-02	SCALE N/A	FILE NO. N/A	JOB NO. 153140602.0003	DWG NO. N/A	SUBTITLE N/A	REV. NO. N/A	FIGURE **3**

APPENDIX D

2020 Potentiometric Surface Maps

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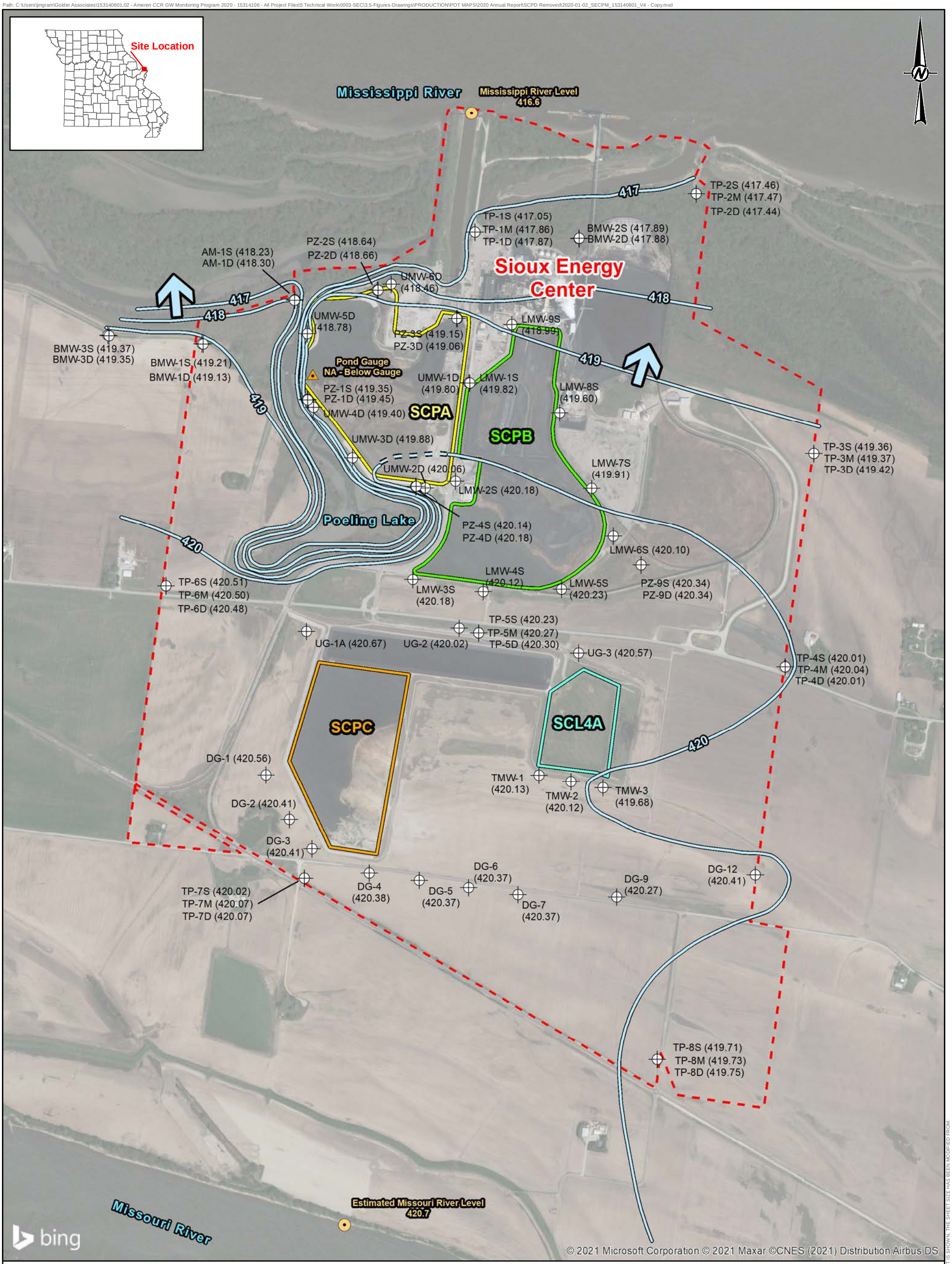

LEGEND

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment
- SCPB - Fly Ash Surface Impoundment
- SCPC - WFGD Surface Impoundmet
- SCL4A - Dry CCR Disposal Area
- Groundwater Flow Direction

Groundwater Elevation Contour (FT MSL)

- Groundwater Elevation Contour (FT MSL)
- Inferred Groundwater Elevation Contour (FT MSL)

Ground/Surface Water Measurement Locations

- SCPA Bottom Ash Surface Impoundment 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.

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 02, 2020 POTENTIOMETRIC SURFACE MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2020-02-10
PREPARED	BTT
DESIGN	JSI
REVIEW	EMS
APPROVED	MNH

PROJECT No. 153-140602
PHASE 0003
FIGURE **D1**

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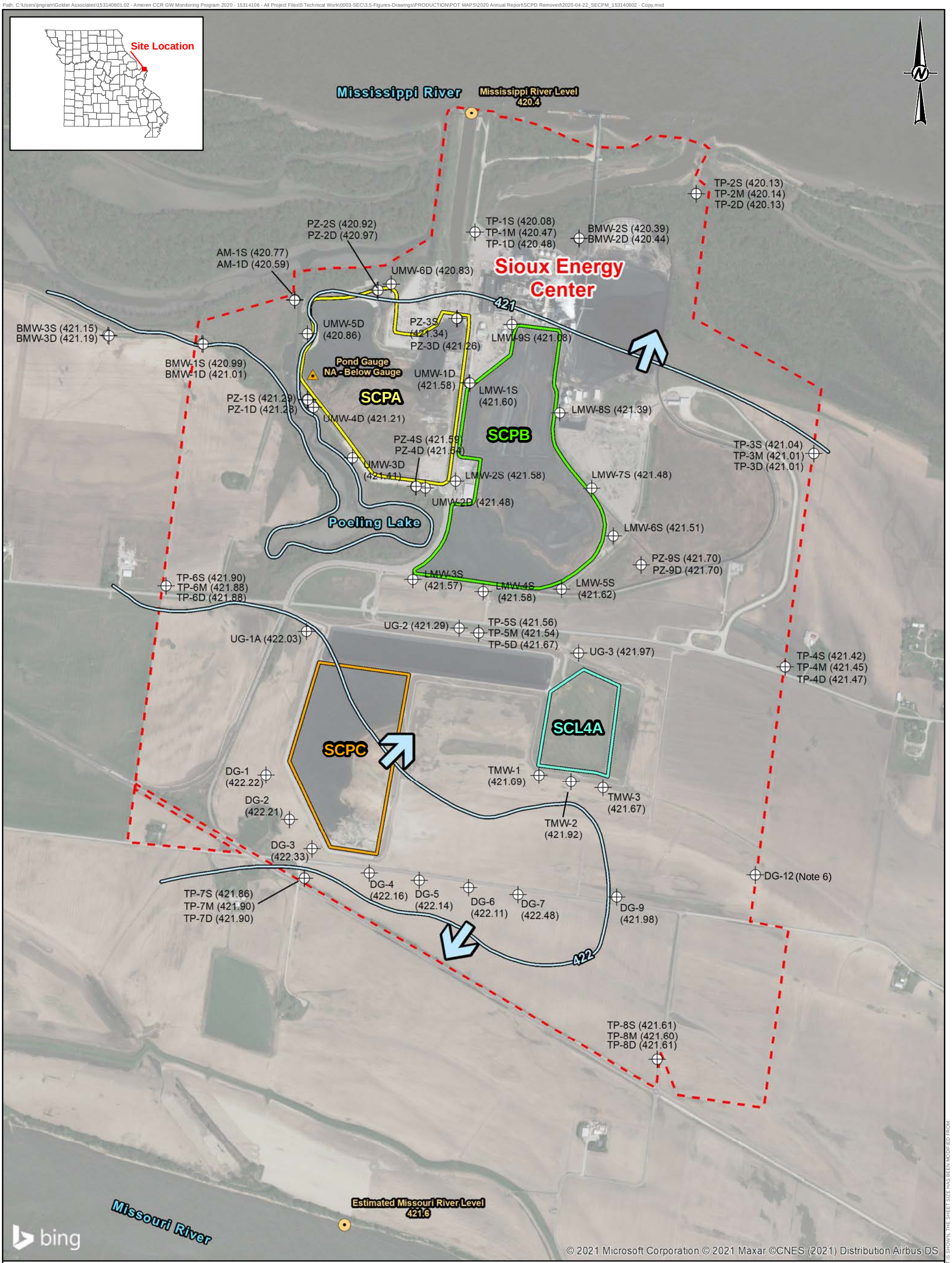

LEGEND

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment
- SCPB - Fly Ash Surface Impoundment
- SCPC - WFGD Surface Impoundmet
- SCL4A - Dry CCR Disposal Area
- Groundwater Flow Direction

Groundwater Elevation Contour (FT MSL)

- Groundwater Elevation Contour (FT MSL)
- Inferred Groundwater Elevation Contour (FT MSL)

Ground/Surface Water Measurement Locations

- SCPA Bottom Ash Surface Impoundment 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-12 WAS NOT USED FOR POTENTIOMETRIC SURFACE MAP CONTOURING DUE TO WATER LEVEL MEASUREMENT ERROR.

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
APRIL 22, 2020 POTENTIOMETRIC SURFACE MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2020-05-14
PREPARED	BTT
DESIGN	JSI
REVIEW	KAB
APPROVED	MNH

PROJECT No. 153-140602
PHASE 0003
FIGURE **D2**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 1 in 0

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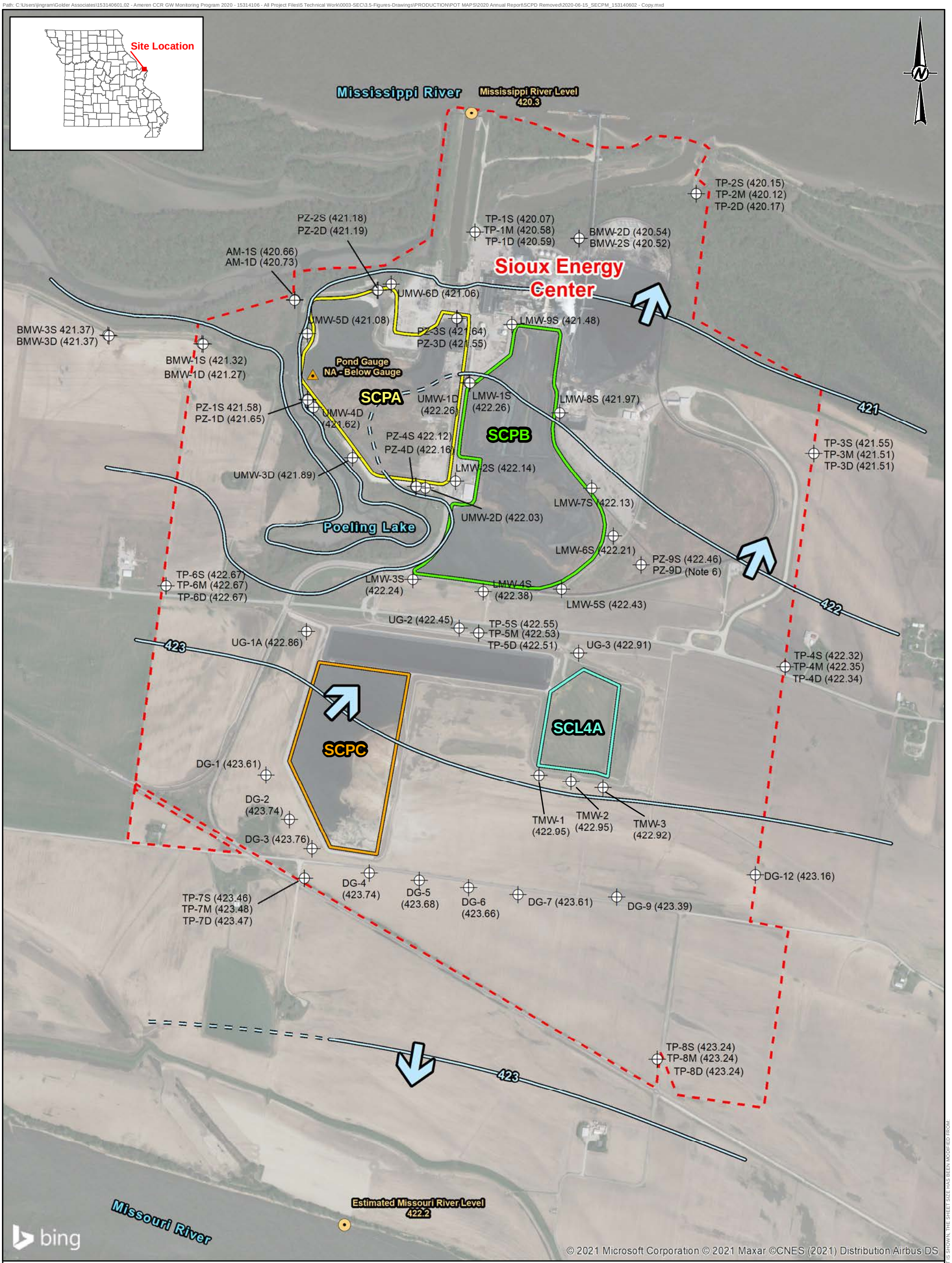

LEGEND

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment
- SCPB - Fly Ash Surface Impoundment
- SCPC - WFGD Surface Impoundmet
- SCL4A - Dry CCR Disposal Area
- Groundwater Flow Direction

Groundwater Elevation Contour (FT MSL)

- Groundwater Elevation Contour (FT MSL)
- Inferred Groundwater Elevation Contour (FT MSL)

Ground/Surface Water Measurement Locations

- SCPA Bottom Ash Surface Impoundment 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.) PZ-9D WAS NOT USED FOR POTENTIOMETRIC SURFACE MAP CONTOURING DUE TO WATER LEVEL MEASUREMENT ERROR.

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
JUNE 15, 2020 POTENTIOMETRIC SURFACE MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2020-06-24
PREPARED	BTT
DESIGN	JSI
REVIEW	EMS
APPROVED	MNH

PROJECT No. 153-140602
PHASE 0003
FIGURE **D3**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 1 in 0

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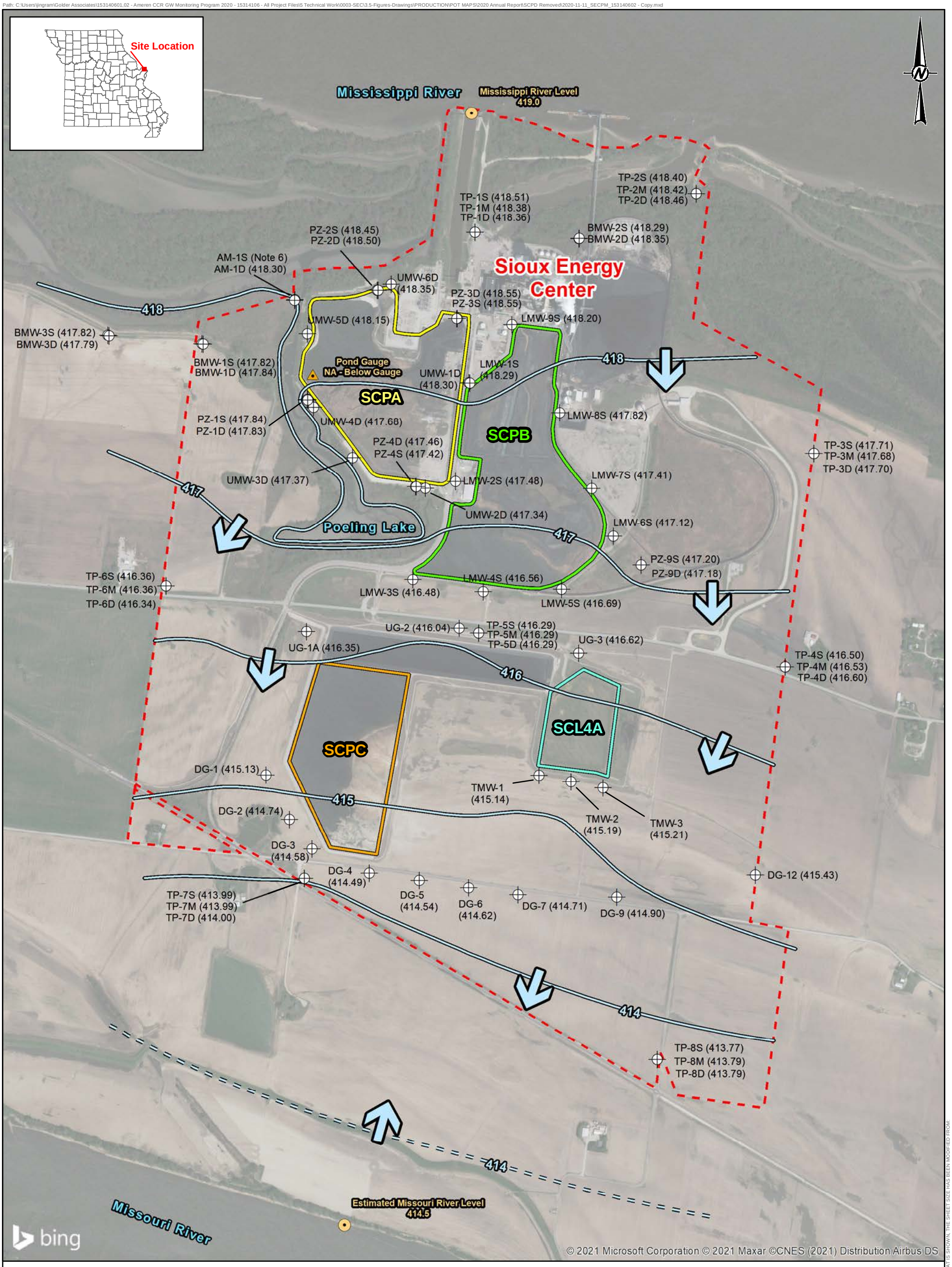

LEGEND

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment
- SCPB - Fly Ash Surface Impoundment
- SCPC - WFGD Surface Impoundmet
- SCL4A - Dry CCR Disposal Area
- Groundwater Flow Direction

Groundwater Elevation Contour (FT MSL)

- Groundwater Elevation Contour (FT MSL)
- Inferred Groundwater Elevation Contour (FT MSL)

Ground/Surface Water Measurement Locations

- SCPA Bottom Ash Surface Impoundment 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.) AM-1S WAS NOT USED IN POTENTIOMETRIC SURFACE CONTOURING DUE TO WATER LEVEL MEASUREMENT ERROR.

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 11, 2020 POTENTIOMETRIC SURFACE MAP

CONSULTANT
GOLDER

YYYY-MM-DD	2020-11-25
PREPARED	BTT
DESIGN	JSI
REVIEW	BTT
APPROVED	MNH

PROJECT No. 153-140602
PHASE 0003
FIGURE **D4**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 1 in 0

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