REPORT

2023 Annual Groundwater Monitoring and Corrective Action Report

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

January 31, 2024

Project Number: 23009

Submitted to:

Ameren Missouri
1901 Chouteau Avenue
St. Louis, Missouri 63103

Submitted by:

Rocksmith Geoengineering, LLC
2320 Creve Coeur Mill Rd
Maryland Heights, MO 63043

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, 2023 through December 31, 2023 including verification results related to late 2022 sampling.

Throughout 2023, 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 2023, an SSI was determined for the October 2022 and May 2023 sampling events and a summary of the SSIs for the past year is provided in **Table 1**.

Table 1 - Summary of 2023 SCL4A Sampling Events, Previous Year Verification, and Statistical Evaluations

Event Name	Type of Event and Sampling Dates	Laboratory Analytical Data Receipt	Parameters Collected	Verified SSIs	SSI Determination Date	ASD Completion Date
October 2022 Sampling Event	Detection Monitoring, October 18-21, 2022	November 22, 2022	Appendix III, Major Cations and Anions	**Sulfate:** TMW-1	February 20, 2023	May 19, 2023
	Verification Sampling, January 3, 2023	January 18, 2023	Detected Appendix III parameters (See Note 1)			
May 2023 Sampling Event	Detection Monitoring, May 2-4, 2023	June 21, 2023	Appendix III, Major Cations and Anions	**Sulfate:** TMW-1	September 19, 2023	December 18, 2023
	Verification Sampling, July 11, 2023	July 24, 2023	Detected Appendix III parameters (See Note 1)			
November 2023 Sampling Event	Detection Monitoring, November 10-13, 2023	December 27, 2023	Appendix III, Major Cations and Anions	To be determined after statistical analysis and Verification Sampling are completed in 2024.		

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.

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.

No new wells were installed or decommissioned in the SCL4A monitoring system in 2023. However, one well modification was conducted. As part of construction activities for the nearby SCPD surface impoundment, the surface grade surrounding well TMW-1 was raised. The well casing at TMW-1 was lengthened and a new surface completion was constructed to accommodate the change in surface grade.

Table of Contents

TABLES

FIGURES

APPENDICES

1.0 INSTALLATION OR DECOMISSIONING 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 groundwater monitoring wells screened in the uppermost aquifer and is displayed in **Figure 1** and wells are listed on **Table 2** below. No new monitoring wells were installed or decommissioned in 2022 as a part of the CCR Rule monitoring program for the SCL4A. However, one well modification was conducted. As part of construction activities for the nearby SCPD surface impoundment, the surface grade surrounding well TMW-1 was raised. The well casing at TMW-1 was lengthened and a new surface completion was constructed to accommodate the change in surface grade. For more information on the groundwater monitoring network, details are provided in the previous Annual Groundwater Monitoring Reports for the SCL4A.

2.0 GROUNDWATER SAMPLING RESULTS AND DISCUSSION

The following sections discuss the sampling events completed for the SCL4A CCR Unit in 2023. **Table 2** below provides a summary of the groundwater samples collected in 2023 including the number of samples, the date of sample collection, and the monitoring program for which the samples were collected.

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 2023 Verification Sampling	-	-	-	1/3/2023	-	1/3/2023	Detection
May 2023 Sampling Event	5/2/2023	5/2/2023	5/4/2023	5/4/2023	5/4/2023	5/4/2023	Detection
July 2023 Verification Sampling	-	-	-	7/11/2023	-	7/11/2023	Detection
November 2023 Sampling Event	11/10/2023	11/10/2023	11/13/2023	11/13/2023	11/13/2023	11/13/2023	Detection
Total Number of Samples Collected	2	2	2	4	2	4	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.

2.1 Detection Monitoring Program

A Detection Monitoring sampling event was completed October 18-21, 2022. Verification sampling and the statistical analyses to evaluate for SSIs for the October 2022 event were not completed until 2023 and are included in this report. Detections above respective prediction limits for some Appendix III analytes triggered a verification sampling event, which was completed on January 3, 2023 and verified one SSI. **Table 3** summarizes

the results and statistical analyses of the October 2022 Detection Monitoring event. Laboratory analytical data from the January 2023 verification sampling event through the November 2023 sampling event are provided in **Appendix A**. Laboratory Analytical data for the October 2022 Detection Monitoring event are provided in the 2022 Groundwater Monitoring and Corrective Action Annual Report for the SCL4A.

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 this SSI and is provided in **Appendix B**. This ASD demonstrates that the SSI at monitoring well TMW-1 is not caused by the SCL4A CCR Unit, and therefore, the SCL4A CCR Unit remains in Detection Monitoring.

Detection Monitoring samples were collected May 2-4, 2023 and testing was completed for all Appendix III analytes, as well as major cations and anions. Detections above respective prediction limits for some Appendix III analytes triggered a verification sampling event, which was completed on July 11, 2023 and verified one SSI. **Table 4** summarizes the results and statistical analyses of the May 2023 Detection Monitoring event. Laboratory analytical data from this sampling event is included in **Appendix A**. The SSI at TMW-1 is not caused by the SCL4A CCR unit as demonstrated by the ASD provided in **Appendix C**.

A Detection Monitoring sampling event was completed November 10-13, 2023 and testing was completed for all Appendix III analytes, as well as major cations and anions. Statistical analyses to evaluate for SSIs in the November 2023 data were not completed in 2023 and the results will be provided in the 2024 Annual Report. **Table 5** summarizes the results of the November 2023 Detection Monitoring event and laboratory analytical data are provided in **Appendix A**.

2.2 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 included 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, which affect water levels, gradients and flow directions in these water bodies. Groundwater in the alluvial aquifer will generally flow from the higher of the two rivers toward the lower elevation river. 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 at the SEC were estimated for the alluvial aquifer wells using commercially available software to evaluate data since 2016. Results indicate that groundwater flow direction at the SEC is variable due to fluctuating river levels but has most often flowed from north to south. The overall net groundwater flow direction in the alluvial aquifer at the SEC was south-southeast in 2023 as a result of river levels in the Missouri and Mississippi Rivers. From 2016 through 2023, horizontal gradients have ranged from 0.00006 to 0.001 feet/foot with an estimated net annual groundwater movement of approximately four feet per year in the prevailing downgradient direction. Since July 2022, due to low Missouri River levels, there has been a more prevalent southward flow direction at a rate of approximately 35 feet per year.

2.3 Sampling Issues

On August 30, 2023 the casing at monitoring well TMW-1 was raised approximately 8 feet to accommodate a change in surface grade for construction of the nearby SCPD surface impoundment. A new surface completion for the well was also installed. The well can be sampled with the same positive displacement method used prior to the modification. The Missouri Department of Natural Resources (MDNR) Well Reconstruction Registration Report and an updated well construction diagram for TMW-1 is included in **Appendix E**.

No notable sampling issues were encountered at the SCL4A in 2023.

3.0 ACTIVITIES PLANNED FOR 2024

Detection Monitoring is scheduled to continue on a semi-annual basis in the second and fourth quarters of 2024. Statistical analysis of the November 2023 Detection Monitoring data will be completed in 2024 and will be included in the 2024 Annual Report.

Tables

Table 3
October 2022 Detection Monitoring Results
SCL4A - Landfill Cell 4A
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS							
		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
October 2022 Detection Monitoring Event											
DATE	NA	10/18/2022	10/18/2022	NA	10/21/2022	NA	10/20/2022	NA	10/20/2022	NA	10/20/2022
pH	SU	6.84	7.01	6.659-7.397	6.94	6.356-7.504	7.04	6.601-7.399	6.89	6.41-7.31	6.84
BORON, TOTAL	µg/L	73.0 J	84.2 J	1,200	302	DQR	ND	104.4	83.7 J	110.6	90.5 J
CALCIUM, TOTAL	µg/L	168,000	131,000	172,812	126,000	119,842	95,000	133,759	118,000	146,661	136,000
CHLORIDE, TOTAL	mg/L	9.2	11.7	85.54	39.5	4.199	2.7 J	4.641	3.3 J	3.1	2.6
FLUORIDE, TOTAL	mg/L	0.20 J	0.22	0.3954	ND	0.4537	0.42	0.4229	ND	0.3773	ND
SULFATE, TOTAL	mg/L	61.1	27.8	139.9	44.1	49.87	53.5	80.98	35.8	60.9	44.9
TOTAL DISSOLVED SOLIDS	mg/L	711	467	671.3	496	462.8	407	513	ND	505.4	838 J
January 2023 Verification Sampling Event											
DATE	NA						1/3/2023				1/3/2023
pH	SU										
BORON, TOTAL	µg/L										
CALCIUM, TOTAL	µg/L										
CHLORIDE, TOTAL	mg/L										
FLUORIDE, TOTAL	mg/L										
SULFATE, TOTAL	mg/L						52.1				
TOTAL DISSOLVED SOLIDS	mg/L										464

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.
9. ND - Constituent was analyzed but was not detected above the Method Detection Limit (MDL) or the adjusted Practical Quantitation Limit (PQL) based on data validation and is considered a non-detect. Values displayed as ND.

Prepared By: GTM
Checked By: JSI
Reviewed By: MNH

Table 4
May 2023 Detection Monitoring Results
SCL4A - Landfill Cell 4A
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS							
		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
May 2023 Detection Monitoring Event											
DATE	NA	5/2/2023	5/2/2023	NA	5/4/2023	NA	5/4/2023	NA	5/4/2023	NA	5/4/2023
pH	SU	6.80	6.95	6.659-7.397	7.09	6.356-7.504	7.16	6.601-7.399	7.05	6.41-7.31	7.03
BORON, TOTAL	µg/L	64.8 J	67.1 J	1,200	258	DQR	76.9 J	104.4	84.9 J	110.6	89.1 J
CALCIUM, TOTAL	µg/L	184,000	137,000	172,812	119,000	119,842	106,000	133,759	123,000	146,661	128,000
CHLORIDE, TOTAL	mg/L	13.1	12.6	85.54	41.9	4.199	4.6	4.641	3.1	3.1	3.6
FLUORIDE, TOTAL	mg/L	ND	ND	0.3954	ND	0.4537	0.33	0.4229	0.27	0.3773	ND
SULFATE, TOTAL	mg/L	37.7	32.4	139.9	48.0	49.87	56.6	80.98	32.8	60.9	40.9
TOTAL DISSOLVED SOLIDS	mg/L	610	495	671.3	522	462.8	411 J	513	451	505.4	319
July 2023 Verification Sampling Event											
DATE	NA						7/11/2023				7/11/2023
pH	SU										
BORON, TOTAL	µg/L										
CALCIUM, TOTAL	µg/L										
CHLORIDE, TOTAL	mg/L						3.1				3.1
FLUORIDE, TOTAL	mg/L										
SULFATE, TOTAL	mg/L						57.7				
TOTAL DISSOLVED SOLIDS	mg/L										

NOTES:
1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. 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.
9. ND - Constituent was analyzed but was not detected above the Method Detection Limit (MDL) or the adjusted Practical Quantitation Limit (PQL) based on data validation and is considered a non-detect. Values displayed as ND.

Prepared By: GTM
Checked By: JSI
Reviewed By: MNH

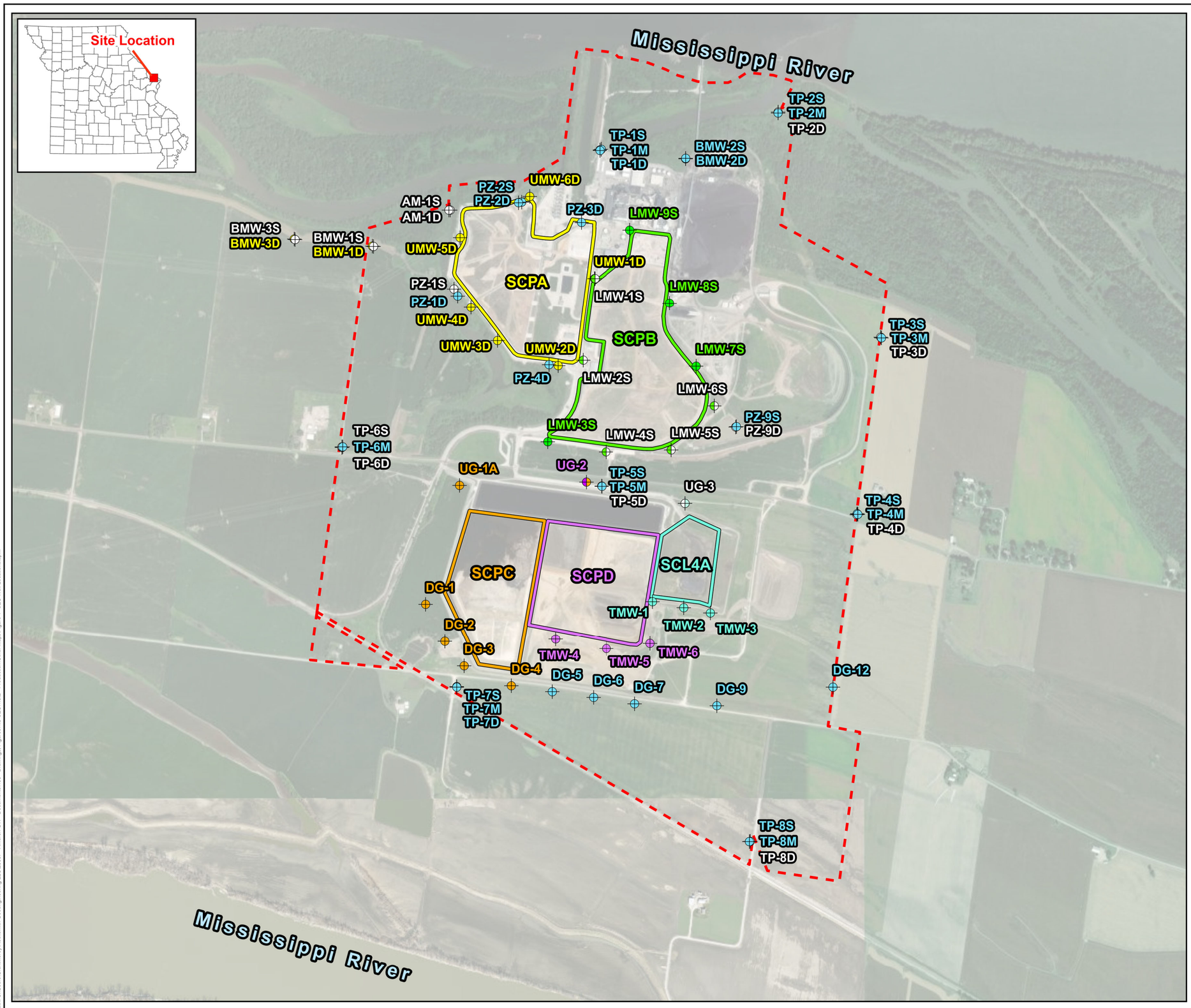
Table 5
November 2023 Detection Monitoring Results
SCL4A - Landfill Cell 4A
Sioux Energy Center, St. Charles County, MO

		BACKGROUND		GROUNDWATER MONITORING WELLS			
ANALYTE	UNITS	BMW-1S	BMW-3S	UG-3	TMW-1	TMW-2	TMW-3
November 2023 Detection Monitoring Event							
DATE	NA	11/10/2023	11/10/2023	11/13/2023	11/13/2023	11/13/2023	11/13/2023
pH	SU	7.04	7.14	7.04	7.11	6.96	7.01
BORON, TOTAL	µg/L	57.9 J	58.9 J	638	80.2 J	85.9 J	96.1 J
CALCIUM, TOTAL	µg/L	136,000	114,000	107,000	107,000	123,000	134,000
CHLORIDE, TOTAL	mg/L	7.2	13.4	34.5 J	2.3	5.8	5.1
FLUORIDE, TOTAL	mg/L	ND	ND	ND	ND	ND	ND
SULFATE, TOTAL	mg/L	46.9	12.3	65.0 J	54.8	28.8	40.9
TOTAL DISSOLVED SOLIDS	mg/L	475	398	504	368	430	475

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. ND - Constituent was analyzed but was not detected above the Method Detection Limit (MDL) or the adjusted Practical Quantitation Limit (PQL) based on data validation and is considered a non-detect. Values displayed as ND.

Prepared By: GTM
Checked By: JSI
Reviewed By: MNH

Figures



TITLE

SIOUX ENERGY CENTER GROUNDWATER MONITORING PROGRAMS AND SAMPLE LOCATION MAP

Legend

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment (Closed)
- SCPB - Fly Ash Surface Impoundment (Closed)

Utility Waste Landfill Cells

- SCL4A - Dry CCR Disposal Area
- SCPC - Inactive FGD Surface Impoundment (Closure in Progress)
- SCPD - FGD Surface Impoundment

Monitoring Well Networks

- Corrective Action Monitoring Well
- SCPA Detection and Assessment Monitoring Well
- SCPB and Corrective Action Monitoring Well
- SCPB Detection Monitoring Well
- SCPC Detection Monitoring Well
- SCPD and SCPC Detection Monitoring Well
- SCPD Detection Monitoring Well
- SCL4A and Corrective Action Monitoring Well
- SCL4A Detection Monitoring Well
- Monitoring Well Used for Water Level Elevation Measurements Only

NOTES

1. All boundaries and locations are approximate.
2. FGD - Flue Gas Desulfurization.
3. CCR - Coal Combustion Residuals.

REFERENCES

1. Ameren Missouri Sioux Energy Center, Sioux Property Control Map, February 2011.

0 500 1,000 2,000 3,000 Feet

PROJECT
CCR RULE GROUNDWATER MONITORING PROGRAM

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

ROCKSMITH GEOENGINEERING

DESIGN	JSI	YYYY-MM-DD	2023-03-29
PREPARED	JSI	PROJECT No.	23009
REVIEW	GTM		
APPROVED	MNH		

FIGURE 1

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

Path: C:\Users\GrantMorey\Rocksmith Geoengineering LLC\23007 - Ameren GW - Documents\400 - Drawings, Figures\4.3-SEC\4.3.2 - Production\Other Maps\Figure 1- SEC Well Locations.aprx

Appendix A
Laboratory Analytical Data

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

January 18, 2023

Jeffrey Ingram
WSP Golder
701 Emerson Road
Suite 250
Saint Louis, MO 63141

RE: Project: AMEREN SEC SCL4A
Pace Project No.: 60419223

Dear Jeffrey Ingram:

Enclosed are the analytical results for sample(s) received by the laboratory on January 05, 2023. 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: Lisa Meyer, Ameren
Grant Morey, WSP Golder
Ann Muehlfarth, WSP Golder
Eric Schneider, WSP Golder

Pace Analytical Services, LLC
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CERTIFICATIONS

Project: AMEREN SEC SCL4A
Pace Project No.: 60419223

Pace Analytical Services Kansas

9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Inorganic Drinking Water Certification #: 10090
Arkansas Drinking Water
Arkansas Certification #: 22-031-0
Illinois Certification #: 2000302021-3
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212023-1
Oklahoma Certification #: 2022-057
Florida: Cert E871149 SEKS WET
Texas Certification #: T104704407-21-15
Utah Certification #: KS000212022-12
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 SEC SCL4A
Pace Project No.: 60419223

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60419223001	**S-TMW-1**	Water	01/03/23 13:33	01/05/23 03:55
60419223002	**S-TMW-3**	Water	01/03/23 12:23	01/05/23 03:55
60419223003	**S-SCL4A-DUP-1**	Water	01/03/23 00:00	01/05/23 03:55
60419223004	**S-SCL4A-FB-1**	Water	01/03/23 12:33	01/05/23 03:55

Pace Analytical Services, LLC
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SAMPLE ANALYTE COUNT

Project: AMEREN SEC SCL4A
Pace Project No.: 60419223

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60419223001	**S-TMW-1**	SM 2540C	TML	1	PASI-K
		EPA 300.0	RKA	1	PASI-K
60419223002	**S-TMW-3**	SM 2540C	TML	1	PASI-K
		EPA 300.0	RKA	1	PASI-K
60419223003	**S-SCL4A-DUP-1**	SM 2540C	TML	1	PASI-K
		EPA 300.0	RKA	1	PASI-K
60419223004	**S-SCL4A-FB-1**	SM 2540C	TML	1	PASI-K
		EPA 300.0	RKA	1	PASI-K

PASI-K = Pace Analytical Services - Kansas City

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SEC SCL4A
Pace Project No.: 60419223

Sample: S-TMW-1 **Lab ID: 60419223001** Collected: 01/03/23 13:33 Received: 01/05/23 03:55 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	**378**	mg/L	5.0	5.0	1		01/10/23 09:32		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Sulfate	**52.1**	mg/L	5.0	2.8	5		01/07/23 00:31	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
9608 Loiret Blvd.
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ANALYTICAL RESULTS

Project: AMEREN SEC SCL4A
Pace Project No.: 60419223

Sample: S-TMW-3 **Lab ID: 60419223002** Collected: 01/03/23 12:23 Received: 01/05/23 03:55 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	**464**	mg/L	10.0	10.0	1		01/10/23 09:33		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Sulfate	**38.0**	mg/L	5.0	2.8	5		01/07/23 00:45	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SEC SCL4A
Pace Project No.: 60419223

Sample: S-SCL4A-DUP-1 **Lab ID: 60419223003** Collected: 01/03/23 00:00 Received: 01/05/23 03:55 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	**379**	mg/L	5.0	5.0	1		01/10/23 09:33		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Sulfate	**52.3**	mg/L	5.0	2.8	5		01/07/23 01:38	14808-79-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: AMEREN SEC SCL4A
Pace Project No.: 60419223

Sample: S-SCL4A-FB-1 **Lab ID: 60419223004** Collected: 01/03/23 12:33 Received: 01/05/23 03:55 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	**<5.0**	mg/L	5.0	5.0	1		01/10/23 09:33		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Sulfate	**<0.55**	mg/L	1.0	0.55	1		01/07/23 01:51	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
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QUALITY CONTROL DATA

Project: AMEREN SEC SCL4A
Pace Project No.: 60419223

QC Batch: 826600 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60419223001, 60419223002, 60419223003, 60419223004

METHOD BLANK: 3283344 Matrix: Water
Associated Lab Samples: 60419223001, 60419223002, 60419223003, 60419223004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	01/10/23 09:30	

LABORATORY CONTROL SAMPLE: 3283345

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	988	99	80-120	

SAMPLE DUPLICATE: 3283346

Parameter	Units	60419220001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	474	476	0	10	

SAMPLE DUPLICATE: 3283347

Parameter	Units	60419223002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	464	466	0	10	

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

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SEC SCL4A
Pace Project No.: 60419223

QC Batch: 826128
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: 60419223001, 60419223002, 60419223003, 60419223004

METHOD BLANK: 3281888 Matrix: Water
Associated Lab Samples: 60419223001, 60419223002, 60419223003, 60419223004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	<0.55	1.0	0.55	01/06/23 16:44	

METHOD BLANK: 3283714 Matrix: Water
Associated Lab Samples: 60419223001, 60419223002, 60419223003, 60419223004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	<0.55	1.0	0.55	01/09/23 19:45	

LABORATORY CONTROL SAMPLE: 3281889

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

LABORATORY CONTROL SAMPLE: 3283715

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3281890 3281891

Parameter	Units	60419218006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	419	500	500	929	881	102	92	80-120	5	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3281893 3281894

Parameter	Units	60419220001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	33.7	5	5	39.3	39.5	113	116	80-120	0	15	E

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 SEC SCL4A
Pace Project No.: 60419223

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3281896 3281897

Parameter	Units	60419222001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	40.3	50	50	92.6	93.2	105	106	80-120	1	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3281899 3281900

Parameter	Units	60419223002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	38.0	25	25	66.3	65.1	113	108	80-120	2	15	

SAMPLE DUPLICATE: 3281892

Parameter	Units	60419218006 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfate	mg/L	419	319	27	15	D6

SAMPLE DUPLICATE: 3281895

Parameter	Units	60419220001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfate	mg/L	33.7	33.7	0	15	E

SAMPLE DUPLICATE: 3281898

Parameter	Units	60419222001 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfate	mg/L	40.3	39.0	3	15	

SAMPLE DUPLICATE: 3281901

Parameter	Units	60419223002 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfate	mg/L	38.0	37.4	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

QUALIFIERS

Project: AMEREN SEC SCL4A
Pace Project No.: 60419223

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.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

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.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SEC SCL4A
Pace Project No.: 60419223

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60419223001	**S-TMW-1**	SM 2540C	826600		
60419223002	**S-TMW-3**	SM 2540C	826600		
60419223003	**S-SCL4A-DUP-1**	SM 2540C	826600		
60419223004	**S-SCL4A-FB-1**	SM 2540C	826600		
60419223001	**S-TMW-1**	EPA 300.0	826128		
60419223002	**S-TMW-3**	EPA 300.0	826128		
60419223003	**S-SCL4A-DUP-1**	EPA 300.0	826128		
60419223004	**S-SCL4A-FB-1**	EPA 300.0	826128		

WO# : 60419223

60419223

Pace ANALYTICAL SERVICES	DC#_Title: ENV-FRM-LENE-0009_Sample C		
	Revision: 2	Effective Date: 01/12/2022	Issued By: Lenexa

Client Name: Golder Associates

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

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

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

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

Thermometer Used: T296 **Type of Ice:** (Wet) Blue None

Cooler Temperature (°C): **As-read** 1.5 **Corr. Factor** -0.1 **Corrected** 1.4

Date and initials of person examining contents: PV 1/5/22

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: _____

Project Manager Review: _____ Date: _____

Qualtrax Document ID: 30468

Page 1 of 1

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 USA Inc.
Address:	701 Emerson Rd, Ste 250
	Creve Coeur, MO 63141
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, Grant Morey
Purchase Order No.:	
Project Name:	Ameren – SCL4A
Project Number:	GL153140604

Section C Invoice Information:

Attention:	
Company Name:	Golder Associates USA, Inc.
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

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

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	Calcium	Chloride	Fluoride	Sulfate	TDS	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-TMW-1	WT	G			1/3/23	1333		1	X												X	X		60419223
2	S-TMW-3	WT	G				1223		1	X												X	X		8 PZU
3	S-SCL4A-DUP-1	WT	G				—															X	X		3BPZU
4	S-SCL4A-FB-1	WT	G				1233															X	X		↓
5	S-SCL4A-MS-1	WT	G				1223															Y	X		
6	S-SCL4A-MSD-1	WT	G				1223															X	X		
7		WT	G																						MS/MSD Collected @ TMW-3
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			
	Jared Beems	1/4/23	1230	Jill Clark	1/4/23	1230				
	Jill Clark	1/4/23	1235	[signature]	1/5/23	0355	1-4	Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Jared Beems

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 1/4/23

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 January 20, 2023 **Project No.** 153140604

TO Project File
WSP USA Inc.

CC Amanda Derhake, Jeff Ingram

FROM Rahel Pommerenke **EMAIL rahel.pommerenke@wsp.com**

DATA VALIDATION SUMMARY, SIOUX ENERGY CENTER – SCL4A – VERIFICATION SAMPLING- DATA PACKAGE 60419223

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

- None.

WSP USA Inc.
701 Emerson Road, Suite 250,
Creve Coeur, Missouri, USA 63141

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

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: WSP USA Inc.
Project Manager: J. Ingram
Project Name: Ameren SEC - SCL4A VS
Project Number: 153140604
Reviewer: R.Pommerenke
Validation Date: 01/20/2023

Laboratory: Pace Analytical Services
SDG #: 60419223
Analytical Method (type and no.): SM2540C (TDS); EPA 300.0 (Anions)
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐ _____
Sample Names S-TMW-1, S-TMW-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			01/03/2023
b) Sampling team indicated?	x			JAB
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)?	☐	☒	☐	
b) Were analytes detected in the field blank(s)?	☐	☒	☐	S-SCL4A-FB-1 @ S-SCL4A-TMW-3
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-SCL4A-TMW-1
b) Were field dup. precision criteria met (note RPD)?	☒	☐	☐	Max RPD [0.3%] < 20%
c) Were lab duplicates analyzed (note original and duplicate samples)?	☒	☐	☐	
d) Were lab dup. precision criteria met (note RPD)?	☐	☒	☐	See notes.

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

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

Comments/Notes:

Dilutions:

Sulfate analyzed at a dilution. No qualification necessary.

Duplicates:

Sample Duplicate 3281892: RPD for sulfate (27%) exceeded max RPD (15%). Performed on unrelated sample: no qualification needed.

QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason

Signature: _____ Date: 1/20/2023

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

June 21, 2023

Mark Haddock
Rocksmith Geoengineering, LLC.
5233 Roanoke Drive
Saint Charles, MO 63304

RE: Project: AMEREN SCL4A
Pace Project No.: 60428019

Dear Mark Haddock:

Enclosed are the analytical results for sample(s) received by the laboratory between May 03, 2023 and May 05, 2023. 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: Jeffrey Ingram, Rocksmith Geoengineering, LLC.
Grant Morey, Rocksmith Geoengineering, LLC.

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

CERTIFICATIONS

Project: AMEREN SCL4A
Pace Project No.: 60428019

Pace Analytical Services Kansas

9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Inorganic Drinking Water Certification #: 10090
Arkansas Drinking Water
Arkansas Certification #: 88-00679
Illinois Certification #: 2000302023-5
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212023-1
Oklahoma Certification #: 2022-057
Florida: Cert E871149 SEKS WET
Texas Certification #: T104704407-22-16
Utah Certification #: KS000212022-12
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 SCL4A
Pace Project No.: 60428019

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60428019001	**S-TMW-1**	Water	05/04/23 11:56	05/05/23 05:10
60428019002	**S-TMW-2**	Water	05/04/23 13:03	05/05/23 05:10
60428019003	**S-TMW-3**	Water	05/04/23 13:41	05/05/23 05:10
60428019004	**S-SCL4A-DUP-1**	Water	05/04/23 08:00	05/05/23 05:10
60428019005	**S-SCL4A-FB-1**	Water	05/04/23 12:46	05/05/23 05:10
60427703010	**S-UG-3**	Water	05/04/23 14:37	05/05/23 05:10
60427703001	**S-BMW-1S**	Water	05/02/23 09:51	05/03/23 05:05
60427703002	**S-BMW-3S**	Water	05/02/23 11:32	05/03/23 05:05

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SAMPLE ANALYTE COUNT

Project: AMEREN SCL4A
Pace Project No.: 60428019

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60428019001	S-TMW-1	EPA 200.7	JXD	7	PASI-K
		SM 2320B	JS2	1	PASI-K
		SM 2540C	BMT	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60428019002	S-TMW-2	EPA 200.7	JXD	7	PASI-K
		SM 2320B	JS2	1	PASI-K
		SM 2540C	BMT	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60428019003	S-TMW-3	EPA 200.7	JXD	7	PASI-K
		SM 2320B	JS2	1	PASI-K
		SM 2540C	BMT	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60428019004	S-SCL4A-DUP-1	EPA 200.7	JXD	7	PASI-K
		SM 2320B	JS2	1	PASI-K
		SM 2540C	BMT	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60428019005	S-SCL4A-FB-1	EPA 200.7	JXD	7	PASI-K
		SM 2320B	JS2	1	PASI-K
		SM 2540C	BMT	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60427703010	S-UG-3	EPA 200.7	JXD	7	PASI-K
		SM 2320B	JS2	1	PASI-K
		SM 2540C	MLD	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60427703001	S-BMW-1S	EPA 200.7	JXD	7	PASI-K
		SM 2320B	JS2	1	PASI-K
		SM 2540C	CRN2	1	PASI-K
		EPA 300.0	CRN2	3	PASI-K
60427703002	S-BMW-3S	EPA 200.7	JXD	7	PASI-K
		SM 2320B	JS2	1	PASI-K
		SM 2540C	CRN2	1	PASI-K
		EPA 300.0	CRN2	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 SCL4A
Pace Project No.: 60428019

Sample: S-TMW-1 **Lab ID: 60428019001** Collected: 05/04/23 11:56 Received: 05/05/23 05:10 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	**76.9J**	ug/L	100	6.4	1	05/11/23 11:53	05/15/23 09:49	7440-42-8	
Calcium	**106000**	ug/L	200	26.9	1	05/11/23 11:53	05/15/23 09:49	7440-70-2	
Iron	**10.7J**	ug/L	50.0	9.1	1	05/11/23 11:53	05/15/23 09:49	7439-89-6	
Magnesium	**18900**	ug/L	50.0	20.1	1	05/11/23 11:53	05/15/23 09:49	7439-95-4	
Manganese	**373**	ug/L	5.0	0.39	1	05/11/23 11:53	05/15/23 09:49	7439-96-5	
Potassium	**4670**	ug/L	500	69.7	1	05/11/23 11:53	05/15/23 09:49	7440-09-7	
Sodium	**3440**	ug/L	500	115	1	05/11/23 11:53	05/15/23 09:49	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**323**	mg/L	20.0	10.5	1		05/09/23 12:30		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**411**	mg/L	10.0	10.0	1		05/11/23 09:18		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**4.6**	mg/L	1.0	0.53	1		05/11/23 23:39	16887-00-6	
Fluoride	**0.33**	mg/L	0.20	0.12	1		05/11/23 23:39	16984-48-8	
Sulfate	**56.6**	mg/L	10.0	5.5	10		05/11/23 23:52	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60428019

Sample: S-TMW-2 **Lab ID: 60428019002** Collected: 05/04/23 13:03 Received: 05/05/23 05:10 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	**84.9J**	ug/L	100	6.4	1	05/11/23 11:53	05/15/23 09:51	7440-42-8	
Calcium	**123000**	ug/L	200	26.9	1	05/11/23 11:53	05/15/23 09:51	7440-70-2	
Iron	**1340**	ug/L	50.0	9.1	1	05/11/23 11:53	05/15/23 09:51	7439-89-6	
Magnesium	**22600**	ug/L	50.0	20.1	1	05/11/23 11:53	05/15/23 09:51	7439-95-4	
Manganese	**346**	ug/L	5.0	0.39	1	05/11/23 11:53	05/15/23 09:51	7439-96-5	
Potassium	**5040**	ug/L	500	69.7	1	05/11/23 11:53	05/15/23 09:51	7440-09-7	
Sodium	**3690**	ug/L	500	115	1	05/11/23 11:53	05/15/23 09:51	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**402**	mg/L	20.0	10.5	1		05/09/23 12:37		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**451**	mg/L	10.0	10.0	1		05/11/23 09:18		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**3.1**	mg/L	1.0	0.53	1		05/12/23 00:06	16887-00-6	
Fluoride	**0.27**	mg/L	0.20	0.12	1		05/12/23 00:06	16984-48-8	
Sulfate	**32.8**	mg/L	10.0	5.5	10		05/12/23 00:19	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60428019

Sample: S-TMW-3 **Lab ID: 60428019003** Collected: 05/04/23 13:41 Received: 05/05/23 05:10 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	**89.1J**	ug/L	100	6.4	1	05/11/23 11:53	05/15/23 09:53	7440-42-8	
Calcium	**128000**	ug/L	200	26.9	1	05/11/23 11:53	05/15/23 09:53	7440-70-2	
Iron	**689**	ug/L	50.0	9.1	1	05/11/23 11:53	05/15/23 09:53	7439-89-6	
Magnesium	**23400**	ug/L	50.0	20.1	1	05/11/23 11:53	05/15/23 09:53	7439-95-4	
Manganese	**353**	ug/L	5.0	0.39	1	05/11/23 11:53	05/15/23 09:53	7439-96-5	
Potassium	**5980**	ug/L	500	69.7	1	05/11/23 11:53	05/15/23 09:53	7440-09-7	
Sodium	**4450**	ug/L	500	115	1	05/11/23 11:53	05/15/23 09:53	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**411**	mg/L	20.0	10.5	1		05/09/23 12:44		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**319**	mg/L	10.0	10.0	1		05/11/23 09:18		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**3.6**	mg/L	1.0	0.53	1		05/12/23 00:32	16887-00-6	
Fluoride	**<0.12**	mg/L	0.20	0.12	1		05/12/23 00:32	16984-48-8	
Sulfate	**40.9**	mg/L	10.0	5.5	10		05/12/23 01:53	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60428019

Sample: S-SCL4A-DUP-1 **Lab ID: 60428019004** Collected: 05/04/23 08:00 Received: 05/05/23 05:10 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	**76.7J**	ug/L	100	6.4	1	05/11/23 11:53	05/15/23 09:59	7440-42-8	
Calcium	**105000**	ug/L	200	26.9	1	05/11/23 11:53	05/15/23 09:59	7440-70-2	
Iron	**14.9J**	ug/L	50.0	9.1	1	05/11/23 11:53	05/15/23 09:59	7439-89-6	
Magnesium	**18600**	ug/L	50.0	20.1	1	05/11/23 11:53	05/15/23 09:59	7439-95-4	
Manganese	**361**	ug/L	5.0	0.39	1	05/11/23 11:53	05/15/23 09:59	7439-96-5	
Potassium	**4480**	ug/L	500	69.7	1	05/11/23 11:53	05/15/23 09:59	7440-09-7	
Sodium	**3350**	ug/L	500	115	1	05/11/23 11:53	05/15/23 09:59	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**316**	mg/L	20.0	10.5	1		05/09/23 13:10		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**62.0**	mg/L	10.0	10.0	1		05/11/23 09:18		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**4.2**	mg/L	1.0	0.53	1		05/12/23 02:46	16887-00-6	
Fluoride	**0.32**	mg/L	0.20	0.12	1		05/12/23 02:46	16984-48-8	
Sulfate	**55.1**	mg/L	10.0	5.5	10		05/12/23 03:00	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60428019

Sample: S-SCL4A-FB-1 **Lab ID: 60428019005** Collected: 05/04/23 12:46 Received: 05/05/23 05:10 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	**<6.4**	ug/L	100	6.4	1	05/11/23 11:53	05/15/23 10:01	7440-42-8	
Calcium	**<26.9**	ug/L	200	26.9	1	05/11/23 11:53	05/15/23 10:01	7440-70-2	
Iron	**<9.1**	ug/L	50.0	9.1	1	05/11/23 11:53	05/15/23 10:01	7439-89-6	
Magnesium	**<20.1**	ug/L	50.0	20.1	1	05/11/23 11:53	05/15/23 10:01	7439-95-4	
Manganese	**0.44J**	ug/L	5.0	0.39	1	05/11/23 11:53	05/15/23 10:01	7439-96-5	
Potassium	**<69.7**	ug/L	500	69.7	1	05/11/23 11:53	05/15/23 10:01	7440-09-7	
Sodium	**<115**	ug/L	500	115	1	05/11/23 11:53	05/15/23 10:01	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**<10.5**	mg/L	20.0	10.5	1		05/09/23 13:17		
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		05/11/23 09:19		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**<0.53**	mg/L	1.0	0.53	1		05/12/23 07:24	16887-00-6	
Fluoride	**<0.12**	mg/L	0.20	0.12	1		05/12/23 07:24	16984-48-8	
Sulfate	**<0.55**	mg/L	1.0	0.55	1		05/12/23 07:24	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60428019

Sample: S-UG-3 **Lab ID: 60427703010** Collected: 05/04/23 14:37 Received: 05/05/23 05:10 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	**258**	ug/L	100	6.4	1	05/11/23 13:50	05/26/23 15:46	7440-42-8	
Calcium	**119000**	ug/L	200	26.9	1	05/11/23 13:50	05/26/23 15:46	7440-70-2	
Iron	**<9.1**	ug/L	50.0	9.1	1	05/11/23 13:50	05/26/23 15:46	7439-89-6	
Magnesium	**22900**	ug/L	50.0	20.1	1	05/11/23 13:50	05/26/23 15:46	7439-95-4	
Manganese	**597**	ug/L	5.0	0.39	1	05/11/23 13:50	05/26/23 15:46	7439-96-5	
Potassium	**4960**	ug/L	500	69.7	1	05/11/23 13:50	05/26/23 15:46	7440-09-7	
Sodium	**39000**	ug/L	500	115	1	05/11/23 13:50	05/26/23 15:46	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**376**	mg/L	20.0	10.5	1		05/09/23 11:23		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**522**	mg/L	10.0	10.0	1		05/10/23 09:25		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**41.9**	mg/L	20.0	10.5	20		05/25/23 12:05	16887-00-6	
Fluoride	**<0.12**	mg/L	0.20	0.12	1		05/25/23 11:52	16984-48-8	
Sulfate	**48.0**	mg/L	20.0	11.0	20		05/25/23 12:05	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60428019

Sample: S-BMW-1S **Lab ID: 60427703001** Collected: 05/02/23 09:51 Received: 05/03/23 05:05 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	**64.8J**	ug/L	100	6.4	1	05/04/23 12:37	05/23/23 09:21	7440-42-8	
Calcium	**184000**	ug/L	200	26.9	1	05/04/23 12:37	05/23/23 09:21	7440-70-2	
Iron	**<9.1**	ug/L	50.0	9.1	1	05/04/23 12:37	05/23/23 09:21	7439-89-6	
Magnesium	**37100**	ug/L	50.0	20.1	1	05/04/23 12:37	05/23/23 09:21	7439-95-4	
Manganese	**849**	ug/L	5.0	0.39	1	05/04/23 12:37	05/23/23 09:21	7439-96-5	
Potassium	**427J**	ug/L	500	69.7	1	05/04/23 12:37	05/23/23 09:21	7440-09-7	
Sodium	**5130**	ug/L	500	115	1	05/04/23 12:37	05/23/23 09:21	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**576**	mg/L	20.0	10.5	1		05/04/23 13:12		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**610**	mg/L	10.0	10.0	1		05/08/23 12:51		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**13.1**	mg/L	1.0	0.53	1		05/24/23 18:29	16887-00-6	
Fluoride	**<0.12**	mg/L	0.20	0.12	1		05/24/23 18:29	16984-48-8	
Sulfate	**37.7**	mg/L	20.0	11.0	20		05/24/23 18:42	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60428019

Sample: S-BMW-3S **Lab ID: 60427703002** Collected: 05/02/23 11:32 Received: 05/03/23 05:05 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	**67.1J**	ug/L	100	6.4	1	05/04/23 12:37	05/23/23 09:27	7440-42-8	
Calcium	**137000**	ug/L	200	26.9	1	05/04/23 12:37	05/23/23 09:27	7440-70-2	
Iron	**<9.1**	ug/L	50.0	9.1	1	05/04/23 12:37	05/23/23 09:27	7439-89-6	
Magnesium	**24400**	ug/L	50.0	20.1	1	05/04/23 12:37	05/23/23 09:27	7439-95-4	
Manganese	**30.2**	ug/L	5.0	0.39	1	05/04/23 12:37	05/23/23 09:27	7439-96-5	
Potassium	**426J**	ug/L	500	69.7	1	05/04/23 12:37	05/23/23 09:27	7440-09-7	
Sodium	**5360**	ug/L	500	115	1	05/04/23 12:37	05/23/23 09:27	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**419**	mg/L	20.0	10.5	1		05/04/23 13:20		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**495**	mg/L	10.0	10.0	1		05/09/23 10:54		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**12.6**	mg/L	1.0	0.53	1		05/24/23 18:54	16887-00-6	
Fluoride	**<0.12**	mg/L	0.20	0.12	1		05/24/23 18:54	16984-48-8	
Sulfate	**32.4**	mg/L	20.0	11.0	20		05/24/23 19:07	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

QC Batch: 845219
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: 60427703001, 60427703002

METHOD BLANK: 3349216 Matrix: Water
Associated Lab Samples: 60427703001, 60427703002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<6.4	100	6.4	05/23/23 09:16	
Calcium	ug/L	28.7J	200	26.9	05/23/23 09:16	
Iron	ug/L	9.3J	50.0	9.1	05/23/23 09:16	
Magnesium	ug/L	<20.1	50.0	20.1	05/23/23 09:16	
Manganese	ug/L	1.1J	5.0	0.39	05/23/23 09:16	
Potassium	ug/L	<69.7	500	69.7	05/23/23 09:16	
Sodium	ug/L	<115	500	115	05/23/23 09:16	

LABORATORY CONTROL SAMPLE: 3349217

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	994	99	85-115	
Calcium	ug/L	10000	10500	105	85-115	
Iron	ug/L	10000	10500	105	85-115	
Magnesium	ug/L	10000	10200	102	85-115	
Manganese	ug/L	1000	1030	103	85-115	
Potassium	ug/L	10000	10200	102	85-115	
Sodium	ug/L	10000	10300	103	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3349218 3349219

Parameter	Units	60427703001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	64.8J	1000	1000	1050	1050	98	98	70-130	0	20	
Calcium	ug/L	184000	10000	10000	191000	195000	73	109	70-130	2	20	
Iron	ug/L	<9.1	10000	10000	10400	10400	104	104	70-130	0	20	
Magnesium	ug/L	37100	10000	10000	47000	47300	99	102	70-130	1	20	
Manganese	ug/L	849	1000	1000	1860	1890	102	104	70-130	1	20	
Potassium	ug/L	427J	10000	10000	10900	10800	104	104	70-130	0	20	
Sodium	ug/L	5130	10000	10000	15600	15700	104	106	70-130	1	20	

MATRIX SPIKE SAMPLE: 3349220

Parameter	Units	60427703007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	101	1000	1070	97	70-130	
Calcium	ug/L	132000	10000	139000	75	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 SCL4A
Pace Project No.: 60428019

MATRIX SPIKE SAMPLE: 3349220

Parameter	Units	60427703007 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	143	10000	10200	100	70-130	
Magnesium	ug/L	28500	10000	37900	94	70-130	
Manganese	ug/L	216	1000	1200	99	70-130	
Potassium	ug/L	2250	10000	12500	102	70-130	
Sodium	ug/L	5580	10000	15800	102	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.

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

QC Batch: 846621
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: 60428019001, 60428019002, 60428019003, 60428019004, 60428019005

METHOD BLANK: 3354489 Matrix: Water
Associated Lab Samples: 60428019001, 60428019002, 60428019003, 60428019004, 60428019005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<6.4	100	6.4	05/15/23 09:45	
Calcium	ug/L	<26.9	200	26.9	05/15/23 09:45	
Iron	ug/L	<9.1	50.0	9.1	05/15/23 09:45	
Magnesium	ug/L	<20.1	50.0	20.1	05/15/23 09:45	
Manganese	ug/L	<0.39	5.0	0.39	05/15/23 09:45	
Potassium	ug/L	<69.7	500	69.7	05/15/23 09:45	
Sodium	ug/L	<115	500	115	05/15/23 09:45	

LABORATORY CONTROL SAMPLE: 3354490

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	963	96	85-115	
Calcium	ug/L	10000	10100	101	85-115	
Iron	ug/L	10000	10300	103	85-115	
Magnesium	ug/L	10000	9910	99	85-115	
Manganese	ug/L	1000	1010	101	85-115	
Potassium	ug/L	10000	9820	98	85-115	
Sodium	ug/L	10000	9990	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3354491 3354492

Parameter	Units	60428019003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	89.1J	1000	1000	1060	1070	97	98	70-130	1	20	
Calcium	ug/L	128000	10000	10000	137000	136000	90	84	70-130	0	20	
Iron	ug/L	689	10000	10000	10900	10900	103	102	70-130	0	20	
Magnesium	ug/L	23400	10000	10000	33500	33300	100	99	70-130	0	20	
Manganese	ug/L	353	1000	1000	1360	1370	100	101	70-130	1	20	
Potassium	ug/L	5980	10000	10000	16100	16200	101	102	70-130	1	20	
Sodium	ug/L	4450	10000	10000	14700	14500	102	100	70-130	1	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(913)599-5665

QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

QC Batch: 846649
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: 60427703010

METHOD BLANK: 3354610 Matrix: Water
Associated Lab Samples: 60427703010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	7.1J	100	6.4	05/26/23 15:39	
Calcium	ug/L	<26.9	200	26.9	05/26/23 15:39	
Iron	ug/L	<9.1	50.0	9.1	05/26/23 15:39	
Magnesium	ug/L	<20.1	50.0	20.1	05/26/23 15:39	
Manganese	ug/L	<0.39	5.0	0.39	05/26/23 15:39	
Potassium	ug/L	<69.7	500	69.7	05/26/23 15:39	
Sodium	ug/L	<115	500	115	05/26/23 15:39	

LABORATORY CONTROL SAMPLE: 3354611

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	1010	101	85-115	
Calcium	ug/L	10000	10700	107	85-115	
Iron	ug/L	10000	10600	106	85-115	
Magnesium	ug/L	10000	10600	106	85-115	
Manganese	ug/L	1000	1020	102	85-115	
Potassium	ug/L	10000	10500	105	85-115	
Sodium	ug/L	10000	10600	106	85-115	

MATRIX SPIKE SAMPLE: 3354612

Parameter	Units	60427703014 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	62.9J	1000	1060	100	70-130	
Calcium	ug/L	116000	10000	125000	93	70-130	
Iron	ug/L	7380	10000	18400	110	70-130	
Magnesium	ug/L	29300	10000	39300	100	70-130	
Manganese	ug/L	468	1000	1460	99	70-130	
Potassium	ug/L	3700	10000	14400	107	70-130	
Sodium	ug/L	7280	10000	17800	105	70-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3354613 3354614

Parameter	Units	60427703022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	7900	1000	1000	8860	8640	96	74	70-130	3	20	
Calcium	ug/L	138000	10000	10000	148000	144000	102	62	70-130	3	20	M1

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3354613 3354614

Parameter	Units	60427703022 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Iron	ug/L	9780	10000	10000	20300	19900	105	101	70-130	2	20	
Magnesium	ug/L	33900	10000	10000	44200	43000	102	91	70-130	3	20	
Manganese	ug/L	1050	1000	1000	2060	2000	101	95	70-130	3	20	
Potassium	ug/L	5330	10000	10000	15800	15500	105	102	70-130	2	20	
Sodium	ug/L	38100	10000	10000	48400	47000	103	89	70-130	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

QC Batch: 845171
QC Batch Method: SM 2320B
Analysis Method: SM 2320B
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60427703001, 60427703002

METHOD BLANK: 3349039 Matrix: Water
Associated Lab Samples: 60427703001, 60427703002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<10.5	20.0	10.5	05/04/23 11:49	

LABORATORY CONTROL SAMPLE: 3349040

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	503	101	90-110	

SAMPLE DUPLICATE: 3349041

Parameter	Units	60427704003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	198	195	2	10	

SAMPLE DUPLICATE: 3349299

Parameter	Units	60427707001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	160	163	2	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

QC Batch: 846049
QC Batch Method: SM 2320B
Analysis Method: SM 2320B
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60427703010

METHOD BLANK: 3352393 Matrix: Water
Associated Lab Samples: 60427703010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<10.5	20.0	10.5	05/09/23 09:16	

LABORATORY CONTROL SAMPLE: 3352394

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	504	101	90-110	

SAMPLE DUPLICATE: 3352395

Parameter	Units	60428021005 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	480	476	1	10	

SAMPLE DUPLICATE: 3352396

Parameter	Units	60428015002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	451	454	1	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

QC Batch: 846050 Analysis Method: SM 2320B
QC Batch Method: SM 2320B Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60428019001, 60428019002, 60428019003, 60428019004, 60428019005

METHOD BLANK: 3352397 Matrix: Water
Associated Lab Samples: 60428019001, 60428019002, 60428019003, 60428019004, 60428019005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<10.5	20.0	10.5	05/09/23 12:18	

LABORATORY CONTROL SAMPLE: 3352398

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

SAMPLE DUPLICATE: 3352399

Parameter	Units	60428019003 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	411	411	0	10	

SAMPLE DUPLICATE: 3352400

Parameter	Units	60428109001 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	559	568	2	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

QC Batch: 845831
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60427703001

METHOD BLANK: 3351717 Matrix: Water
Associated Lab Samples: 60427703001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	05/08/23 12:49	

LABORATORY CONTROL SAMPLE: 3351718

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

SAMPLE DUPLICATE: 3351719

Parameter	Units	60427607001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	3540	3470	2	10	

SAMPLE DUPLICATE: 3351720

Parameter	Units	60427705002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	ND	<5.0		10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

QC Batch: 846023
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60427703002

METHOD BLANK: 3352331 Matrix: Water
Associated Lab Samples: 60427703002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	05/09/23 10:54	

LABORATORY CONTROL SAMPLE: 3352332

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	1030	103	80-120	

SAMPLE DUPLICATE: 3352333

Parameter	Units	60427707001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	957	916	4	10	

SAMPLE DUPLICATE: 3352334

Parameter	Units	60427777001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	972	913	6	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

QC Batch: 846264
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60427703010

METHOD BLANK: 3353161 Matrix: Water
Associated Lab Samples: 60427703010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	05/10/23 09:23	

LABORATORY CONTROL SAMPLE: 3353162

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

SAMPLE DUPLICATE: 3353163

Parameter	Units	60428021005 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	640	646	1	10	D6

SAMPLE DUPLICATE: 3353164

Parameter	Units	60428144001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	426	463	8	10	

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

QC Batch: 846518 | Analysis Method: SM 2540C
QC Batch Method: SM 2540C | Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60428019001, 60428019002, 60428019003, 60428019004, 60428019005

METHOD BLANK: 3354150 Matrix: Water
Associated Lab Samples: 60428019001, 60428019002, 60428019003, 60428019004, 60428019005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	05/11/23 09:17	

LABORATORY CONTROL SAMPLE: 3354151

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

SAMPLE DUPLICATE: 3354353

Parameter	Units	60428015002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	526	518	2	10	

SAMPLE DUPLICATE: 3354354

Parameter	Units	60428019003 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	319	352	10	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

QC Batch: 846459
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: 60428019001, 60428019002, 60428019003, 60428019004, 60428019005

METHOD BLANK: 3353923 Matrix: Water
Associated Lab Samples: 60428019001, 60428019002, 60428019003, 60428019004, 60428019005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	05/11/23 18:45	
Fluoride	mg/L	<0.12	0.20	0.12	05/11/23 18:45	
Sulfate	mg/L	<0.55	1.0	0.55	05/11/23 18:45	

LABORATORY CONTROL SAMPLE: 3353924

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	96	90-110	
Sulfate	mg/L	5	4.9	98	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3353925 3353926

Parameter	Units	60428015002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	1.9	5	5	7.1	7.0	105	104	80-120	1	15	
Fluoride	mg/L	<0.12	2.5	2.5	2.9	2.9	116	114	80-120	1	15	
Sulfate	mg/L	39.7	50	50	105	94.5	130	110	80-120	10	15	M1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3353928 3353929

Parameter	Units	60428019003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	3.6	5	5	9.0	9.3	107	114	80-120	4	15	
Fluoride	mg/L	<0.12	2.5	2.5	2.7	2.9	109	116	80-120	7	15	
Sulfate	mg/L	40.9	50	50	95.7	95.2	110	109	80-120	1	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3353931 3353932

Parameter	Units	60428021005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	6.9	5	5	12.6	12.7	114	117	80-120	1	15	
Fluoride	mg/L	<0.12	2.5	2.5	2.9	2.9	114	116	80-120	2	15	
Sulfate	mg/L	76.3	50	50	128	129	103	106	80-120	1	15	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

SAMPLE DUPLICATE: 3353927

Parameter	Units	60428015002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	1.9	1.9	0	15	
Fluoride	mg/L	<0.12	<0.12		15	
Sulfate	mg/L	39.7	39.0	2	15	

SAMPLE DUPLICATE: 3353930

Parameter	Units	60428019003 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	3.6	3.9	7	15	
Fluoride	mg/L	<0.12	<0.12		15	
Sulfate	mg/L	40.9	41.9	2	15	

SAMPLE DUPLICATE: 3353933

Parameter	Units	60428021005 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	6.9	6.9	1	15	
Fluoride	mg/L	<0.12	<0.12		15	
Sulfate	mg/L	76.3	70.6	8	15	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

QC Batch: 848462
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: 60427703001, 60427703002

METHOD BLANK: 3361725 Matrix: Water
Associated Lab Samples: 60427703001, 60427703002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	05/24/23 09:13	
Fluoride	mg/L	<0.12	0.20	0.12	05/24/23 09:13	
Sulfate	mg/L	<0.55	1.0	0.55	05/24/23 09:13	

LABORATORY CONTROL SAMPLE: 3361726

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	2.5	101	90-110	
Sulfate	mg/L	5	5.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3361727 3361728

Parameter	Units	60428838004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	1.6	5	5	6.0	6.2	88	91	80-120	3	15	
Fluoride	mg/L	0.21	2.5	2.5	2.7	2.7	98	101	80-120	3	15	
Sulfate	mg/L	193	250	250	450	427	103	94	80-120	5	15	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60428019

QC Batch: 849094
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: 60427703010

METHOD BLANK: 3363879 Matrix: Water
Associated Lab Samples: 60427703010

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	05/25/23 09:21	
Fluoride	mg/L	<0.12	0.20	0.12	05/25/23 09:21	
Sulfate	mg/L	<0.55	1.0	0.55	05/25/23 09:21	

LABORATORY CONTROL SAMPLE: 3363880

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	2.6	103	90-110	
Sulfate	mg/L	5	5.0	100	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3363881 3363882

Parameter	Units	60429025007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	19.0	10	10	28.5	28.8	95	98	80-120	1	15	
Fluoride	mg/L	ND	5	5	4.4	4.5	87	90	80-120	3	15	
Sulfate	mg/L	67.5	10	10	78.6	79.3	112	118	80-120	1	15	

SAMPLE DUPLICATE: 3363883

Parameter	Units	60429025007 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	19.0	19.5	3	15	
Fluoride	mg/L	ND	<0.25		15	
Sulfate	mg/L	67.5	69.2	2	15	

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: AMEREN SCL4A
Pace Project No.: 60428019

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.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

D6	The precision between the sample and sample duplicate exceeded laboratory control limits.
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 SCL4A
Pace Project No.: 60428019

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60427703001	**S-BMW-1S**	EPA 200.7	845219	EPA 200.7	845416
60427703002	**S-BMW-3S**	EPA 200.7	845219	EPA 200.7	845416
60428019001	**S-TMW-1**	EPA 200.7	846621	EPA 200.7	846677
60428019002	**S-TMW-2**	EPA 200.7	846621	EPA 200.7	846677
60428019003	**S-TMW-3**	EPA 200.7	846621	EPA 200.7	846677
60428019004	**S-SCL4A-DUP-1**	EPA 200.7	846621	EPA 200.7	846677
60428019005	**S-SCL4A-FB-1**	EPA 200.7	846621	EPA 200.7	846677
60427703010	**S-UG-3**	EPA 200.7	846649	EPA 200.7	846727
60427703001	**S-BMW-1S**	SM 2320B	845171		
60427703002	**S-BMW-3S**	SM 2320B	845171		
60428019001	**S-TMW-1**	SM 2320B	846050		
60428019002	**S-TMW-2**	SM 2320B	846050		
60428019003	**S-TMW-3**	SM 2320B	846050		
60428019004	**S-SCL4A-DUP-1**	SM 2320B	846050		
60428019005	**S-SCL4A-FB-1**	SM 2320B	846050		
60427703010	**S-UG-3**	SM 2320B	846049		
60427703001	**S-BMW-1S**	SM 2540C	845831		
60427703002	**S-BMW-3S**	SM 2540C	846023		
60428019001	**S-TMW-1**	SM 2540C	846518		
60428019002	**S-TMW-2**	SM 2540C	846518		
60428019003	**S-TMW-3**	SM 2540C	846518		
60428019004	**S-SCL4A-DUP-1**	SM 2540C	846518		
60428019005	**S-SCL4A-FB-1**	SM 2540C	846518		
60427703010	**S-UG-3**	SM 2540C	846264		
60427703001	**S-BMW-1S**	EPA 300.0	848462		
60427703002	**S-BMW-3S**	EPA 300.0	848462		
60428019001	**S-TMW-1**	EPA 300.0	846459		
60428019002	**S-TMW-2**	EPA 300.0	846459		
60428019003	**S-TMW-3**	EPA 300.0	846459		
60428019004	**S-SCL4A-DUP-1**	EPA 300.0	846459		
60428019005	**S-SCL4A-FB-1**	EPA 300.0	846459		
60427703010	**S-UG-3**	EPA 300.0	849094		

Pace ANALYTICAL SERVICES	DC#_Title: ENV-FRM-LENE-0009_Samp	WO# : 60428019
	Revision: 2	Effective Date: 01/12/2(

60428019

Client Name: Rocksmith

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

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

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

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

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

Cooler Temperature (°C): **As-read** 1.6/0.1/2.3 **Corr. Factor** +0.2 **Corrected** 1.8/0.3/2.5

Date and initials of person examining contents: 5/5

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#: 67187	☒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: _____ Date: _____

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical
www.pacelabs.com

Page: 1 of 1

Section A Required Client Information:

Company:	Rocksmith Geoengineers, LLC.
Address:	5233 Roanoke Drive
	St. Charles, MO 63304
Email To:	mark.haddock@rocksmithgeo.com
Phone: 314-974-6578	Fax:
Requested Due Date/TAT:	Standard

Section B Required Project Information:

Report To:	Mark Haddock
Copy To:	Jeffrey Ingram
Purchase Order No.:	
Project Name:	AMEREN SCL4A
Project Number:	COC #11

Section C Invoice Information:

Attention:	
Company Name:	Rocksmith
Address:	
Pace Quote Reference:	
Pace Project Manager:	Jamie Church
Pace Profile #:	15856, line 2

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

	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
1	S-TMW-1	WT	G			5-4-23	1156		2	1		1					
2	S-TMW-2	WT	G			"	1303		1	1		1					
3	S-TMW-3	WT	G			"	1341		1	1		1					
4	S-UG-3	WT	G			"	1437		1	1		1					
5	S-SCL4A-DUP-1	WT	G			5-4-23	—		2	1		1					
6	S-SCL4A-FB-1	WT	G			"	1246		1	1		1					
7	S-SCL4A-MS-1	WT	G			"	1341		1	1		1					
8	S-SCL4A-MSD-1	WT	G			"	1341		1	1		1					
9	S-BMW-1S	WT	G														
10	S-BMW-3S	WT	G														
11		WT	G														
12		WT	G														

Requested Analysis Filtered (Y/N)

	Y/N	Analysis Test	Chloride/Fluoride/Sulfate	App III and Cat/An Metals*	Alkalinity	TDS	Appendix IV Metals **	Mercury	Radium 226	Radium 228	Ferrous/Ferric Iron	SM4500-S2D Sulfide			Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	N		✓	✓	✓	✓										60428619
2	N		"	"	"	"										
3	N		"	"	"	"										
4	N		"	"	"	"										
5	N		✓	✓	✓	✓										
6	N		"	"	"	"										
7	N		"	"	"	"										Collected @ S-TMW-3
8	N		"	"	"	"										"
9	N															
10	N															
11	N															
12	N															

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
App III and Cat/An Metals - EPA 200.7: B, Ca, Fe, Mg, Mn, K, Na	Grant Morey/WP	5-4-23	1600	[signature]	5/5	0516	1.8	Y	Y	Y
**- App IV Metals - EPA 200.7 - Ba, Be, Co, Pb, Li, Mo 200.8 Metals - Sb, As, Cd, Cr, Se, Tl							0.3			
							2.5			
Radium 226/228 to Pace PA										

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

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Grant Morey

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 05/04/23

Memorandum

June 28, 2023

To:	Project File Rocksmith Geoengineering, LLC	**Project Number:**	23009
CC:	Mark Haddock, Jeffrey Ingram		
From:	Grant Morey	**Email:**	Grant.Morey@Rocksmithgeo.com
RE:	**Data Validation Summary, Sioux Energy Center – SCL4A – Data Package 60428019**		

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 Method Detection Limit (MDL) and Practical Quantification Limit (PQL), the results were recorded at the detection value and qualified as estimates (J).
- When a duplicate criterion was not met, the associated sample result was qualified as an estimate (J for detects, UJ for non-detects).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Rocksmith Geoengineering
Project Manager: J. Ingram
Project Name: Ameren SCL4A
Project Number: 23009
Reviewer: G. Morey
Validation Date: 6/28/2023

Laboratory: Pace Analytical
SDG #: 60428019
Analytical Method (type and no.): EPA 200.7 (Total Metals); SM 2320B (Alkalinity); SM 2540C (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			5/2/2023 - 5/4/2023
b) Sampling team indicated?	x			GTM
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, Spec 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	No lab narrative.

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)?	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			See Notes
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			

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:

General:

Chloride and/or Sulfate were diluted in some samples; no qualification necessary.

Method Blanks:

3349216: Calcium (28.7J), Iron (9.3J), and Manganese (1.1J). Associated with samples -001 and -002.

Calcium and Manganese results > RL and 10x blank, no qualification necessary. Iron results non-detect, no qualification.

QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

Comments/Notes:

Method Blanks (continued):

3354610: Boron (7.1J), associated with sample -010. Result > RL and 10x blank, no qualification necessary.

Field Blanks:

S-SCL4A-FB-1 @ S-TMW-2: Manganese (0.44J) and TDS (9.0). Results > RL and 10x blank, no qualification necessary.

Duplicates:

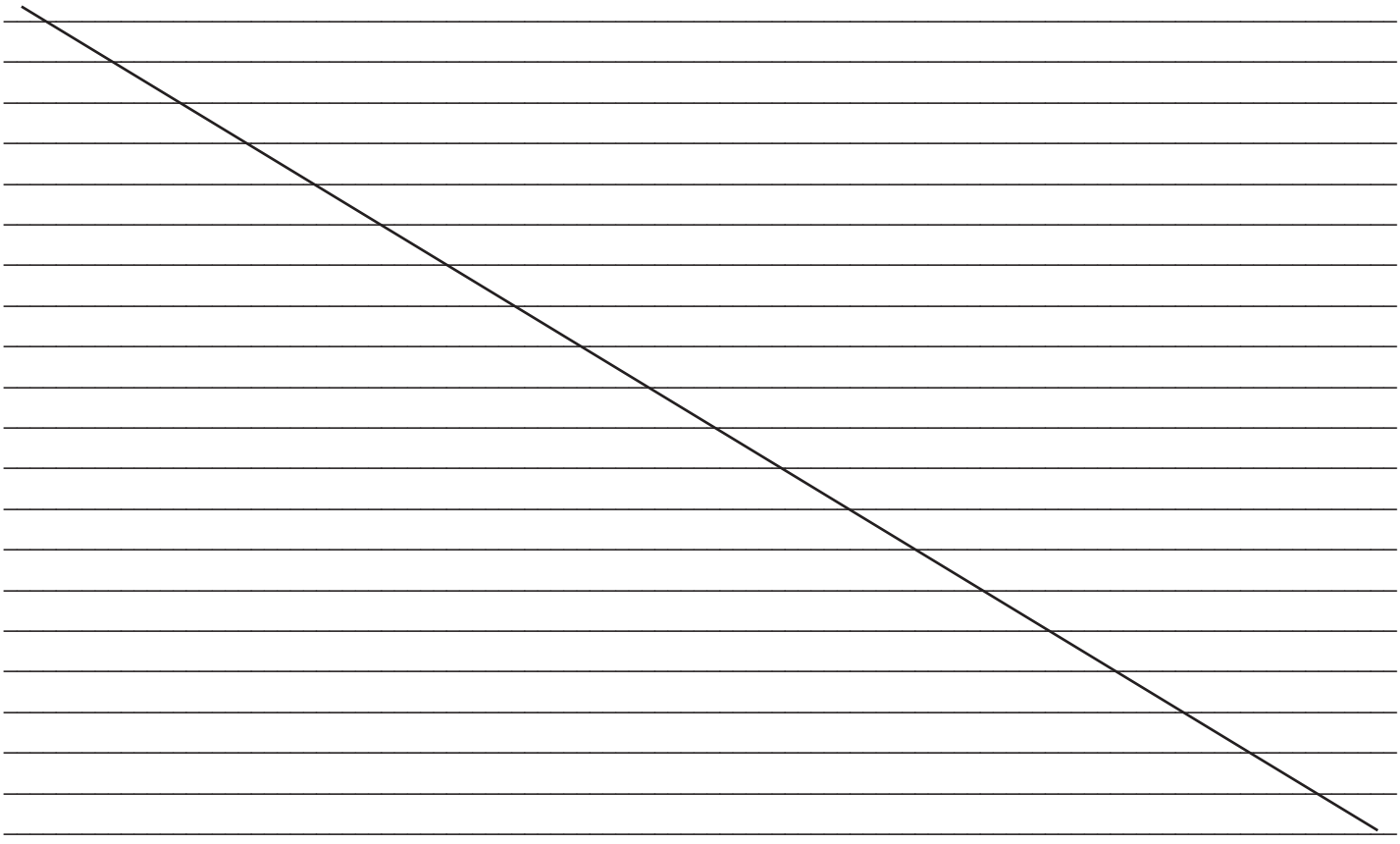
S-SCL4A-DUP-1 @ S-TMW-1: RPD exceeds control limits for Iron (33%) and TDS (148%). Results qualified as estimates.

Lab duplicate Max RPD: 10%: Alkalinity, TDS; 15%: Chloride, Fluoride, Sulfate

MS/MSD:

3354613/3354614: MSD recovery low for Calcium, associated with sample -022. MS recovery and RPD within control limits. Only one QC indicator out, no qualification necessary.

3353925/3353926: MS recovery high for Sulfate, associated with sample -002. MSD recovery and RPD within control limits. Only one QC indicator out, no qualification necessary.



QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-TMW-1	Iron	10.7	J	Field DUP RPD exceeds control limits
S-SCL4A-DUP-1	"	14.9	J	"
S-TMW-1	TDS	411	J	"
S-SCL4A-DUP-1	"	62	J	"

QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason

Signature: Grant Morey Date: 06/28/2023

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

August 03, 2023

Mark Haddock
Rocksmith Geoengineering, LLC.
5233 Roanoke Drive
Saint Charles, MO 63304

RE: Project: AMEREN-VERIFICATION, SCL4A
Pace Project No.: 60432864

Dear Mark Haddock:

Enclosed are the analytical results for sample(s) received by the laboratory on July 12, 2023. 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

REV-1, 8/3/23: Per client request, Sulfate added to TMW-1.

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: Jeffrey Ingram, Rocksmith Geoengineering, LLC.
Grant Morey, Rocksmith Geoengineering, LLC.

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

CERTIFICATIONS

Project: AMEREN-VERIFICATION, SCL4A
Pace Project No.: 60432864

Pace Analytical Services Kansas
9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Inorganic Drinking Water Certification #: 10090
Arkansas Drinking Water
Arkansas Certification #: 88-00679
Illinois Certification #: 2000302023-5
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212023-1
Oklahoma Certification #: 2022-057
Florida: Cert E871149 SEKS WET
Texas Certification #: T104704407-22-16
Utah Certification #: KS000212022-12
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-VERIFICATION, SCL4A
Pace Project No.: 60432864

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60432864001	**S--TMW-3**	Water	07/11/23 12:02	07/12/23 04:58
60432864002	**S-SCL4A-FB-1**	Water	07/11/23 10:02	07/12/23 04:58
60432864003	**S-SCL4A-DUP-1**	Water	07/11/23 00:00	07/12/23 04:58
60432864004	**S-TMW-1**	Water	07/11/23 10:50	07/12/23 04:58

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SAMPLE ANALYTE COUNT

Project: AMEREN-VERIFICATION, SCL4A
Pace Project No.: 60432864

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60432864001	**S--TMW-3**	EPA 300.0	CRN2	1	PASI-K
60432864002	**S-SCL4A-FB-1**	EPA 300.0	CRN2	1	PASI-K
60432864003	**S-SCL4A-DUP-1**	EPA 300.0	CRN2	1	PASI-K
60432864004	**S-TMW-1**	EPA 300.0	CRN2, MLD	2	PASI-K

PASI-K = Pace Analytical Services - Kansas City

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

ANALYTICAL RESULTS

Project: AMEREN-VERIFICATION, SCL4A
Pace Project No.: 60432864

Sample: S--TMW-3 **Lab ID: 60432864001** Collected: 07/11/23 12:02 Received: 07/12/23 04:58 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								
Chloride	**3.1**	mg/L	1.0	0.53	1		07/18/23 15:28	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN-VERIFICATION, SCL4A
Pace Project No.: 60432864

Sample: S-SCL4A-FB-1 **Lab ID: 60432864002** Collected: 07/11/23 10:02 Received: 07/12/23 04:58 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								
Chloride	**<0.53**	mg/L	1.0	0.53	1		07/18/23 15:41	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN-VERIFICATION, SCL4A
Pace Project No.: 60432864

Sample: S-SCL4A-DUP-1 **Lab ID: 60432864003** Collected: 07/11/23 00:00 Received: 07/12/23 04:58 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								
Chloride	**3.3**	mg/L	1.0	0.53	1		07/18/23 15:53	16887-00-6	

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN-VERIFICATION, SCL4A
Pace Project No.: 60432864

Sample: S-TMW-1 **Lab ID: 60432864004** Collected: 07/11/23 10:50 Received: 07/12/23 04:58 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								
Chloride	**3.1**	mg/L	1.0	0.53	1		07/18/23 16:06	16887-00-6	
Sulfate	**57.7**	mg/L	10.0	5.5	10		08/01/23 10:24	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN-VERIFICATION, SCL4A
Pace Project No.: 60432864

QC Batch: 856699
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: 60432864001, 60432864002, 60432864003, 60432864004

METHOD BLANK: 3392849 Matrix: Water
Associated Lab Samples: 60432864001, 60432864002, 60432864003, 60432864004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	07/18/23 08:52	

LABORATORY CONTROL SAMPLE: 3392850

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

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3392851 3392852

Parameter	Units	60432864004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	2.9	5	5	7.1	7.7	80	92	80-120	8	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3392854 3392855

Parameter	Units	60432876002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	10.0	50	50	57.1	56.2	94	92	80-120	2	15	

SAMPLE DUPLICATE: 3392853

Parameter	Units	60432864004 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	2.9	3.0	3	15	

SAMPLE DUPLICATE: 3392856

Parameter	Units	60432876002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	10.0	9.8J		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-VERIFICATION, SCL4A
Pace Project No.: 60432864

QC Batch: 858322
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: 60432864004

METHOD BLANK: 3399218 Matrix: Water
Associated Lab Samples: 60432864004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	<0.55	1.0	0.55	08/01/23 09:04	

METHOD BLANK: 3401223 Matrix: Water
Associated Lab Samples: 60432864004

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Sulfate	mg/L	<0.55	1.0	0.55	08/02/23 10:24	

LABORATORY CONTROL SAMPLE: 3399219

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.1	103	90-110	

LABORATORY CONTROL SAMPLE: 3401224

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Sulfate	mg/L	5	5.4	108	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3399221 3399222

Parameter	Units	60432864004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Sulfate	mg/L	57.7	50	50	107	105	99	95	80-120	2	15	

SAMPLE DUPLICATE: 3399220

Parameter	Units	60432864004 Result	Dup Result	RPD	Max RPD	Qualifiers
Sulfate	mg/L	57.7	57.4	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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QUALIFIERS

Project: AMEREN-VERIFICATION, SCL4A
Pace Project No.: 60432864

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.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

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

TNI - The NELAC Institute.

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

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN-VERIFICATION, SCL4A
Pace Project No.: 60432864

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60432864001	**S--TMW-3**	EPA 300.0	856699		
60432864002	**S-SCL4A-FB-1**	EPA 300.0	856699		
60432864003	**S-SCL4A-DUP-1**	EPA 300.0	856699		
60432864004	**S-TMW-1**	EPA 300.0	856699		
60432864004	**S-TMW-1**	EPA 300.0	858322		

WO# : 60432864

60432864

Pace ANALYTICAL SERVICES	DC#_Title: ENV-FRM-LENE-0009_Samp	
	Revision: 2	Effective Date: 01/12/20

Client Name: Rocksmith

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 ☑ Epic

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

Cooler Temperature (°C): **As-read** 1.5 **Corr. Factor** +0.2 **Corrected** 1.7

Date and initials of person examining contents: 07.12.2023 KL

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: _____

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.

G043 2864

Page: 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Rocksmith Geoengineering, LLC	Report To:	Mark Haddock	Attention:	
Address:	5233 Roanoke Drive	Copy To:	Jeffery Ingram, Grant Morey	Company Name:	Rocksmith
	St. Charles, MO 63304			Address:	
Email To:	mark.haddock@rocksmithgeo.com	Purchase Order No.:	COC #1	Pace Quote Reference:	
Phone: 314-974-5678	Fax:	Project Name:	Ameren - Verification Sampling	Pace Project Manager:	Jamie Church
Requested Due Date/TAT:	Standard	Project Number:	COC#1	Pace Profile #:	15856, line 1

REGULATORY AGENCY

- [ ] NPDES
- [x] 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): N N N N N N N N N 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	Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test	TDS	Sulfate	Chloride	Boron	TOX	Calcium	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	S-TMW-3	WT	G			7/11	602		1												1					
2	S-ECL4A-FB-1	WT	G				1002																			
3	S-SCL4A-Dup-1	WT	G				—																			
4	S-TMW-1	WT	G				1050																			
5	S-SCL4A-MS	WT	G				1050																			Collected at
6	S-SCL4A-MSD	WT	G				1050																			TMW-3
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			
	J. Ingram / Rocksmith	7/11/23	1330	[illegible signature]	7.12.23	0458	1.7	Y	Y	Y
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Jeff Ingram

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 7/11/23

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

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

Client: Rock Smith Profile #

Site: Ameran - Verification Samp. Notes

COC Line Item	Matrix	VG9H	DG9H	DG9Q	VG9U	DG9U	DG9M	DG9B	BG1U	AG1H	AG1U	AG2U	AG3S	AG4U	AG5U	JGFU	WGKU	WGDU	BP1U	BP2U	BP3U	BP1N	BP3N	BP3F	BP3S	BP3C	BP3Z	WPDU	ZPLC	Other		
1	WT																			1												
2	WT																			1												
3	WT																			1												
4	WT			RQS																3												
5	1																															
6	1																															
7																																
8																																
9																																
10																																
11																																
12																																

Container Codes

Glass			
DG9B	40mL bisulfate clear vial	WGKU	8oz clear soil jar
DG9H	40mL HCl amber voa vial	WGFU	4oz clear soil jar
DG9M	40mL MeOH clear vial	WG2U	2oz clear soil jar
DG9Q	40mL TSP amber vial	JGFU	4oz unpreserved amber wide
DG9S	40mL H2SO4 amber vial	AG0U	100mL unores amber glass
DG9T	40mL Na Thio amber vial	AG1H	1L HCl amber glass
DG9U	40mL amber unpreserved	AG1S	1L H2SO4 amber glass
VG9H	40mL HCl clear vial	AG1T	1L Na Thiosulfate clear/amber glass
VG9T	40mL Na Thio. clear vial	AG1U	1liter unpres amber glass
VG9U	40mL unpreserved clear vial	AG2N	500mL HNO3 amber glass
BG1S	1liter H2SO4 clear glass	AG2S	500mL H2SO4 amber glass
BG1U	1liter unpres glass	AG3S	250mL H2SO4 amber glass
BG3H	250mL HCL Clear glass	AG2U	500mL unpres amber glass
BG3U	250mL Unpres Clear glass	AG3U	250mL unpres amber glass
WGDU	16oz clear soil jar	AG4U	125mL unpres amber glass
		AG5U	100mL unpres amber glass

Plastic	
BP1C	1L NAOH plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn Acetate
BP2C	500mL NAOH plastic
BP2N	500mL HNO3 plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Acetate
BP3C	250mL NaOH plastic
BP3F	250mL HNO3 plastic - field filtered
BP3N	250mL HNO3 plastic
BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Acetate
BP4U	125mL unpreserved plastic
BP4N	125mL HNO3 plastic
BP4S	125mL H2SO4 plastic
WPDU	16oz unpresserved plstic

Misc.	
I	Wipe/Swab
SP5T	120mL Coliform Na Thiosulfate
ZPLC	Ziploc Bag
AF	Air Filter
C	Air Cassettes
R	Terracore Kit
U	Summa Can

Matrix	
WT	Water
SL	Solid
NAL	Non-aqueous Liquid
OL	OIL
WP	Wipe
DW	Drinking Water

Work Order Number: 66432864

Memorandum

August 10, 2023

To:	Project File Rocksmith Geoengineering, LLC	**Project Number:**	23009
CC:	Mark Haddock, Jeffrey Ingram		
From:	Grant Morey	**Email:**	Grant.Morey@Rocksmithgeo.com
RE:	**Data Validation Summary, Sioux Energy Center – SCL4A Verification – Data Package 60432864**		

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

- None.

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Rocksmith Geoengineering
Project Manager: J. Ingram
Project Name: Ameren SCL4A Verification
Project Number: 23009
Reviewer: G. Morey
Validation Date: 8/10/2023

Laboratory: Pace Analytical
SDG #: 60432864
Analytical Method (type and no.): EPA 300.0 (Chloride, Sulfate)
Matrix: ☐ Air ☐ Soil/Sed. ■ Water ☐ Waste ☐ _____
Sample Names S-TMW-3, S-SCL4A-FB-1, S-SCL4A-DUP-1, S-TMW-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			7/11/2023
b) Sampling team indicated?	x			JSI
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, Spec 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	No lab narrative.

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			DF of Sulfate: 10
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)?	☒	☐	☐	S-SCL4A-DUP-1 @ S-TMW-3
b) Were field dup. precision criteria met (note RPD)?	☒	☐	☐	RPD = 6.25% (Chloride)
c) Were lab duplicates analyzed (note original and duplicate samples)?	☒	☐	☐	
d) Were lab dup. precision criteria met (note RPD)?	☒	☐	☐	

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

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

Comments/Notes:

No qualifications necessary.

QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason

Signature: Grant Morey Date: 08/10/2023

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

December 27, 2023

Mark Haddock
Rocksmith Geoengineering, LLC.
2320 Creve Coeur Mill Road
Maryland Heights, MO 63043

RE: Project: AMEREN SCL4A
Pace Project No.: 60442093

Dear Mark Haddock:

Enclosed are the analytical results for sample(s) received by the laboratory between November 11, 2023 and November 15, 2023. 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: Jeffrey Ingram, Rocksmith Geoengineering, LLC.
Grant Morey, Rocksmith Geoengineering, LLC.

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

CERTIFICATIONS

Project: AMEREN SCL4A
Pace Project No.: 60442093

Pace Analytical Services Kansas

9608 Loiret Boulevard, Lenexa, KS 66219
Missouri Inorganic Drinking Water Certification #: 10090
Arkansas Drinking Water
Arkansas Certification #: 88-00679
Illinois Certification #: 2000302023-5
Iowa Certification #: 118
Kansas/NELAP Certification #: E-10116
Louisiana Certification #: 03055
Nevada Certification #: KS000212023-1
Oklahoma Certification #: 2022-057
Florida: Cert E871149 SEKS WET
Texas Certification #: T104704407-23-17
Utah Certification #: KS000212022-12
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 SCL4A
Pace Project No.: 60442093

Lab ID	Sample ID	Matrix	Date Collected	Date Received
60442093001	**S-TMW-1**	Water	11/13/23 13:25	11/15/23 05:11
60442093002	**S-TMW-2**	Water	11/13/23 14:20	11/15/23 05:11
60442093003	**S-TMW-3**	Water	11/13/23 15:05	11/15/23 05:11
60442093004	**S-SCL4A-DUP-1**	Water	11/13/23 08:00	11/15/23 05:11
60442093005	**S-SCL4A-FB-1**	Water	11/13/23 13:22	11/15/23 05:11
60441897019	**S-UG-3**	Water	11/13/23 12:20	11/15/23 05:11
60441897001	**S-BMW-1S**	Water	11/10/23 09:57	11/11/23 04:50
60441897002	**S-BMW-3S**	Water	11/10/23 09:18	11/11/23 04:50

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

SAMPLE ANALYTE COUNT

Project: AMEREN SCL4A
Pace Project No.: 60442093

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
60442093001	**S-TMW-1**	EPA 200.7	JXD	7	PASI-K
		SM 2320B	BMT	1	PASI-K
		SM 2540C	ZVF	1	PASI-K
		EPA 300.0	RKA	3	PASI-K
60442093002	**S-TMW-2**	EPA 200.7	JXD	7	PASI-K
		SM 2320B	BMT	1	PASI-K
		SM 2540C	ZVF	1	PASI-K
		EPA 300.0	RKA	3	PASI-K
60442093003	**S-TMW-3**	EPA 200.7	JXD	7	PASI-K
		SM 2320B	BMT	1	PASI-K
		SM 2540C	ZVF	1	PASI-K
		EPA 300.0	RKA	3	PASI-K
60442093004	**S-SCL4A-DUP-1**	EPA 200.7	JXD	7	PASI-K
		SM 2320B	BMT	1	PASI-K
		SM 2540C	ZVF	1	PASI-K
		EPA 300.0	RKA	3	PASI-K
60442093005	**S-SCL4A-FB-1**	EPA 200.7	JXD	7	PASI-K
		SM 2320B	BMT	1	PASI-K
		SM 2540C	ZVF	1	PASI-K
		EPA 300.0	RKA	3	PASI-K
60441897019	**S-UG-3**	EPA 200.7	JXD	7	PASI-K
		SM 2320B	BMT	1	PASI-K
		SM 2540C	ZVF	1	PASI-K
		EPA 300.0	RKA	3	PASI-K
60441897001	**S-BMW-1S**	EPA 200.7	JXD	7	PASI-K
		SM 2320B	BMT	1	PASI-K
		SM 2540C	ZVF	1	PASI-K
		EPA 300.0	RKA	3	PASI-K
60441897002	**S-BMW-3S**	EPA 200.7	JXD	7	PASI-K
		SM 2320B	BMT	1	PASI-K
		SM 2540C	ZVF	1	PASI-K
		EPA 300.0	RKA	3	PASI-K

PASI-K = Pace Analytical Services - Kansas City

REPORT OF LABORATORY ANALYSIS

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

ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60442093

Sample: S-TMW-1 **Lab ID: 60442093001** Collected: 11/13/23 13:25 Received: 11/15/23 05:11 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	**80.2J**	ug/L	100	6.4	1	11/29/23 12:57	12/01/23 13:57	7440-42-8	
Calcium	**107000**	ug/L	200	26.9	1	11/29/23 12:57	12/01/23 13:57	7440-70-2	
Iron	**<9.1**	ug/L	50.0	9.1	1	11/29/23 12:57	12/01/23 13:57	7439-89-6	
Magnesium	**18500**	ug/L	50.0	20.1	1	11/29/23 12:57	12/01/23 13:57	7439-95-4	
Manganese	**278**	ug/L	5.0	0.39	1	11/29/23 12:57	12/01/23 13:57	7439-96-5	
Potassium	**5730**	ug/L	500	69.7	1	11/29/23 12:57	12/01/23 13:57	7440-09-7	
Sodium	**3510**	ug/L	500	115	1	11/29/23 12:57	12/01/23 14:10	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**279**	mg/L	20.0	10.5	1		11/22/23 19:07		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**368**	mg/L	10.0	10.0	1		11/20/23 14:26		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**2.3**	mg/L	1.0	0.53	1		12/07/23 23:39	16887-00-6	
Fluoride	**<0.12**	mg/L	0.20	0.12	1		12/07/23 23:39	16984-48-8	L1
Sulfate	**54.8**	mg/L	10.0	5.5	10		12/07/23 23:50	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
Pace Project No.: 60442093

Sample: S-TMW-2 **Lab ID: 60442093002** Collected: 11/13/23 14:20 Received: 11/15/23 05:11 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	**85.9J**	ug/L	100	6.4	1	11/30/23 10:05	12/04/23 10:39	7440-42-8	
Calcium	**123000**	ug/L	200	26.9	1	11/30/23 10:05	12/04/23 10:39	7440-70-2	
Iron	**2250**	ug/L	50.0	9.1	1	11/30/23 10:05	12/04/23 10:39	7439-89-6	
Magnesium	**21700**	ug/L	50.0	20.1	1	11/30/23 10:05	12/04/23 10:39	7439-95-4	
Manganese	**431**	ug/L	5.0	0.39	1	11/30/23 10:05	12/04/23 10:39	7439-96-5	
Potassium	**5290**	ug/L	500	69.7	1	11/30/23 10:05	12/04/23 10:39	7440-09-7	
Sodium	**4450**	ug/L	500	115	1	11/30/23 10:05	12/04/23 10:39	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**379**	mg/L	20.0	10.5	1		11/22/23 19:12		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**430**	mg/L	10.0	10.0	1		11/20/23 14:26		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**5.8**	mg/L	1.0	0.53	1		12/11/23 21:49	16887-00-6	
Fluoride	**<0.12**	mg/L	0.20	0.12	1		12/11/23 21:49	16984-48-8	L1
Sulfate	**28.8**	mg/L	10.0	5.5	10		12/11/23 22:58	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60442093

Sample: S-TMW-3 **Lab ID: 60442093003** Collected: 11/13/23 15:05 Received: 11/15/23 05:11 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	**96.1J**	ug/L	100	6.4	1	11/30/23 10:05	12/04/23 10:45	7440-42-8	
Calcium	**134000**	ug/L	200	26.9	1	11/30/23 10:05	12/04/23 10:45	7440-70-2	
Iron	**1320**	ug/L	50.0	9.1	1	11/30/23 10:05	12/04/23 10:45	7439-89-6	
Magnesium	**24000**	ug/L	50.0	20.1	1	11/30/23 10:05	12/04/23 10:45	7439-95-4	
Manganese	**620**	ug/L	5.0	0.39	1	11/30/23 10:05	12/04/23 10:45	7439-96-5	
Potassium	**6430**	ug/L	500	69.7	1	11/30/23 10:05	12/04/23 10:45	7440-09-7	
Sodium	**4980**	ug/L	500	115	1	11/30/23 10:05	12/04/23 10:45	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**399**	mg/L	20.0	10.5	1		11/22/23 19:36		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**475**	mg/L	10.0	10.0	1		11/20/23 13:13		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**5.1**	mg/L	1.0	0.53	1		12/11/23 23:43	16887-00-6	
Fluoride	**<0.12**	mg/L	0.20	0.12	1		12/11/23 23:43	16984-48-8	L1
Sulfate	**40.9**	mg/L	10.0	5.5	10		12/11/23 23:54	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60442093

Sample: S-SCL4A-DUP-1 **Lab ID: 60442093004** Collected: 11/13/23 08:00 Received: 11/15/23 05:11 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	**92.7J**	ug/L	100	6.4	1	11/30/23 10:05	12/04/23 10:47	7440-42-8	
Calcium	**131000**	ug/L	200	26.9	1	11/30/23 10:05	12/04/23 10:47	7440-70-2	
Iron	**1400**	ug/L	50.0	9.1	1	11/30/23 10:05	12/04/23 10:47	7439-89-6	
Magnesium	**23600**	ug/L	50.0	20.1	1	11/30/23 10:05	12/04/23 10:47	7439-95-4	
Manganese	**601**	ug/L	5.0	0.39	1	11/30/23 10:05	12/04/23 10:47	7439-96-5	
Potassium	**6190**	ug/L	500	69.7	1	11/30/23 10:05	12/04/23 10:47	7440-09-7	
Sodium	**4840**	ug/L	500	115	1	11/30/23 10:05	12/04/23 10:47	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**389**	mg/L	20.0	10.5	1		11/22/23 19:42		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**478**	mg/L	10.0	10.0	1		11/20/23 13:13		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**4.9**	mg/L	1.0	0.53	1		12/12/23 00:06	16887-00-6	H1
Fluoride	**<0.12**	mg/L	0.20	0.12	1		12/12/23 00:06	16984-48-8	H1,L1
Sulfate	**43.1**	mg/L	10.0	5.5	10		12/12/23 00:17	14808-79-8	H1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60442093

Sample: S-SCL4A-FB-1 **Lab ID: 60442093005** Collected: 11/13/23 13:22 Received: 11/15/23 05:11 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	**<6.4**	ug/L	100	6.4	1	11/30/23 10:05	12/04/23 10:56	7440-42-8	
Calcium	**<26.9**	ug/L	200	26.9	1	11/30/23 10:05	12/04/23 10:56	7440-70-2	
Iron	**<9.1**	ug/L	50.0	9.1	1	11/30/23 10:05	12/04/23 10:56	7439-89-6	
Magnesium	**<20.1**	ug/L	50.0	20.1	1	11/30/23 10:05	12/04/23 10:56	7439-95-4	
Manganese	**12.0**	ug/L	5.0	0.39	1	11/30/23 10:05	12/04/23 10:56	7439-96-5	
Potassium	**<69.7**	ug/L	500	69.7	1	11/30/23 10:05	12/04/23 10:56	7440-09-7	
Sodium	**<115**	ug/L	500	115	1	11/30/23 10:05	12/04/23 10:56	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**14.1J**	mg/L	20.0	10.5	1		11/22/23 19:49		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**<5.0**	mg/L	5.0	5.0	1		11/20/23 13:13		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**<0.53**	mg/L	1.0	0.53	1		12/12/23 00:28	16887-00-6	H1
Fluoride	**<0.12**	mg/L	0.20	0.12	1		12/12/23 00:28	16984-48-8	H1,L1
Sulfate	**<0.55**	mg/L	1.0	0.55	1		12/12/23 00:28	14808-79-8	H1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60442093

Sample: S-UG-3 **Lab ID: 60441897019** Collected: 11/13/23 12:20 Received: 11/15/23 05:11 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	**638**	ug/L	100	6.4	1	12/04/23 12:31	12/05/23 10:17	7440-42-8	
Calcium	**107000**	ug/L	200	26.9	1	12/04/23 12:31	12/05/23 10:17	7440-70-2	
Iron	**14.8J**	ug/L	50.0	9.1	1	12/04/23 12:31	12/05/23 10:17	7439-89-6	
Magnesium	**20800**	ug/L	50.0	20.1	1	12/04/23 12:31	12/05/23 10:17	7439-95-4	
Manganese	**1080**	ug/L	5.0	0.39	1	12/04/23 12:31	12/05/23 10:17	7439-96-5	
Potassium	**5030**	ug/L	500	69.7	1	12/04/23 12:31	12/05/23 10:17	7440-09-7	
Sodium	**45800**	ug/L	500	115	1	12/04/23 12:31	12/05/23 10:17	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**333**	mg/L	20.0	10.5	1		11/23/23 11:04		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**504**	mg/L	10.0	10.0	1		11/20/23 15:49		2e
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**34.5**	mg/L	5.0	2.6	5		12/14/23 16:34	16887-00-6	H1
Fluoride	**<0.12**	mg/L	0.20	0.12	1		12/13/23 17:58	16984-48-8	H1,L1
Sulfate	**65.0**	mg/L	5.0	2.8	5		12/14/23 16:34	14808-79-8	H1

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60442093

Sample: S-BMW-1S **Lab ID: 60441897001** Collected: 11/10/23 09:57 Received: 11/11/23 04:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City								
Boron	**57.9J**	ug/L	100	6.4	1	11/28/23 12:31	11/29/23 10:15	7440-42-8	
Calcium	**136000**	ug/L	200	26.9	1	11/28/23 12:31	11/29/23 10:15	7440-70-2	
Iron	**57.0**	ug/L	50.0	9.1	1	11/28/23 12:31	11/29/23 10:15	7439-89-6	
Magnesium	**26600**	ug/L	50.0	20.1	1	11/28/23 12:31	11/29/23 10:15	7439-95-4	
Manganese	**489**	ug/L	5.0	0.39	1	11/28/23 12:31	11/29/23 10:15	7439-96-5	
Potassium	**633**	ug/L	500	69.7	1	11/28/23 12:31	11/29/23 10:15	7440-09-7	
Sodium	**5970**	ug/L	500	115	1	11/28/23 12:31	11/29/23 10:15	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**427**	mg/L	20.0	10.5	1		11/21/23 20:50		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**475**	mg/L	10.0	10.0	1		11/17/23 14:43		
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**7.2**	mg/L	1.0	0.53	1		12/07/23 13:26	16887-00-6	
Fluoride	**<0.12**	mg/L	0.20	0.12	1		12/07/23 13:26	16984-48-8	L1
Sulfate	**46.9**	mg/L	5.0	2.8	5		12/08/23 21:55	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: AMEREN SCL4A
Pace Project No.: 60442093

Sample: S-BMW-3S **Lab ID: 60441897002** Collected: 11/10/23 09:18 Received: 11/11/23 04:50 Matrix: Water

Parameters	Results	Units	PQL	MDL	DF	Prepared	Analyzed	CAS No.	Qual
200.7 Metals, Total	Analytical Method: EPA 200.7 Preparation Method: EPA 200.7 Pace Analytical Services - Kansas City								
Boron	**58.9J**	ug/L	100	6.4	1	11/28/23 12:31	11/29/23 10:17	7440-42-8	
Calcium	**114000**	ug/L	200	26.9	1	11/28/23 12:31	11/29/23 10:17	7440-70-2	
Iron	**58.0**	ug/L	50.0	9.1	1	11/28/23 12:31	11/29/23 10:17	7439-89-6	
Magnesium	**20700**	ug/L	50.0	20.1	1	11/28/23 12:31	11/29/23 10:17	7439-95-4	
Manganese	**211**	ug/L	5.0	0.39	1	11/28/23 12:31	11/29/23 10:17	7439-96-5	
Potassium	**717**	ug/L	500	69.7	1	11/28/23 12:31	11/29/23 10:17	7440-09-7	
Sodium	**5960**	ug/L	500	115	1	11/28/23 12:31	11/29/23 10:17	7440-23-5	
2320B Alkalinity	Analytical Method: SM 2320B Pace Analytical Services - Kansas City								
Alkalinity, Total as CaCO3	**357**	mg/L	20.0	10.5	1		11/21/23 20:55		
2540C Total Dissolved Solids	Analytical Method: SM 2540C Pace Analytical Services - Kansas City								
Total Dissolved Solids	**398**	mg/L	10.0	10.0	1		11/17/23 14:43		1e
300.0 IC Anions 28 Days	Analytical Method: EPA 300.0 Pace Analytical Services - Kansas City								
Chloride	**13.4**	mg/L	1.0	0.53	1		12/07/23 13:49	16887-00-6	
Fluoride	**<0.12**	mg/L	0.20	0.12	1		12/07/23 13:49	16984-48-8	L1
Sulfate	**12.3**	mg/L	1.0	0.55	1		12/07/23 13:49	14808-79-8	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

QC Batch: 874935
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: 60441897001, 60441897002

METHOD BLANK: 3465241 Matrix: Water
Associated Lab Samples: 60441897001, 60441897002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<6.4	100	6.4	11/29/23 10:04	
Calcium	ug/L	<26.9	200	26.9	11/29/23 10:04	
Iron	ug/L	<9.1	50.0	9.1	11/29/23 10:04	
Magnesium	ug/L	<20.1	50.0	20.1	11/29/23 10:04	
Manganese	ug/L	<0.39	5.0	0.39	11/29/23 10:04	
Potassium	ug/L	<69.7	500	69.7	11/29/23 10:04	
Sodium	ug/L	<115	500	115	11/29/23 10:04	

LABORATORY CONTROL SAMPLE: 3465242

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	935	94	85-115	
Calcium	ug/L	10000	9590	96	85-115	
Iron	ug/L	10000	9850	98	85-115	
Magnesium	ug/L	10000	9550	95	85-115	
Manganese	ug/L	1000	1000	100	85-115	
Potassium	ug/L	10000	9440	94	85-115	
Sodium	ug/L	10000	9780	98	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3465243 3465244

Parameter	Units	60442540001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	420	1000	1000	1370	1320	95	90	70-130	4	20	
Calcium	ug/L	33500	10000	10000	43100	41500	96	79	70-130	4	20	
Iron	ug/L	992	10000	10000	10800	10400	98	94	70-130	4	20	
Magnesium	ug/L	10500	10000	10000	20000	19300	95	88	70-130	4	20	
Manganese	ug/L	395	1000	1000	1360	1310	96	92	70-130	3	20	
Potassium	ug/L	18900	10000	10000	30300	29400	115	105	70-130	3	20	
Sodium	ug/L	1780000	10000	10000	1810000	1730000	259	-572	70-130	5	20	E,M1

MATRIX SPIKE SAMPLE: 3465245

Parameter	Units	60442296002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	290	1000	1240	95	70-130	
Calcium	ug/L	104000	10000	112000	83	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 SCL4A
Pace Project No.: 60442093

MATRIX SPIKE SAMPLE: 3465245

Parameter	Units	60442296002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	270	10000	10100	98	70-130	
Magnesium	ug/L	52900	10000	62400	95	70-130	
Manganese	ug/L	73.5	1000	1070	100	70-130	
Potassium	ug/L	86000	10000	94800	88	70-130	
Sodium	ug/L	212000	10000	219000	67	70-130	M1

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

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

QC Batch: 875077
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: 60442093001

METHOD BLANK: 3465717 Matrix: Water
Associated Lab Samples: 60442093001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<6.4	100	6.4	11/30/23 14:27	
Calcium	ug/L	<26.9	200	26.9	11/30/23 14:27	
Iron	ug/L	<9.1	50.0	9.1	11/30/23 14:27	
Magnesium	ug/L	<20.1	50.0	20.1	11/30/23 14:27	
Manganese	ug/L	<0.39	5.0	0.39	11/30/23 14:27	
Potassium	ug/L	<69.7	500	69.7	11/30/23 14:27	
Sodium	ug/L	<115	500	115	11/30/23 14:27	

LABORATORY CONTROL SAMPLE: 3465718

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	962	96	85-115	
Calcium	ug/L	10000	10000	100	85-115	
Iron	ug/L	10000	10400	104	85-115	
Magnesium	ug/L	10000	9950	99	85-115	
Manganese	ug/L	1000	1060	106	85-115	
Potassium	ug/L	10000	9900	99	85-115	
Sodium	ug/L	10000	10400	104	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3465719 3465720

Parameter	Units	60442607001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	ND	1000	1000	1010	1030	97	98	70-130	1	20	
Calcium	ug/L	38.3 mg/L	10000	10000	48200	48200	100	100	70-130	0	20	
Iron	ug/L	2.5 mg/L	10000	10000	12900	13000	104	105	70-130	0	20	
Magnesium	ug/L	7.5 mg/L	10000	10000	17300	17500	99	100	70-130	1	20	
Manganese	ug/L	0.032 mg/L	1000	1000	1080	1090	105	106	70-130	1	20	
Potassium	ug/L	5.6 mg/L	10000	10000	15900	16100	103	104	70-130	1	20	
Sodium	ug/L	70.4 mg/L	10000	10000	81000	81000	106	106	70-130	0	20	

MATRIX SPIKE SAMPLE: 3465721

Parameter	Units	60442668002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	0.47 mg/L	1000	1430	97	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

MATRIX SPIKE SAMPLE: 3465721

Parameter	Units	60442668002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Calcium	ug/L	293 mg/L	10000	309000	163	70-130	
Iron	ug/L	24.5 mg/L	10000	36900	124	70-130	
Magnesium	ug/L	53.5 mg/L	10000	65500	120	70-130	
Manganese	ug/L	1.1 mg/L	1000	2110	102	70-130	
Potassium	ug/L	25.5 mg/L	10000	38400	128	70-130	
Sodium	ug/L	249 mg/L	10000	265000	161	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

QC Batch: 875214
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: 60442093002, 60442093003, 60442093004, 60442093005

METHOD BLANK: 3466202 Matrix: Water
Associated Lab Samples: 60442093002, 60442093003, 60442093004, 60442093005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<6.4	100	6.4	12/04/23 10:31	
Calcium	ug/L	<26.9	200	26.9	12/04/23 10:31	
Iron	ug/L	<9.1	50.0	9.1	12/04/23 10:31	
Magnesium	ug/L	<20.1	50.0	20.1	12/04/23 10:31	
Manganese	ug/L	<0.39	5.0	0.39	12/04/23 10:31	
Potassium	ug/L	<69.7	500	69.7	12/04/23 10:31	
Sodium	ug/L	<115	500	115	12/04/23 10:31	

LABORATORY CONTROL SAMPLE: 3466203

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	959	96	85-115	
Calcium	ug/L	10000	10200	102	85-115	
Iron	ug/L	10000	9970	100	85-115	
Magnesium	ug/L	10000	9910	99	85-115	
Manganese	ug/L	1000	1010	101	85-115	
Potassium	ug/L	10000	10000	100	85-115	
Sodium	ug/L	10000	10000	100	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3466205 3466206

Parameter	Units	60442093002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	85.9J	1000	1000	1090	1040	100	95	70-130	5	20	
Calcium	ug/L	123000	10000	10000	136000	132000	130	89	70-130	3	20	
Iron	ug/L	2250	10000	10000	12500	12100	103	99	70-130	3	20	
Magnesium	ug/L	21700	10000	10000	32600	31400	109	97	70-130	4	20	
Manganese	ug/L	431	1000	1000	1470	1420	104	99	70-130	4	20	
Potassium	ug/L	5290	10000	10000	15700	15000	104	97	70-130	5	20	
Sodium	ug/L	4450	10000	10000	14400	13800	99	94	70-130	4	20	

MATRIX SPIKE SAMPLE: 3466207

Parameter	Units	60442101001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	214	1000	1190	98	70-130	
Calcium	ug/L	207000	10000	218000	111	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

MATRIX SPIKE SAMPLE: 3466207

Parameter	Units	60442101001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	77.2	10000	10200	101	70-130	
Magnesium	ug/L	43300	10000	53100	98	70-130	
Manganese	ug/L	124	1000	1150	103	70-130	
Potassium	ug/L	5190	10000	15400	102	70-130	
Sodium	ug/L	20900	10000	31000	102	70-130	

MATRIX SPIKE SAMPLE: 3466209

Parameter	Units	60442101004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1080	1000	2130	106	70-130	
Calcium	ug/L	203000	10000	226000	232	70-130	M1
Iron	ug/L	11.2J	10000	10300	103	70-130	
Magnesium	ug/L	67200	10000	80700	136	70-130	M1
Manganese	ug/L	154	1000	1200	104	70-130	
Potassium	ug/L	4910	10000	15700	108	70-130	
Sodium	ug/L	38600	10000	51200	126	70-130	

SAMPLE DUPLICATE: 3467972

Parameter	Units	60442101001 Result	Dup Result	RPD	Max RPD	Qualifiers
Boron	ug/L	214	215	0	20	
Calcium	ug/L	207000	206000	0	20	
Iron	ug/L	77.2	81.2	5	19	
Magnesium	ug/L	43300	43100	1	20	
Manganese	ug/L	124	125	1	12	
Potassium	ug/L	5190	5160	1	20	
Sodium	ug/L	20900	20700	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

QC Batch: 875648
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: 60441897019

METHOD BLANK: 3467866 Matrix: Water
Associated Lab Samples: 60441897019

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Boron	ug/L	<6.4	100	6.4	12/05/23 09:47	
Calcium	ug/L	<26.9	200	26.9	12/05/23 09:47	
Iron	ug/L	<9.1	50.0	9.1	12/05/23 09:47	
Magnesium	ug/L	<20.1	50.0	20.1	12/05/23 09:47	
Manganese	ug/L	<0.39	5.0	0.39	12/05/23 09:47	
Potassium	ug/L	<69.7	500	69.7	12/05/23 09:47	
Sodium	ug/L	<115	500	115	12/05/23 09:47	

LABORATORY CONTROL SAMPLE: 3467867

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	1000	975	97	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	1050	105	85-115	
Potassium	ug/L	10000	9710	97	85-115	
Sodium	ug/L	10000	10200	102	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3467868 3467869

Parameter	Units	60441897015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Boron	ug/L	92.3J	1000	1000	1080	1080	98	99	70-130	1	20	
Calcium	ug/L	270000	10000	10000	280000	284000	105	139	70-130	1	20	M1
Iron	ug/L	16700	10000	10000	26700	27000	100	103	70-130	1	20	
Magnesium	ug/L	74000	10000	10000	84500	85700	105	117	70-130	1	20	
Manganese	ug/L	1290	1000	1000	2310	2330	102	104	70-130	1	20	
Potassium	ug/L	6010	10000	10000	16300	16600	103	106	70-130	2	20	
Sodium	ug/L	21800	10000	10000	32600	33100	108	113	70-130	2	20	

MATRIX SPIKE SAMPLE: 3467870

Parameter	Units	60441897020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Boron	ug/L	58.8J	1000	1040	98	70-130	
Calcium	ug/L	115000	10000	125000	100	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

MATRIX SPIKE SAMPLE: 3467870

Parameter	Units	60441897020 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Iron	ug/L	6050	10000	16400	104	70-130	
Magnesium	ug/L	28400	10000	38800	103	70-130	
Manganese	ug/L	394	1000	1440	104	70-130	
Potassium	ug/L	3250	10000	13400	101	70-130	
Sodium	ug/L	7600	10000	18200	106	70-130	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

QC Batch: 874278
QC Batch Method: SM 2320B
Analysis Method: SM 2320B
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60441897001, 60441897002

METHOD BLANK: 3462786 Matrix: Water
Associated Lab Samples: 60441897001, 60441897002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<10.5	20.0	10.5	11/21/23 19:16	

LABORATORY CONTROL SAMPLE: 3462787

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	481	96	90-110	

SAMPLE DUPLICATE: 3462788

Parameter	Units	60441589019 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	475	483	2	10	

SAMPLE DUPLICATE: 3462789

Parameter	Units	60441862007 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	232	240	3	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

QC Batch: 874536 | Analysis Method: SM 2320B
QC Batch Method: SM 2320B | Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60442093001, 60442093002, 60442093003, 60442093004, 60442093005

METHOD BLANK: 3463831 Matrix: Water
Associated Lab Samples: 60442093001, 60442093002, 60442093003, 60442093004, 60442093005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<10.5	20.0	10.5	11/22/23 17:11	

LABORATORY CONTROL SAMPLE: 3463832

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	484	97	90-110	

SAMPLE DUPLICATE: 3463833

Parameter	Units	60442020013 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	411	405	2	10	

SAMPLE DUPLICATE: 3463834

Parameter	Units	60442093002 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	379	377	0	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

QC Batch: 874578
QC Batch Method: SM 2320B
Analysis Method: SM 2320B
Analysis Description: 2320B Alkalinity
Laboratory: Pace Analytical Services - Kansas City

Associated Lab Samples: 60441897019

METHOD BLANK: 3464006 Matrix: Water
Associated Lab Samples: 60441897019

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Alkalinity, Total as CaCO3	mg/L	<10.5	20.0	10.5	11/23/23 10:53	

LABORATORY CONTROL SAMPLE: 3464007

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Alkalinity, Total as CaCO3	mg/L	500	480	96	90-110	

SAMPLE DUPLICATE: 3464008

Parameter	Units	60441897019 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	333	340	2	10	

SAMPLE DUPLICATE: 3464009

Parameter	Units	60442041008 Result	Dup Result	RPD	Max RPD	Qualifiers
Alkalinity, Total as CaCO3	mg/L	183	186	2	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

QC Batch: 873904
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60441897001, 60441897002

METHOD BLANK: 3461231 Matrix: Water
Associated Lab Samples: 60441897001, 60441897002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/17/23 14:43	

LABORATORY CONTROL SAMPLE: 3461232

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	998	100	80-120	

SAMPLE DUPLICATE: 3461233

Parameter	Units	60441897001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	475	462	3	10	

SAMPLE DUPLICATE: 3461753

Parameter	Units	60441898004 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	345	366	6	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

QC Batch: 874089
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60442093001, 60442093002

METHOD BLANK: 3462069 Matrix: Water
Associated Lab Samples: 60442093001, 60442093002

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/20/23 14:23	

LABORATORY CONTROL SAMPLE: 3462070

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

SAMPLE DUPLICATE: 3462392

Parameter	Units	60442020013 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	868	881	2	10	

SAMPLE DUPLICATE: 3462393

Parameter	Units	60442093002 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	430	420	2	10	1e

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

QC Batch: 874090
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60442093003, 60442093004, 60442093005

METHOD BLANK: 3462073 Matrix: Water
Associated Lab Samples: 60442093003, 60442093004, 60442093005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/20/23 13:12	

LABORATORY CONTROL SAMPLE: 3462074

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	986	99	80-120	

SAMPLE DUPLICATE: 3462244

Parameter	Units	60442101001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	751	727	3	10	

SAMPLE DUPLICATE: 3462245

Parameter	Units	60442105001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	451	471	4	10	

SAMPLE DUPLICATE: 3462246

Parameter	Units	60442112001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	672	643	4	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

QC Batch: 874170
QC Batch Method: SM 2540C
Analysis Method: SM 2540C
Analysis Description: 2540C Total Dissolved Solids
Laboratory: Pace Analytical Services - Kansas City
Associated Lab Samples: 60441897019

METHOD BLANK: 3462407 Matrix: Water
Associated Lab Samples: 60441897019

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Total Dissolved Solids	mg/L	<5.0	5.0	5.0	11/20/23 15:48	

LABORATORY CONTROL SAMPLE: 3462408

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Dissolved Solids	mg/L	1000	934	93	80-120	

SAMPLE DUPLICATE: 3462071

Parameter	Units	60441897022 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	<5.0	13.0		10	1e

SAMPLE DUPLICATE: 3462409

Parameter	Units	60441897015 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Dissolved Solids	mg/L	1270	1260	1	10	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

QC Batch: 875885
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: 60441897001, 60441897002, 60442093001

METHOD BLANK: 3469019 Matrix: Water
Associated Lab Samples: 60441897001, 60441897002, 60442093001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	12/07/23 13:03	
Fluoride	mg/L	<0.12	0.20	0.12	12/07/23 13:03	
Sulfate	mg/L	<0.55	1.0	0.55	12/07/23 13:03	

METHOD BLANK: 3471852 Matrix: Water
Associated Lab Samples: 60441897001, 60441897002, 60442093001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	12/08/23 21:31	
Fluoride	mg/L	<0.12	0.20	0.12	12/08/23 21:31	
Sulfate	mg/L	<0.55	1.0	0.55	12/08/23 21:31	

LABORATORY CONTROL SAMPLE: 3469020

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.5	90	90-110	
Fluoride	mg/L	2.5	2.6	103	90-110	
Sulfate	mg/L	5	4.5	91	90-110	

LABORATORY CONTROL SAMPLE: 3471853

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	4.9	97	90-110	
Fluoride	mg/L	2.5	2.8	113	90-110	L1
Sulfate	mg/L	5	4.8	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3469021 3469022

Parameter	Units	60441898004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	23.8	25	25	48.4	48.2	99	98	80-120	0	15	H1
Fluoride	mg/L	0.15J	2.5	2.5	3.1	3.2	119	122	80-120	2	15	M1
Sulfate	mg/L	1.9	5	5	6.9	7.2	100	106	80-120	4	15	

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REPORT OF LABORATORY ANALYSIS

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

QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

SAMPLE DUPLICATE: 3469023

Parameter	Units	60441898004 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	23.8	23.0	3	15	H1
Fluoride	mg/L	0.15J	0.15J		15	
Sulfate	mg/L	1.9	1.7	9	15	

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

QC Batch: 876463
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: 60442093002, 60442093003, 60442093004, 60442093005

METHOD BLANK: 3471507 Matrix: Water
Associated Lab Samples: 60442093002, 60442093003, 60442093004, 60442093005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	12/11/23 21:27	
Fluoride	mg/L	<0.12	0.20	0.12	12/11/23 21:27	
Sulfate	mg/L	<0.55	1.0	0.55	12/11/23 21:27	

METHOD BLANK: 3474186 Matrix: Water
Associated Lab Samples: 60442093002, 60442093003, 60442093004, 60442093005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	12/13/23 13:43	
Fluoride	mg/L	<0.12	0.20	0.12	12/13/23 13:43	
Sulfate	mg/L	<0.55	1.0	0.55	12/13/23 13:43	

METHOD BLANK: 3474189 Matrix: Water
Associated Lab Samples: 60442093002, 60442093003, 60442093004, 60442093005

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	12/12/23 08:56	
Fluoride	mg/L	<0.12	0.20	0.12	12/12/23 08:56	
Sulfate	mg/L	<0.55	1.0	0.55	12/12/23 08:56	

LABORATORY CONTROL SAMPLE: 3471508

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.0	100	90-110	
Fluoride	mg/L	2.5	2.7	107	90-110	
Sulfate	mg/L	5	4.8	96	90-110	

LABORATORY CONTROL SAMPLE: 3474187

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	2.8	113	90-110	L1
Sulfate	mg/L	5	4.9	98	90-110	

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

LABORATORY CONTROL SAMPLE: 3474190

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	2.5	99	90-110	
Sulfate	mg/L	5	5.5	109	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3471509 3471510

Parameter	Units	60442093002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	5.8	5	5	11.1	11.1	106	107	80-120	0	15	
Fluoride	mg/L	<0.12	2.5	2.5	2.8	2.8	111	113	80-120	2	15	
Sulfate	mg/L	28.8	50	50	78.7	81.7	100	106	80-120	4	15	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3471512 3471513

Parameter	Units	60442105001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	2.0	5	5	6.0	6.1	81	82	80-120	1	15	H1
Fluoride	mg/L	<0.12	2.5	2.5	2.8	2.9	113	114	80-120	1	15	H1
Sulfate	mg/L	44.3	50	50	97.9	136	107	183	80-120	33	15	H1,M1, R1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3471515 3471516

Parameter	Units	60442112001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	74.8	50	50	120	122	91	95	80-120	2	15	H1
Fluoride	mg/L	<0.12	2.5	2.5	2.8	2.7	112	107	80-120	5	15	H1
Sulfate	mg/L	52.7	50	50	97.0	102	89	99	80-120	5	15	H1

SAMPLE DUPLICATE: 3471511

Parameter	Units	60442093002 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	5.8	5.8	0	15	
Fluoride	mg/L	<0.12	<0.12		15	
Sulfate	mg/L	28.8	27.5	5	15	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

SAMPLE DUPLICATE: 3471514

Parameter	Units	60442105001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	2.0	2.0	2	15	H1
Fluoride	mg/L	<0.12	<0.12		15	H1
Sulfate	mg/L	44.3	44.4	0	15	H1

SAMPLE DUPLICATE: 3471517

Parameter	Units	60442112001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	74.8	71.4	5	15	H1
Fluoride	mg/L	<0.12	<0.12		15	H1
Sulfate	mg/L	52.7	47.7	10	15	H1

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REPORT OF LABORATORY ANALYSIS

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Lenexa, KS 66219
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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

QC Batch: 876640
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: 60441897019

METHOD BLANK: 3472119 Matrix: Water
Associated Lab Samples: 60441897019

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	12/12/23 20:15	
Fluoride	mg/L	<0.12	0.20	0.12	12/12/23 20:15	
Sulfate	mg/L	<0.55	1.0	0.55	12/12/23 20:15	

METHOD BLANK: 3474158 Matrix: Water
Associated Lab Samples: 60441897019

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	12/13/23 15:16	
Fluoride	mg/L	<0.12	0.20	0.12	12/13/23 15:16	
Sulfate	mg/L	<0.55	1.0	0.55	12/13/23 15:16	

METHOD BLANK: 3475195 Matrix: Water
Associated Lab Samples: 60441897019

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
Chloride	mg/L	<0.53	1.0	0.53	12/14/23 15:37	
Fluoride	mg/L	<0.12	0.20	0.12	12/14/23 15:37	
Sulfate	mg/L	<0.55	1.0	0.55	12/14/23 15:37	

LABORATORY CONTROL SAMPLE: 3472120

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2.5	3.0	122	90-110	L1
Sulfate	mg/L	5	4.8	96	90-110	

LABORATORY CONTROL SAMPLE: 3474159

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	2.8	113	90-110	L1
Sulfate	mg/L	5	4.9	97	90-110	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: AMEREN SCL4A
Pace Project No.: 60442093

LABORATORY CONTROL SAMPLE: 3475196

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chloride	mg/L	5	5.4	107	90-110	
Fluoride	mg/L	2.5	3.5	138	90-110	L1
Sulfate	mg/L	5	4.9	97	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3472121 3472122

Parameter	Units	60442101001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	62.6	100	100	149	147	86	84	80-120	1	15	H1
Fluoride	mg/L	<0.12	2.5	2.5	2.6	2.6	102	103	80-120	1	15	H1
Sulfate	mg/L	37.0	25	25	63.3	64.2	105	109	80-120	1	15	H1

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3472124 3472125

Parameter	Units	60441897015 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chloride	mg/L	61.2	50	50	117	116	112	109	80-120	1	15	H1
Fluoride	mg/L	<0.12	2.5	2.5	2.7	2.8	109	112	80-120	3	15	H1
Sulfate	mg/L	459	250	250	733	732	110	109	80-120	0	15	H1

SAMPLE DUPLICATE: 3472123

Parameter	Units	60442101001 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	62.6	60.2	4	15	H1
Fluoride	mg/L	<0.12	<0.12		15	H1
Sulfate	mg/L	37.0	43.9	17	15	D6,H1

SAMPLE DUPLICATE: 3472126

Parameter	Units	60441897015 Result	Dup Result	RPD	Max RPD	Qualifiers
Chloride	mg/L	61.2	60.7	1	15	H1
Fluoride	mg/L	<0.12	<0.12		15	H1
Sulfate	mg/L	459	453	1	15	H1

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REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: AMEREN SCL4A
Pace Project No.: 60442093

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.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

1e	Achieving a constant weight was not met for this sample.
2e	Achieving a constant weight was not met for this sample. .
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.
H1	Analysis conducted outside the EPA method holding time.
L1	Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
R1	RPD value was outside control limits.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: AMEREN SCL4A
Pace Project No.: 60442093

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
60441897001	**S-BMW-1S**	EPA 200.7	874935	EPA 200.7	874954
60441897002	**S-BMW-3S**	EPA 200.7	874935	EPA 200.7	874954
60442093001	**S-TMW-1**	EPA 200.7	875077	EPA 200.7	875230
60442093002	**S-TMW-2**	EPA 200.7	875214	EPA 200.7	875324
60442093003	**S-TMW-3**	EPA 200.7	875214	EPA 200.7	875324
60442093004	**S-SCL4A-DUP-1**	EPA 200.7	875214	EPA 200.7	875324
60442093005	**S-SCL4A-FB-1**	EPA 200.7	875214	EPA 200.7	875324
60441897019	**S-UG-3**	EPA 200.7	875648	EPA 200.7	875705
60441897001	**S-BMW-1S**	SM 2320B	874278		
60441897002	**S-BMW-3S**	SM 2320B	874278		
60442093001	**S-TMW-1**	SM 2320B	874536		
60442093002	**S-TMW-2**	SM 2320B	874536		
60442093003	**S-TMW-3**	SM 2320B	874536		
60442093004	**S-SCL4A-DUP-1**	SM 2320B	874536		
60442093005	**S-SCL4A-FB-1**	SM 2320B	874536		
60441897019	**S-UG-3**	SM 2320B	874578		
60441897001	**S-BMW-1S**	SM 2540C	873904		
60441897002	**S-BMW-3S**	SM 2540C	873904		
60442093001	**S-TMW-1**	SM 2540C	874089		
60442093002	**S-TMW-2**	SM 2540C	874089		
60442093003	**S-TMW-3**	SM 2540C	874090		
60442093004	**S-SCL4A-DUP-1**	SM 2540C	874090		
60442093005	**S-SCL4A-FB-1**	SM 2540C	874090		
60441897019	**S-UG-3**	SM 2540C	874170		
60441897001	**S-BMW-1S**	EPA 300.0	875885		
60441897002	**S-BMW-3S**	EPA 300.0	875885		
60442093001	**S-TMW-1**	EPA 300.0	875885		
60442093002	**S-TMW-2**	EPA 300.0	876463		
60442093003	**S-TMW-3**	EPA 300.0	876463		
60442093004	**S-SCL4A-DUP-1**	EPA 300.0	876463		
60442093005	**S-SCL4A-FB-1**	EPA 300.0	876463		
60441897019	**S-UG-3**	EPA 300.0	876640		

WO# : 60442093

60442093

Pace ANALYTICAL SERVICES	DC#_Title: ENV-FRM-LENE-0009_Sampl		
	Revision: 2	Effective Date: 01/12/2022	Issued By: Lenexa

Client Name: Locksmith Cleaning

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

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

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

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

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

Cooler Temperature (°C): As-read 1.7/1.6/1.1 **Corr. Factor** -0.2 **Corrected** 1.4/1.3/0.8

Date and initials of person examining contents: 11/15/23

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#:** 67187	☑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: _____ Date: _____

Qualtrax Document ID: 30468

Page 1 of 1

Pace® Location Requested (City/State):
Pace Analytical Kansas
9608 Loiret Blvd., Lenexa, KS 66219

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY- Affix Workorder/Login Label Here

Scan QR Code for instructions

60442093

Company Name:	Rocksmith Geoengineering, LLC.	Contact/Report To:	Mark Haddock
Street Address:	2320 Creve Coeur Mill Road, Maryland Heights, MO 63043	Phone #:	314-974-6578
		E-Mail:	mark.haddock@rocksmithgeo.com
		Cc E-Mail:	Jeff Ingram, jeff.ingram@rocksmithgeo.com
Customer Project #:		Invoice To:	Mark Haddock
Project Name:	AMEREN SCL4A	Invoice E-Mail:	mark.haddock@rocksmithgeo.com
Site Collection Info/Facility ID (as applicable):		Purchase Order # (if applicable):	
		Quote #:	

Time Zone Collected: [ ] AK [ ] PT [ ] MT [ ] CT [ ] ET

County / State origin of sample(s): Missouri

Data Deliverables:
[ ] Level II [ ] Level III [ ] Level IV
[ ] EQUIS
[ ] Other_____

Regulatory Program (DW, RCRA, etc.) as applicable:

Rush (Pre-approval required):
[ ] 2 Day [ ] 3 day [ ] 5 day [ ] Other_____
Date Results Requested:

DW PWSID # or WW Permit # as applicable:

Field Filtered (if applicable): [ ] Yes [ ] No
Analysis:

Specify Container Size **

Identify Container Preservative Type***

Analysis Requested

**Container Size: (1) 1L, (2) 500mL, (3) 250mL, (4) 125mL, (5) 100mL, (6) 40mL vial, (7) EnCore, (8) TerraCore, (9) Other

*** Preservative Types: (1) None, (2) HNO3, (3) H2SO4, (4) HCl, (5) NaOH, (6) Zn Acetate, (7) NaHSO4, (8) Sod. Thiosulfate, (9) Ascorbic Acid, (10) MeOH, (11) Other

Lab Use Only
Proj. Mgr: Jamie Church
AcctNum / Client ID:
Table #:
Profile / Template: 15856, Line 2
Prelog / Bottle Ord. ID: EZ 3011905

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Waste Water (WW), Product (P), Soil/Solid (SS), Oil (OL), Wipe (WP), Tissue (TS), Bioassay (B), Vapor (V), Other (OT), Surface Water (SW),Sediment (SED), Sludge (SL), Caulk

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res. CL2	Number & Type of Containers Plastic	Number & Type of Containers Glass	Chloride/Fluoride/Sulfate	Alkalinity	TDS	App III and Cat/An Metals (200.7)*	Sample Comment	Preservation non-conformance Identified for sample.
S-TMW-1	WT	G	11/13/23	1325				2		✓	✓	✓	✓		
S-TMW-2	WT	G	11/13/23	1420				2		✓	✓	✓	✓		
S-TMW-3	WT	G	11/13/23	1505				2		✓	✓	✓	✓		
S-UG-3	WT	G	11/13/23	1220				2		✓	✓	✓	✓	log under SCPA-CA	
S-SCL4A-DUP-1	WT	G	11/13/23	—				2		✓	✓	✓	✓		
S-SCL4A-FB-1	WT	G	11/13/23	1322				2		✓	✓	✓	✓		
S-SCL4A-MS-1	WT	G	11/13/23	1420				2		✓	✓	✓	✓		
S-SCL4A-MSD-1	WT	G	11/13/23	1420				2		✓	✓	✓	✓		
S-BMW-1S	WT													log under SCPA-CA	
S-BMW-3S	WT													log under SCPA-CA	

Customer Remarks / Special Conditions / Possible Hazards:
* - App III and Cat/An Metals* - EPA 200.7: Fe, Mg, Mn, K, Na, Ca, B

Collected By:
Printed Name: Jeff Ingram
Signature:

Additional Instructions from Pace®:

# Coolers:	Thermometer ID:	Correction Factor (°C):	Obs. Temp. (°C)	Corrected Temp. (°C)
3	T298	-0.3	1.7/1.6/1.1	1.4/1.3/0.8

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Tracking Number:
Jeff Ingram / Rocksmith	11-14-23/1430		11/15/23 0511	
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Delivered by: [ ] In- Person [ ] Courier
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Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Page: 1 of 1

Client: Rocksmith Geoeng

Profile #

Site: Ameren SCL4A

Notes

COC Line Item	Matrix	VG9H	DG9H	DG9Q	VG9U	DG9U	DG9M	DG9B	BG1U	AG1H	AG1U	AG2U	AG3S	AG4U	AG5U	JGFU	WGKU	WGDU	BP1U	BP2U	BP3U	BP1N	BP3N	BP3F	BP3S	BP3C	BP3Z	WPDU	ZPLC	Other		
1	WT																		1				1									
2	↓																		3				3									
3																			1				1									
4																																
5	↓																		1				1									
6																			1				1									
7																																
8																																
9																																
10																																
11																																
12																																

Container Codes

Glass			
DG9B	40mL bisulfate clear vial	WGKU	8oz clear soil jar
DG9H	40mL HCl amber voa vial	WGFU	4oz clear soil jar
DG9M	40mL MeOH clear vial	WG2U	2oz clear soil jar
DG9Q	40mL TSP amber vial	JGFU	4oz unpreserved amber wide
DG9S	40mL H2SO4 amber vial	AG0U	100mL unores amber glass
DG9T	40mL Na Thio amber vial	AG1H	1L HCl amber glass
DG9U	40mL amber unpreserved	AG1S	1L H2SO4 amber glass
VG9H	40mL HCl clear vial	AG1T	1L Na Thiosulfate clear/amber glass
VG9T	40mL Na Thio. clear vial	AG1U	1liter unpres amber glass
VG9U	40mL unpreserved clear vial	AG2N	500mL HNO3 amber glass
BG1S	1liter H2SO4 clear glass	AG2S	500mL H2SO4 amber glass
BG1U	1liter unpres glass	AG3S	250mL H2SO4 amber glass
BG3H	250mL HCL Clear glass	AG2U	500mL unpres amber glass
BG3U	250mL Unpres Clear glass	AG3U	250mL unpres amber glass
WGDU	16oz clear soil jar	AG4U	125mL unpres amber glass
		AG5U	100mL unpres amber glass

Plastic	
BP1C	1L NAOH plastic
BP1N	1L HNO3 plastic
BP1S	1L H2SO4 plastic
BP1U	1L unpreserved plastic
BP1Z	1L NaOH, Zn Acetate
BP2C	500mL NAOH plastic
BP2N	500mL HNO3 plastic
BP2S	500mL H2SO4 plastic
BP2U	500mL unpreserved plastic
BP2Z	500mL NaOH, Zn Acetate
BP3C	250mL NaOH plastic
BP3F	250mL HNO3 plastic - field filtered
BP3N	250mL HNO3 plastic
BP3U	250mL unpreserved plastic
BP3S	250mL H2SO4 plastic
BP3Z	250mL NaOH, Zn Acetate
BP4U	125mL unpreserved plastic
BP4N	125mL HNO3 plastic
BP4S	125mL H2SO4 plastic
WPDU	16oz unpresserved plstic

Misc.	
I	Wipe/Swab
SP5T	120mL Coliform Na Thiosulfate
ZPLC	Ziploc Bag
AF	Air Filter
C	Air Cassettes
R	Terracore Kit
U	Summa Can

Matrix	
WT	Water
SL	Solid
NAL	Non-aqueous Liquid
OL	OIL
WP	Wipe
DW	Drinking Water

Work Order Number: 60442093

Pace® L… Requested (City/State):
Pace An… Kansas
9608 Loiret Blvd., Lenexa, KS 66219

CHAIN-OF-CUSTODY Analytical Reques… ocument

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY- Affix Workorder/Login Label Here

Scan QR Code for instructions

Company Name:	Rocksmith Geoengineering, LLC.	Contact/Report To:	Mark Haddock
Street Address:	2320 Creve Coeur Mill Road, Maryland Heights, MO 63043	Phone #:	314-974-6578
		E-Mail:	mark.haddock@rocksmithgeo.com
		Cc E-Mail:	Jeff Ingram, jeff.ingram@rocksmithgeo.com
Customer Project #:		Invoice To:	Mark Haddock
Project Name:	AMEREN SCL4A	Invoice E-Mail:	mark.haddock@rocksmithgeo.com
Site Collection Info/Facility ID (as applicable):		Purchase Order # (if applicable):	
		Quote #:	

Time Zone Collected: [ ] AK [ ] PT [ ] MT [ ] CT [ ] ET

County / State origin of sample(s): Missouri

Data Deliverables:
[ ] Level II [ ] Level III [ ] Level IV
[ ] EQUIS
[ ] Other_____

Regulatory Program (DW, RCRA, etc.) as applicable:

Rush (Pre-approval required):
[ ] 2 Day [ ] 3 day [ ] 5 day [ ] Other_____
Date Results Requested:

DW PWSID # or WW Permit # as applicable:

Field Filtered (if applicable): [ ] Yes [ ] No
Analysis:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Waste Water (WW), Product (P), Soil/Solid (SS), Oil (OL), Wipe (WP), Tissue (TS), Bioassay (B), Vapor (V), Other (OT), Surface Water (SW),Sediment (SED), Sludge (SL), Caulk

Specify Container Size **
Identify Container Preservative Type***
Analysis Requested

**Container Size: (1) 1L, (2) 500mL, (3) 250mL, (4) 125mL, (5) 100mL, (6) 40mL vial, (7) EnCore, (8) TerraCore, (9) Other

*** Preservative Types: (1) None, (2) HNO3, (3) H2SO4, (4) HCl, (5) NaOH, (6) Zn Acetate, (7) NaHSO4, (8) Sod. Thiosulfate, (9) Ascorbic Acid, (10) MeOH, (11) Other

Lab Use Only
Proj. Mgr: Jamie Church
AcctNum / Client ID:
Table #:
Profile / Template: 15856, Line 2
Prelog / Bottle Ord. ID: EZ 3011905

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res. Cl2	Number & Type of Containers Plastic	Number & Type of Containers Glass	Chloride/Fluoride/Sulfate	Alkalinity	TDS	App III and Cat/An Metals (200.7)*	Sample Comment	Preservation non-conformance identified for sample.
S-TMW-1	WT														
S-TMW-2	WT														
S-TMW-3	WT														
S-UG-3	WT													log under SCPA-CA	
S-SCL4A-DUP-1	WT														
S-SCL4A-FB-1	WT														
S-SCL4A-MS-1	WT														
S-SCL4A-MSD-1	WT														
S-BMW-1S	WT	G	11/10/23	0957	—	—		4	-	✓	✓	✓	✓	log under SCPA-CA	
S-BMW-3S	WT	G	11/10/23	0916	—	—		4	-	✓	✓	✓	✓	log under SCPA-CA	

Customer Remarks / Special Conditions / Possible Hazards:
* - App III and Cat/An Metals* - EPA 200.7: Fe, Mg, Mn, K, Na, Ca, B

Collected By:
Printed Name: Grant Marx
Signature:

Additional Instructions from Pace®:

Coolers: Thermometer ID: Correction Factor (°C): Obs. Temp. (°C) Corrected Temp. (°C)

Relinquished by/Company: (Signature) Rocksmith	Date/Time: 11-10-23 / 1550	Received by/Company: (Signature)	Date/Time:	Tracking Number:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Delivered by: [ ] In- Person [ ] Courier
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	[ ] FedEx [ ] UPS [ ] Other
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Page: 1 of 1

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace® Terms and Conditions found at https://www.pacelabs.com/resource-library/resource/pace-terms-and-conditions/

ENV-FRM-CORQ-0019_v01_082123 ©

Memorandum

January 21, 2024

To:	Project File Rocksmith Geoengineering, LLC	**Project Number:**	23009
CC:	Mark Haddock, Jeffrey Ingram		
From:	Grant Morey	**Email:**	Grant.Morey@Rocksmithgeo.com
RE:	**Data Validation Summary, Sioux Energy Center – SCL4A – Data Package 60442093**		

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 analyzed outside of hold time, the sample result was qualified as an estimate (J for detects, UJ for non-detects).
- When a compound was detected in a sample result between the Method Detection Limit (MDL) and Practical Quantification Limit (PQL), the results were recorded at the detection value and qualified as estimates (J).

QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Company Name: Rocksmith Geoengineering
Project Manager: J. Ingram
Project Name: Ameren SCL4A
Project Number: 23009
Reviewer: G. Morey
Validation Date: 1/21/2024

Laboratory: Pace Analytical
SDG #: 60442093
Analytical Method (type and no.): EPA 200.7 (Total Metals); SM 2320B (Alkalinity); SM 2540C (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			11/13/2023 - 11/15/2023
b) Sampling team indicated?	x			JSI
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, Spec 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	No lab narrative.

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)?	☒	☐	☐	See Notes
c) Were analytes detected in the equipment blank(s)?	☐	☐	☒	
d) Were analytes detected in the trip blank(s)?	☐	☐	☒	

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

Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?				S-SCL4A-DUP-1 @ S-TMW-3
	☒	☐	☐	See Notes
b) Were field dup. precision criteria met (note RPD)?	☒	☐	☐	
c) Were lab duplicates analyzed (note original and duplicate samples)?				
	☒	☐	☐	See Notes
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?	☐	☒	☐	See Notes
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
b) Was MSD accuracy criteria met?	☐	☒	☐	See Notes
Recovery could not be calculated since sample contained high concentration of analyte?	☐	☐	☒	
c) Were MS/MSD precision criteria met?	☐	☒	☒	See Notes

Comments/Notes:

General:

Chloride, fluoride, and sulfate were analyzed outside of hold time for some samples, results qualified as estimates.

Chloride and sulfate diluted in some samples, no qualification necessary.

QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

Comments/Notes:

Field Blanks:

S-SCL4A-FB-1 @ S-TMW-1: Manganese (12.0) and Alkalinity (14.1J). Results > RL and 10x blank, no qualification necessary.

Laboratory Control Samples:

3471853: LCS recovery high for fluoride, associated with samples -7001, 7002, and -3001. All results are non-dectects, no qualification necessary.

3471508: LCS recovery high for fluoride, associated with samples -002 through -005. All results are non-detects, no qualification necessary.

3472120/34741593475196: LCS recovery high for fluoride, associated with sample -019. Result is a non-detect, no qualification necessary.

Duplicates:

3472123: Lab duplicate exceeds max RPD for sulfate, associated with unrelated sample, no qualification necessary.

Lab duplicate Max RPD: 10%: Alkalinity, TDS; 15%: Chloride, Fluoride, Sulfate

MS/MSD:

3465243/3465244: MS recovery high & MSD recovery low for sodium, associated with unrelated sample, no qualification necessary.

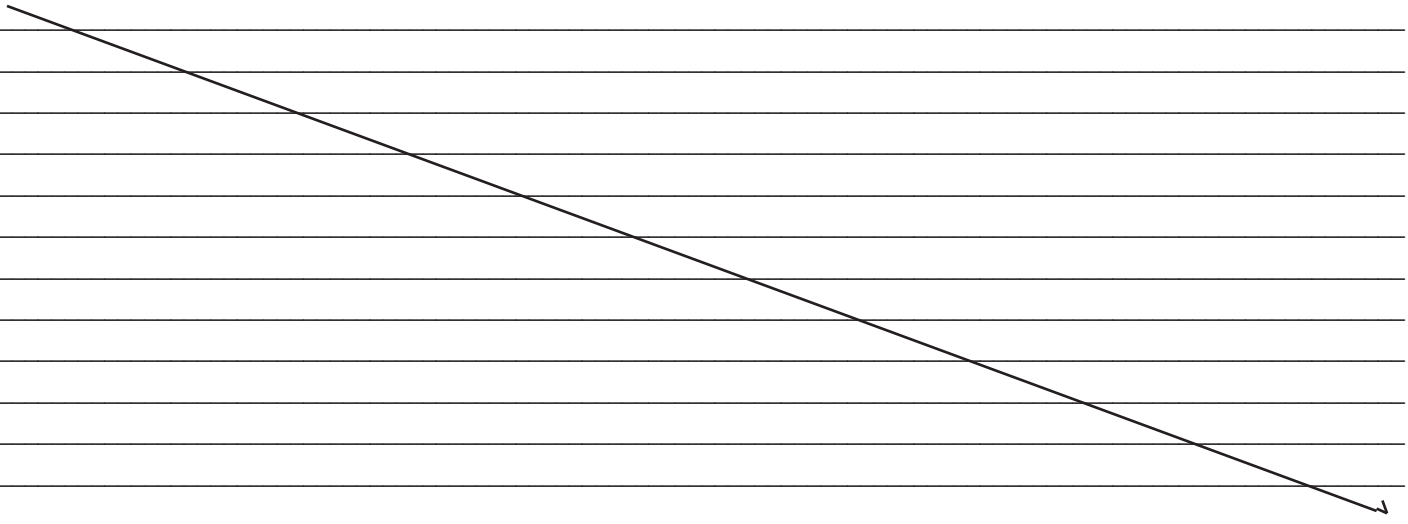
3465245: MS recovery low for sodium, associated with unrelated sample, no qualification necessary.

3466209: MS recoveries high for calcium and magnesium, associated with unrelated sample, no qualification necessary.

3467868/3467869: MSD recovery high for calcium, MS recovery and RPD within control limits, no qualification necessary.

3469021/3469022: MSD recovery high for fluoride, MS recovery and RPD within control limits, no qualification necessary.

3471512/3471513: MSD recovery high for sulfate, RPD exceeds control limits, associated with unrelated sample, no qualification necessary.



QA LEVEL II - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
S-SCL4A-DUP-1	Chloride	4.9	J	Analyzed outside of hold time control
"	Fluoride	0.12	UJ	"
"	Sulfate	43.1	J	"
S-SCL4A-FB-1	Chloride	0.53	UJ	"
"	Fluoride	0.12	UJ	"
"	Sulfate	0.55	UJ	"
S-UG-3	Chloride	34.5	J	"
"	Fluoride	0.12	UJ	"
"	Sulfate	65.0	J	"

QA LEVEL IV - INORGANIC DATA EVALUATION CHECKLIST

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason

Signature: Grant Morey Date: 01/21/2024

Appendix B

Alternative Source Demonstration – October 2022 Sampling Event

REPORT

SCL4A – Alternative Source Demonstration

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

May 19, 2023

Submitted to:

Ameren Missouri
1901 Chouteau Ave, St. Louis, MO 63103

Submitted by:

Rocksmith Geoengineering, LLC

Table of Contents

TABLES

FIGURES

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 Rocksmith Geoengineering, LLC.

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).

Rocksmith Geoengineering, LLC

_____

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

Principal Engineer, Senior Partner

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 (SSI) 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 SSI and that the apparent SSI was the result of an alternative source or resulted from errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

3.0 SITE DESCRIPTION AND BACKGROUND

Ameren owns and operates the SEC in St. Charles County, Missouri, located approximately 12 miles west-northwest of the confluence of the Mississippi and Missouri Rivers. **Figure 1** depicts the site location and layout, including the location of the SCL4A. The SEC is approximately 1,100 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.

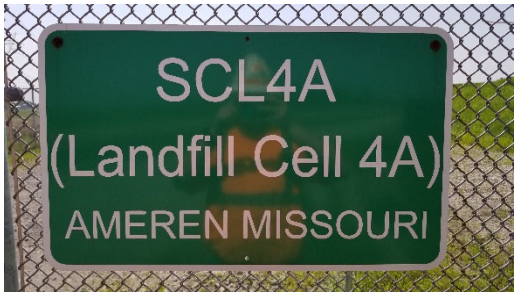
3.1 Geological and Hydrogeological Setting

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 that lie unconformably on top of bedrock. These alluvial deposits, which can range from approximately 100 to 130 feet in thickness, 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 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 high density polyethylene (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 at UG-3 since June 2008 for the analysis of state required UWL

parameters. Monitoring wells TMW-1, TMW-2, and TMW-3 were installed in April 2016 and have have been sampled since that time for CCR Rule sampling events.

The permit for the Sioux UWL was issued July 30, 2010 (permit #0918301) for the SCPC (Cell 1). Nine 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 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 monitoring wells screened in the uppermost aquifer (alluvial aquifer) as shown on **Figure 1**. One 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 Associates Inc. (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 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 baseline sampling events were used to calculate statistical upper prediction limits (UPLs). These UPLs were then compared to the detection monitoring results from the November 2017 samples and subsequent semi-annual detection monitoring sampling events. If results from the detection monitoring event were higher than the calculated UPL, it was considered to be an initial exceedance and a verification sample was then collected and tested in accordance with the SCPC Statistical Analysis Plan (SAP). In August 2019 and in June 2021, the background dataset used to calculate statistical limits was expanded to include the first four detection monitoring events, per the SAP. The following provides a summary of the detection monitoring results to date.

Since November 2017, several ASDs have been prepared for UG-3, TMW-1, and TMW-2. These previous ASDs are available in the 2018, 2019, 2020, 2021 and 2022 Annual Reports for the SCL4A and are available on Ameren's publicly available CCR Compliance website (https://www.ameren.com/company/environment-and-sustainability/managing-coal-combustion/ccr-compliance-reports). These ASDs have demonstrated that previous SSIs at the site were not caused by the SCL4A, but rather primarily the result of relatively low calculated UPLs that were not representative of the full, natural geochemical variability within the alluvial aquifer or primarily caused by the SCL4A being downgradient from the SCPA, which is currently in corrective action.

In October 2022, 2 initial exceedances were identified for sulfate at TMW-1 and Total Dissolved Solids (TDS) at TMW-3. Verification sampling results confirmed only the sulfate at TMW-1 to be an SSI. Results from this sampling event are provided in **Table 1**.

4.0 REVIEW OF THE STATISTICALLY SIGNIFICANT INCREASE

The October 2022 SSI for sulfate occurred at monitoring well TMW-1. TMW-1 is screened in the upper portion of the alluvial aquifer just below the average seasonal low for groundwater. As shown in **Figure 1**, TMW-1 is located south of the SCL4A and Highway 94, and north of Dwiggins Road.

Based on Rocksmith'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-date 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 sulfate at TMW-1 was 46.3 milligrams per liter (mg/L) based on the results from the initial eight baseline sampling events that ranged from 23.2 to 38.0 mg/L, as summarized in **Table 2**. The results from this small dataset were normally distributed, and a calculated UPL was used. In August 2019, the baseline dataset was expanded to include the next four sampling events, and the UPL changed from 46.3 to 50.29 mg/L. In June 2021, the baseline data set was further expanded to include the subsequent four or more sampling events, and the UPL changed from 50.29 to 49.87 mg/L. During the October 2022 detection monitoring event, a concentration of 53.5 mg/L was reported for sulfate in TMW-1, which was confirmed in January 2023 by a verification result of 52.1 mg/L, which slightly exceeds the current UPL of 49.7 mg/L.

Table 2: Review of Statistically Significant Increase

Constituent	Well ID	UPL Based on Baseline Events	August 2019 Updated UPL	June 2021 Updated UPL	Baseline Sampling Event Range	Detection Monitoring Sampling Range (November 2017 - June 2022)	October 2022 Result	January 2023 Result
Sulfate (mg/L)	TMW-1	46.3	50.29	49.87	23.2 - 38.0	33.8 - 64.9	53.5	52.1

Notes:
1) mg/L – milligrams per liter.
2) UPL – upper prediction limit.
3) UPLs calculated using Sanitas™ software.
4) UWL – Utility Waste Landfill.
5) J – result is an estimated value.

5.0 EVIDENCE OF SSI FROM ALTERNATIVE SOURCE

Several different lines of evidence indicate that the SSI at the SCL4A is 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 sulfate concentrations in nearby and background monitoring wells.
- Review of historical and current sulfate concentrations at TMW-1.

- Documentation of the construction of the SCL4A with a 60-mil HDPE 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 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. FGD type wastes at the SEC are managed at the SCPC, located to the west of the SCL4A.

5.2 Evaluation of SSI

5.2.1 Boron Concentrations

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-1, as well as background wells BMW-1S and BMW-3S and nearby wells TMW-2 and TMW-3. If the SSI at TMW-1 was caused by impacts from the SCL4A, boron concentrations would 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-1 does not have boron impacts, and therefore, a source other than CCR is likely the cause of the SSI at TMW-1.

5.2.2 Sulfate Concentrations

Sulfate, much like boron, is a key indicator for potential CCR impacts 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 at the SCL4A. Therefore, if the SSI was caused by impacts from the SCL4A, it would be expected that sulfate values, along with boron 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-1 are from an alternative source.

As displayed on **Figure 3**, during baseline sampling at TMW-1, sulfate ranged from 23.2 to 38.0 mg/L. During the subsequent sampling events, sulfate concentrations at TMW-1 have ranged from 33.8 to 64.9 mg/L. The time series plot on **Figure 3** shows the high degree of variability in sulfate concentrations at the TMW wells south of the SCL4A since the onset of baseline monitoring. This figure provides further evidence that the limited number of data points used to calculate the intrawell UPL for sulfate at TMW-1 do not accurately reflect the natural geochemical variability within the groundwater. Two other compliance monitoring wells are located approximately 325 and 650 feet to the east of TMW-1 as displayed in **Figure 1**: TMW-2 and TMW-3, respectively. Sulfate concentrations in these monitoring wells ranged from 26.4 to 85.8 mg/L and UPLs for these monitoring wells are 80.98 mg/L at TMW-2 and 60.9 mg/L at TMW-3. Based on the sulfate concentration range of the nearby wells, the sulfate concentration in TMW-1 for October 2022 is within the range of historical concentrations for adjacent wells, which indicates that the SSI for sulfate in TMW-1 is likely the result of a limited baseline sampling period that did not capture the full range of natural geochemical variability within the shallow zone of the alluvial aquifer at TMW-1 and variable changes in the pre-existing concentrations.

To further investigate the geochemical variability of sulfate in the area of the SCL4A, the historical data from the state UWL wells [located on the south side of the UWL, outside the zone of impact from the SCPA] were reviewed. These UWL wells (labeled “DG-xx”) were installed and sampled on multiple occasions prior to the receipt of CCR at the SCL4A. These DG-xx monitoring wells are screened at approximately the same depth as TMW-1 in the shallow zone of the alluvial aquifer. **Figure 4** displays a box and whisker plot of the natural variability of the sulfate concentrations within the alluvial aquifer prior to the receipt of CCR in the SCL4A for these wells. As shown on **Figure 4**, the recent results from TMW-1 are within range of concentrations for the DG-xx wells, which represent groundwater quality from a period that occurred prior to the receipt of CCR in SCL4A.

The lines of evidence listed above indicate that the sulfate concentration in TMW-1 in October 2022 is not the result of a release from the SCL4A, but instead can be attributed to pre-existing impacts and variability in the alluvial aquifer combined with the limited dataset used for the calculation of the previous sulfate UPLs in TMW-1.

6.0 DEMONSTRATION THAT SSI WAS NOT CAUSED BY SCL4A IMPACT

Based on the information presented in Section 5, above, the SSI reported for the October 2022 monitoring event at TMW-1 is not a result of impacts from the SCL4A. The SSI appears to be a result of numerous factors, including (1) pre-existing low concentrations of CCR indicators from the upgradient SCPA that predate the SCL4A, (2) relatively low calculated UPLs, and (3) a relatively small set of baseline data that do not reflect the full natural temporal and spatial variability within the aquifer. Only 16 samples have been used thus far to calculate the intrawell UPLs in TMW-1. It can take many years of data gathering to observe the range of variability in groundwater concentrations that are representative of natural conditions or pre-existing impacts for any given aquifer. The results gathered thus far may not have captured the full extent of the spatial and temporal variability in the downgradient alluvial aquifer monitoring wells at the SEC.

Along with the lines of evidence listed above, SCL4A is constructed with 2 feet of compacted clay baseliner overlain by a 60-mil HDPE liner. Documented construction of SCL4A with these components act to limit the potential that the SSI reported for sulfate in TMW-1 during October 2022 is a result of influence from the SCL4A. The SSI observed in TMW-1 is not caused by impacts from the SCL4A but is a result of natural variability and pre-existing impacts within the alluvial aquifer at the site.

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Tables

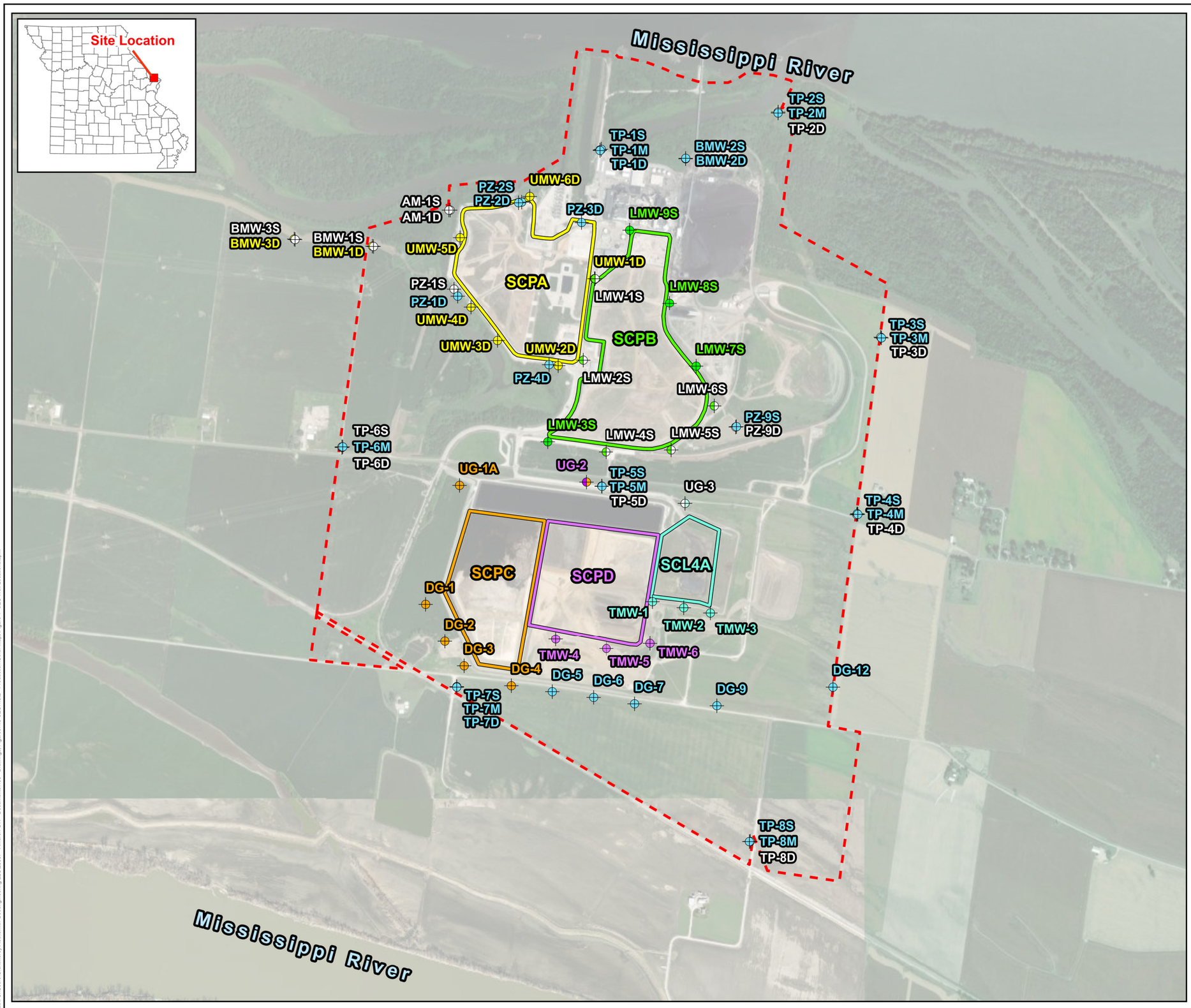
Table 1
October 2022 Detection Monitoring Results
SCL4A - Landfill Cell 4A
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS							
		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
October 2022 Detection Monitoring Event											
DATE	NA	10/18/2022	10/18/2022	NA	10/21/2022	NA	10/20/2022	NA	10/20/2022	NA	10/20/2022
pH	SU	6.84	7.01	6.659-7.397	6.94	6.356-7.504	7.04	6.601-7.399	6.89	6.41-7.31	6.84
BORON, TOTAL	µg/L	73.0 J	84.2 J	1,200	302	DQR	ND	104.4	83.7 J	110.6	90.5 J
CALCIUM, TOTAL	µg/L	168,000	131,000	172,812	126,000	119,842	95,000	133,759	118,000	146,661	136,000
CHLORIDE, TOTAL	mg/L	9.2	11.7	85.54	39.5	4.199	2.7 J	4.641	3.3 J	3.1	2.6
FLUORIDE, TOTAL	mg/L	0.20 J	0.22	0.3954	ND	0.4537	0.42	0.4229	ND	0.3773	ND
SULFATE, TOTAL	mg/L	61.1	27.8	139.9	44.1	49.87	53.5	80.98	35.8	60.9	44.9
TOTAL DISSOLVED SOLIDS	mg/L	711	467	671.3	496	462.8	407	513	ND	505.4	838 J
January 2023 Verification Sampling Event											
DATE	NA						1/3/2023				1/3/2023
pH	SU										
BORON, TOTAL	µg/L										
CALCIUM, TOTAL	µg/L										
CHLORIDE, TOTAL	mg/L										
FLUORIDE, TOTAL	mg/L										
SULFATE, TOTAL	mg/L						52.1				
TOTAL DISSOLVED SOLIDS	mg/L										464

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.
9. ND - Constituent was analyzed but was not detected above the Method Detection Limit (MDL) or the adjusted Practical Quantitation Limit (PQL) based on data validation and is considered a non-detect. Values displayed as ND.

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

Figures



TITLE

SIOUX ENERGY CENTER GROUNDWATER MONITORING PROGRAMS AND SAMPLE LOCATION MAP

Legend

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment (Closed)
- SCPB - Fly Ash Surface Impoundment (Closed)

Utility Waste Landfill Cells

- SCL4A - Dry CCR Disposal Area
- SCPC - Inactive FGD Surface Impoundment (Closure in Progress)
- SCPD - FGD Surface Impoundment

Monitoring Well Networks

- Corrective Action Monitoring Well
- SCPA Detection and Assessment Monitoring Well
- SCPB and Corrective Action Monitoring Well
- SCPB Detection Monitoring Well
- SCPC Detection Monitoring Well
- SCPD and SCPC Detection Monitoring Well
- SCPD Detection Monitoring Well
- SCL4A and Corrective Action Monitoring Well
- SCL4A Detection Monitoring Well
- Monitoring Well Used for Water Level Elevation Measurements Only

NOTES

1. All boundaries and locations are approximate.
2. FGD - Flue Gas Desulfurization.
3. CCR - Coal Combustion Residuals.

REFERENCES

1. Ameren Missouri Sioux Energy Center, Sioux Property Control Map, February 2011.

0 500 1,000 2,000 3,000 Feet

PROJECT
CCR RULE GROUNDWATER MONITORING PROGRAM

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

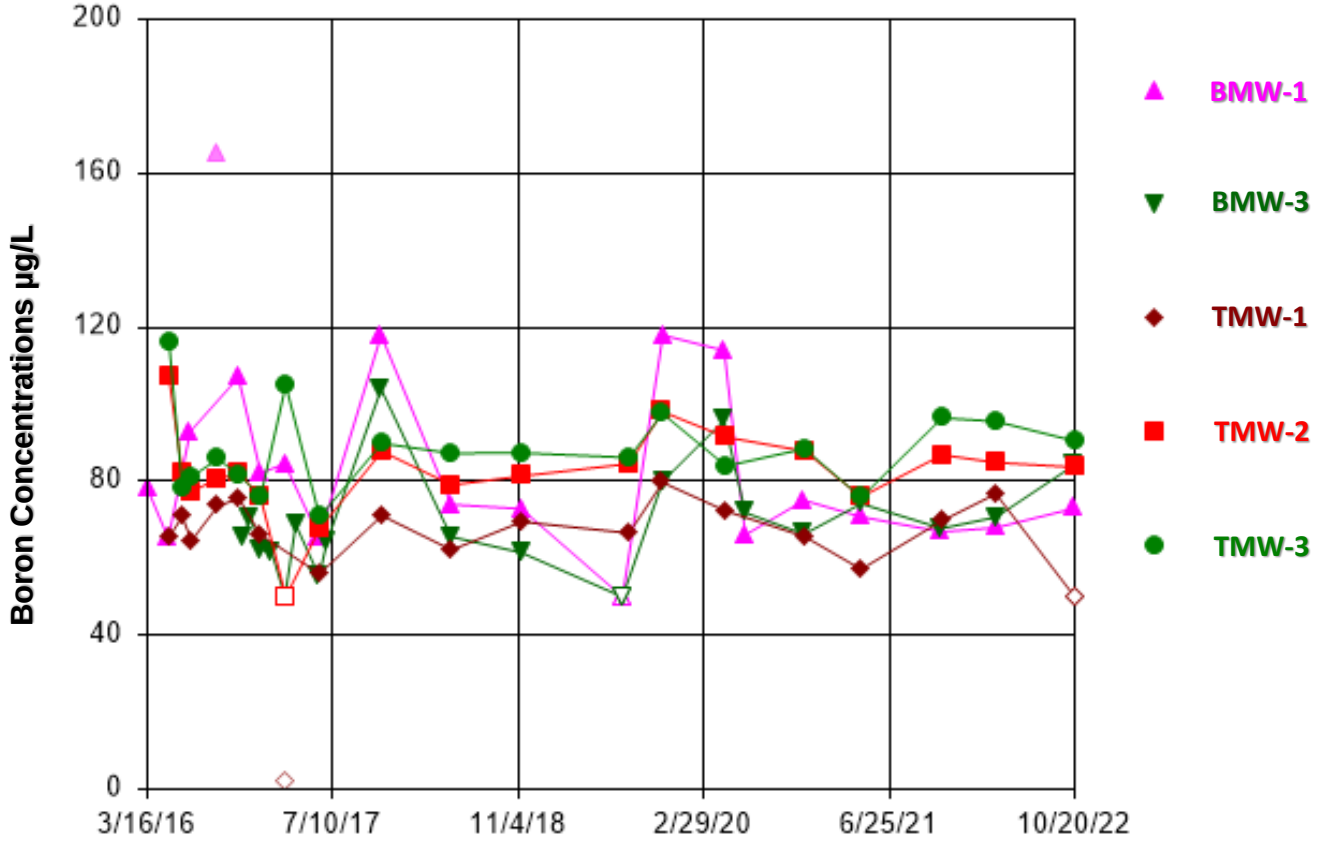
ROCKSMITH GEOENGINEERING

DESIGN	JSI	YYYY-MM-DD	2023-03-29
PREPARED	JSI	PROJECT No.	23009
REVIEW	GTM		
APPROVED	MNH		

FIGURE 1

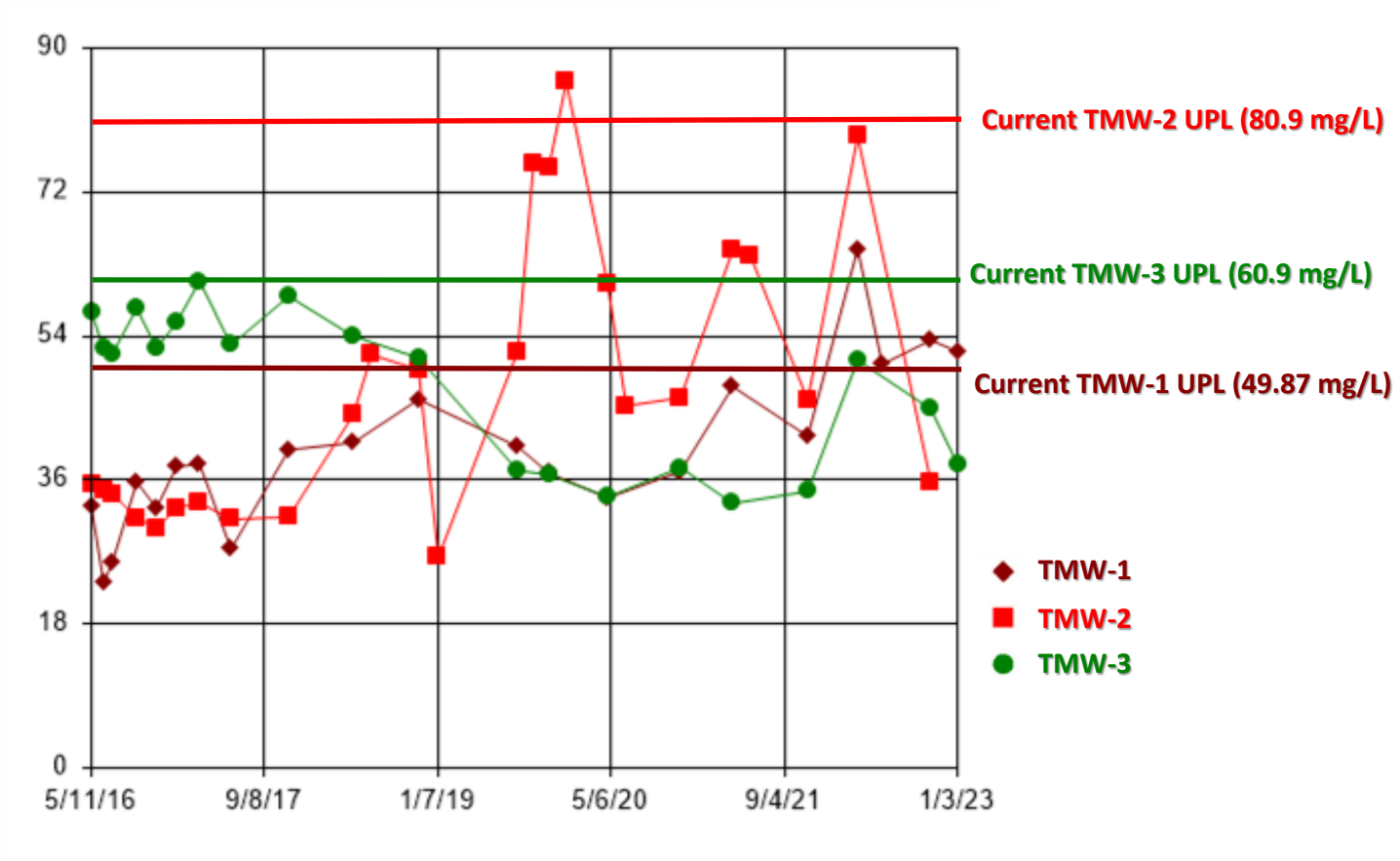
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: 1 in 0

Path: C:\Users\GrantMorey\Rocksmith Geoengineering LLC\23007 - Ameren GW - Documents\400 - Drawings, Figures\4.3-SEC\4.3.2 - Production\Other Maps\Figure 1- SEC Well Locations.aprx



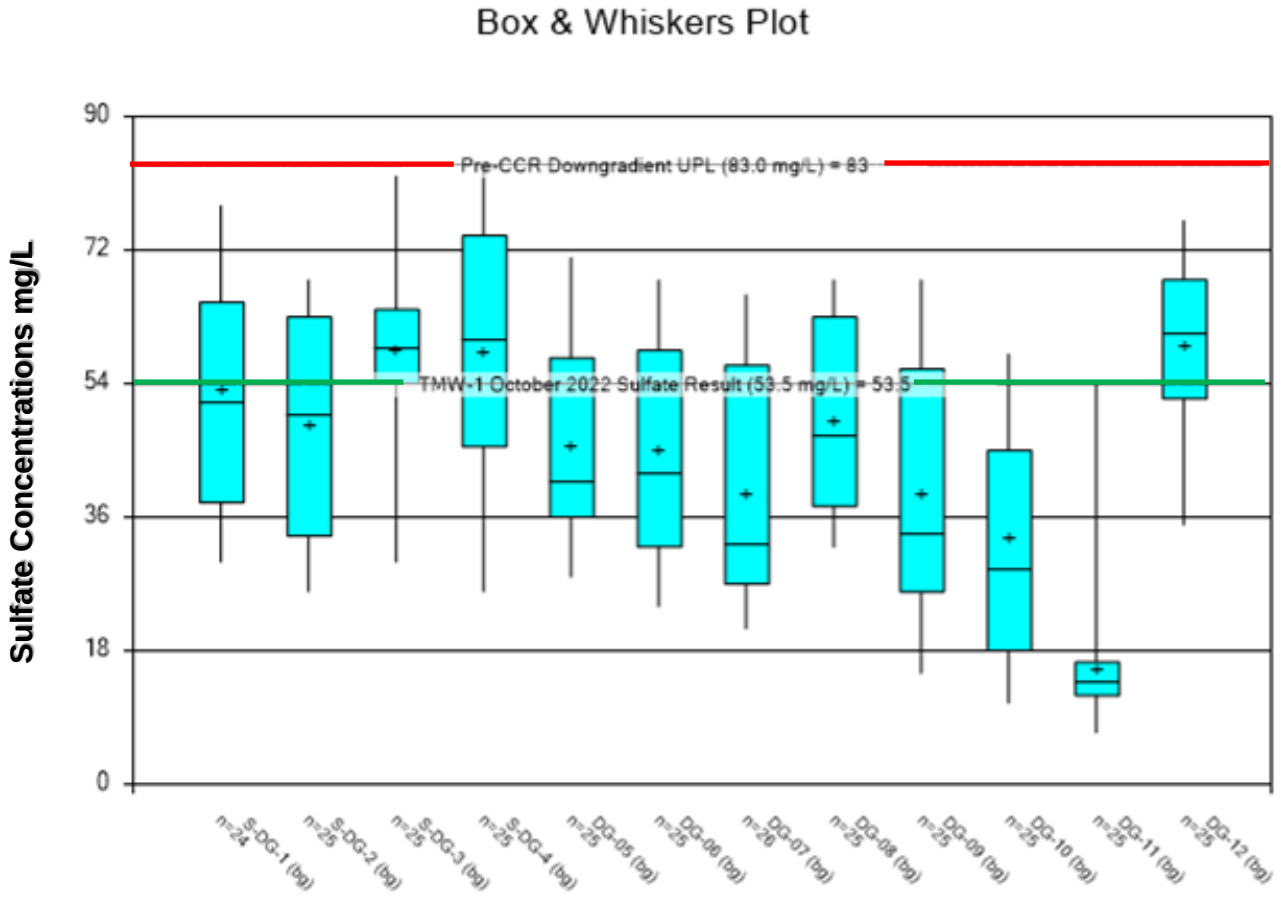
Notes
1) µg/L – Micrograms per liter.
2) Points not connected to lines are considered outliers as specified in the Statistical Analysis Plan for the SCL4A.
3) Non-detected concentrations are depicted as unfilled points.

CLIENT/PROJECT					TITLE		
AMEREN MISSOURI **SIOUX ENERGY CENTER**					**Timeseries Plot of Boron Concentrations**		
DRAWN	CHECKED	REVIEWED	DATE		Rev No.	JOB NO.	FIGURE
JSI	JSI	MNH	2023-03-29		NA	23009	**2**



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

CLIENT/PROJECT					TITLE		
AMEREN MISSOURI **SIOUX ENERGY CENTER**				ROCKSMITH GEOENGINEERING	**Time Series Plot for Sulfate Concentrations South of the SCL4A**		
DRAWN JSI	CHECKED JSI	REVIEWED MNH	DATE 2023-03-29		Rev No. NA	JOB NO. 23009	FIGURE **3**



Pre-CCR Downgradient UPL (83.0 mg/L)

TMW-1 October 2022 Sulfate Result (53.5 mg/L)

Notes
1) mg/L – Milligrams per liter.
2) UPL – Upper Prediction Limit.
3) CCR – Coal Combustion Residuals.

CLIENT/PROJECT					TITLE		
AMEREN MISSOURI **SIOUX ENERGY CENTER**				ROCKSMITH GEOENGINEERING	**Pre-CCR Sulfate Plots – Downgradient Monitoring Wells**		
DRAWN	CHECKED	REVIEWED	DATE		Rev No.	JOB NO.	FIGURE
JSI	JSI	MNH	2023-03-29		NA	23009	**4**

Appendix C

Alternative Source Demonstration – May 2023 Sampling Event

REPORT

SCL4A – Alternative Source Demonstration

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

December 18, 2023

Project Number: 23009

Submitted to:

Ameren Missouri
1901 Chouteau Ave
St. Louis, MO 63103

Submitted by:

Rocksmith Geoengineering, LLC
2320 Creve Coeur Mill Road
Maryland Heights, MO 63043

Table of Contents

TABLES

FIGURES

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 Rocksmith Geoengineering, LLC.

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).

Rocksmith Geoengineering, LLC

_____

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

Principal Engineer, Senior Partner

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 (SSI) identified for Ameren Missouri's (Ameren) Sioux Energy Center (SEC), Utility Waste Landfill (UWL) Cell 4A, referred to as the 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 SSI and that the apparent SSI was the result of an alternative source or resulted from errors in sampling, analysis, statistical evaluation, or natural variation in groundwater quality.

3.0 SITE DESCRIPTION AND BACKGROUND

Ameren owns and operates the SEC in St. Charles County, Missouri, located approximately 12 miles west-northwest of the confluence of the Mississippi and Missouri Rivers. **Figure 1** depicts the site location and layout, including the location of the SCL4A. The SEC is approximately 1,100 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 that lie unconformably on top of bedrock. These alluvial deposits, which can range from approximately 100 to 130 feet in thickness, 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 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 high density polyethylene (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 at UG-3 since June 2008 for the analysis of state required UWL

parameters, and TMW-1, TMW-2, and TMW-3 have been sampled since May 2016 for CCR Rule sampling events.

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 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 monitoring wells screened in the uppermost aquifer (alluvial aquifer) as shown on **Figure 1**. One 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 Associates Inc. (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 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 baseline sampling events were used to calculate statistical upper prediction limits (UPLs). These UPLs were then compared to the detection monitoring results from the November 2017 samples and subsequent semi-annual detection monitoring sampling events. If results from the detection monitoring event were higher than the calculated UPL, this was considered to be an initial exceedance and a verification sample was then collected and tested in accordance with the SCPC Statistical Analysis Plan (SAP). In August 2019 and June 2021, the background dataset used to calculate statistical limits was expanded to include a total of eight additional detection monitoring events, as outlined in the SAP, bringing the total number of background observations to at least sixteen per constituent per well. The following provides a summary of the detection monitoring results to date.

Since November 2017, several ASDs have been prepared for detections in well UG-3, TMW-1, and TMW-2. These previous ASDs are available in the 2018 through 2022 Annual Reports for the SCL4A and are available on Ameren's publicly available CCR Compliance website (https://www.ameren.com/company/environment-and-sustainability/managing-coal-combustion/ccr-compliance-reports). These ASDs have demonstrated that previous SSIs at the site were not caused by the SCL4A, but rather primarily the result of relatively low calculated UPLs

that were not representative of the natural geochemical variability within the alluvial aquifer or primarily caused by the SCL4A being downgradient from the SCPA, which is currently in corrective action.

In May 2023, initial exceedances were identified for sulfate at TMW-1 and for chloride at TMW-1 and TMW-3. Verification sampling results from July 2023 confirmed only the sulfate at TMW-1 to be an SSI. Results from this sampling event are provided in **Table 1**.

4.0 REVIEW OF THE STATISTICALLY SIGNIFICANT INCREASE

The May 2023 SSI for sulfate occurred at monitoring well TMW-1. TMW-1 is screened in the upper portion of the alluvial aquifer just below the average seasonal low for groundwater. As shown in **Figure 1**, TMW-1 is located south of the SCL4A and Highway 94, and north of Dwiggins Road.

Based on Rocksmith'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-date 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 sulfate at TMW-1 was 46.3 milligrams per liter (mg/L) based on the results from the initial eight baseline sampling events that ranged from 23.2 to 38.0 mg/L, as summarized in **Table 2**. The results from this small dataset were normally distributed, and a calculated UPL was used. In August 2019, the baseline dataset was expanded to include the next four sampling events, and the UPL changed from 46.3 to 50.29 mg/L. In June 2021, the baseline data set was further expanded to include the subsequent four or more sampling events, and the UPL changed from 50.29 to 49.87 mg/L. During the May 2023 detection monitoring event, a concentration of 56.6 mg/L was reported for sulfate in TMW-1, which was confirmed in July 2023 by a verification result of 57.7 mg/L, which slightly exceeds the current UPL of 49.87 mg/L.

Table 2: Review of Statistically Significant Increase

Constituent	Well ID	UPL Based on Baseline Events	August 2019 Updated UPL	June 2021 Updated UPL	Baseline Sampling Event Range	Detection Monitoring Sampling Range (November 2017 - October 2022)	May 2023 Result	July 2023 Result
Sulfate (mg/L)	TMW-1	46.3	50.29	49.87	23.2 - 38.0	33.8 - 64.9	56.6	57.7

Notes:
1) mg/L – milligrams per liter.
2) UPL – upper prediction limit.
3) UPLs calculated using Sanitas™ software.
4) UWL – Utility Waste Landfill.
5) J – result is an estimated value.

5.0 EVIDENCE OF SSI FROM ALTERNATIVE SOURCE

Several different lines of evidence indicate that the SSI at the SCL4A is 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.

- Presence 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.
- Similarity of sulfate concentrations in nearby and background monitoring wells.

- Similarity of historical and current sulfate concentrations at TMW-1.
- Construction of the SCL4A with a 60-mil HDPE 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 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. FGD type wastes at the SEC are managed at the SCPC and SCPD, located to the west of the SCL4A.

5.2 Evaluation of SSI

5.2.1 Boron Concentrations

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-1, as well as background wells BMW-1S and BMW-3S and nearby wells TMW-2 and TMW-3. If the SSI at TMW-1 was caused by impacts from the SCL4A, boron concentrations would 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-1 does not have boron impacts, and therefore, a source other than CCR is likely the cause of the SSI at TMW-1.

5.2.2 Sulfate Concentrations

Sulfate, much like boron, is a key indicator for potential CCR impacts 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 at the SCL4A.

As displayed on **Figure 3**, sulfate ranged from 23.2 to 38.0 mg/L during baseline sampling at TMW-1. During the subsequent sampling events, sulfate concentrations at TMW-1 have ranged from 33.8 to 64.9 mg/L. The time series plot on **Figure 3** shows the high degree of variability in sulfate concentrations at the TMW wells south of the SCL4A since the onset of baseline monitoring. This figure provides further evidence that the limited number of data points used to calculate the intrawell UPL for sulfate at TMW-1 do not accurately reflect the natural geochemical variability within the groundwater. Two other compliance monitoring wells are located approximately 325 and 650 feet to the east of TMW-1 as displayed in **Figure 1**: TMW-2 and TMW-3, respectively. Sulfate concentrations in these monitoring wells ranged from 26.4 to 85.8 mg/L and UPLs for these monitoring wells are 80.98 mg/L at TMW-2 and 60.9 mg/L at TMW-3. Based on the sulfate concentration range of the nearby wells, the sulfate concentration in TMW-1 for May 2023 is within the range of historical concentrations for adjacent wells, which indicates that the SSI for sulfate in TMW-1 is likely the result of a limited baseline sampling period that did not capture the full range of natural geochemical variability within the shallow zone of the alluvial aquifer at TMW-1 and variable changes in the pre-existing concentrations.

To further investigate the geochemical variability of sulfate in the area of the SCL4A, the historical data from the state UWL wells [located on the south side of the UWL, outside the zone of impact from the SCPA] were reviewed. These UWL wells (labeled “DG-xx”) were installed and sampled on multiple occasions prior to the receipt of CCR at the SCL4A. These DG-xx monitoring wells are screened at approximately the same depth as TMW-1 in the shallow zone of the alluvial aquifer. **Figure 4** displays a box and whisker plot of the natural variability of the sulfate concentrations within the alluvial aquifer prior to the receipt of CCR in the SCL4A for these wells. As shown on **Figure 4**, the recent results from TMW-1 are within range of concentrations for the DG-xx wells, which represent groundwater quality from a period that occurred prior to the receipt of CCR in SCL4A.

The lines of evidence listed above indicate that the sulfate concentration at TMW-1 in May 2023 is not the result of a release from the SCL4A, but instead can be attributed to pre-existing impacts and variability in the alluvial aquifer combined with the limited dataset used for the calculation of the previous sulfate UPLs in TMW-1.

6.0 DEMONSTRATION THAT SSI WAS NOT CAUSED BY SCL4A IMPACT

Based on the information presented in Section 5, above, the SSI reported for the May 2023 monitoring event at TMW-1 is not a result of impacts from the SCL4A. The SSI appears to be a result of numerous factors, including (1) pre-existing low concentrations of CCR indicators from the upgradient SCPA that predate the SCL4A, (2) relatively low calculated UPLs, and (3) a relatively small set of baseline data that does not reflect the extent of natural temporal and spatial variability of groundwater chemistry within the aquifer. Only sixteen samples have been used thus far to calculate the intrawell UPLs in TMW-1. It can take many years of data gathering to observe the range of variability in groundwater concentrations that are representative of natural conditions or pre-existing impacts for any given aquifer. The results gathered thus far may not have captured the full extent of the spatial and temporal variability in the downgradient alluvial aquifer monitoring wells at the SEC.

Along with the lines of evidence listed above, SCL4A is constructed with 2 feet of compacted clay baseliner which is overlain by a 60-mil HDPE liner. Construction of SCL4A with these components limits the potential that the SSI reported for sulfate at TMW-1 in May 2023 is a result of influence from the SCL4A. The SSI observed in TMW-1 is not caused by impacts from the SCL4A but is a result of natural variability and pre-existing impacts within the alluvial aquifer at the site.

7.0 REFERENCES

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Tables

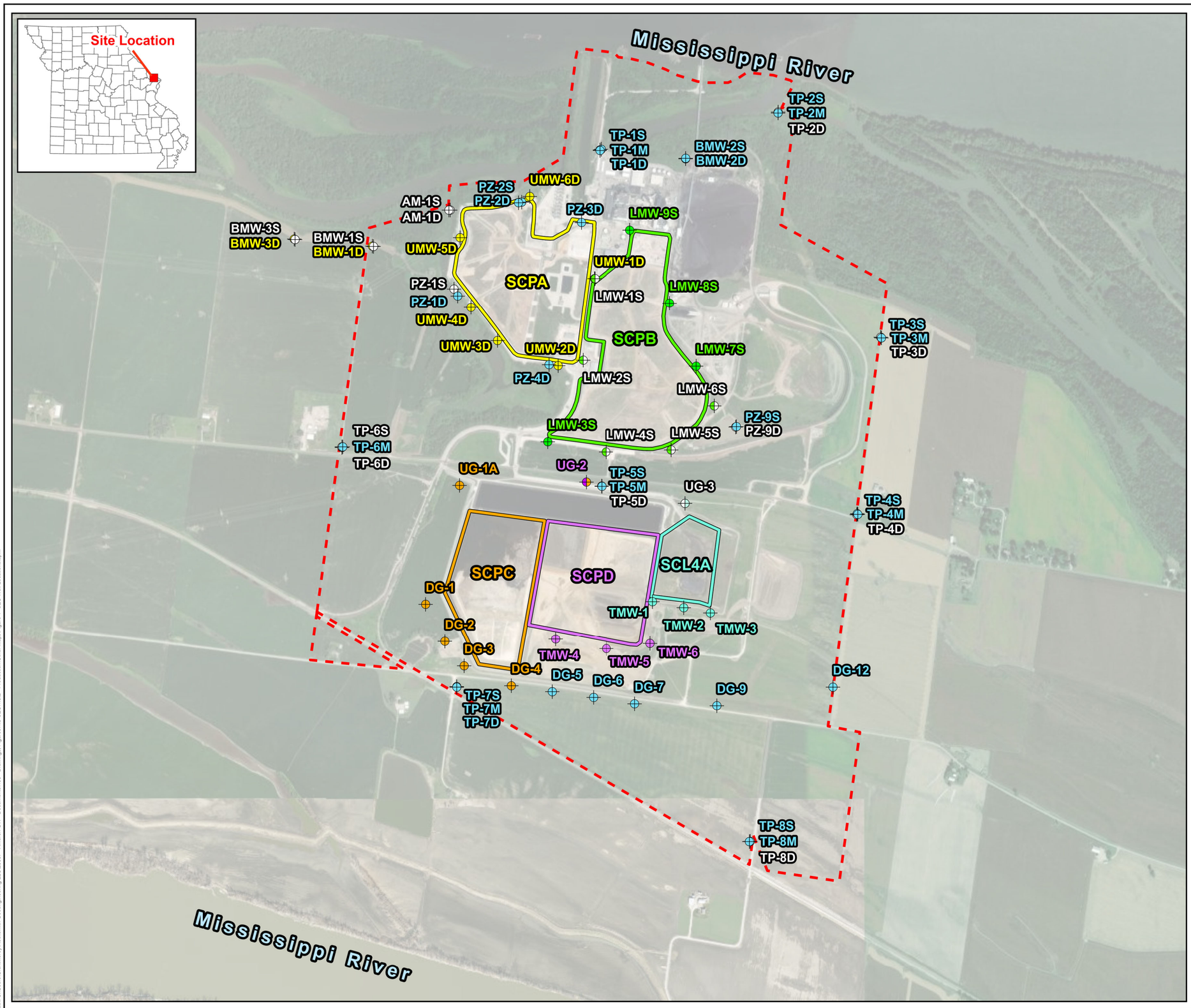
Table 1
May 2023 Detection Monitoring Results
SCL4A - Landfill Cell 4A
Sioux Energy Center, St. Charles County, MO

ANALYTE	UNITS	BACKGROUND		GROUNDWATER MONITORING WELLS							
		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
May 2023 Detection Monitoring Event											
DATE	NA	5/2/2023	5/2/2023	NA	5/4/2023	NA	5/4/2023	NA	5/4/2023	NA	5/4/2023
pH	SU	6.80	6.95	6.659-7.397	7.09	6.356-7.504	7.16	6.601-7.399	7.05	6.41-7.31	7.03
BORON, TOTAL	µg/L	64.8 J	67.1 J	1,200	258	DQR	76.9 J	104.4	84.9 J	110.6	89.1 J
CALCIUM, TOTAL	µg/L	184,000	137,000	172,812	119,000	119,842	106,000	133,759	123,000	146,661	128,000
CHLORIDE, TOTAL	mg/L	13.1	12.6	85.54	41.9	4.199	4.6	4.641	3.1	3.1	3.6
FLUORIDE, TOTAL	mg/L	ND	ND	0.3954	ND	0.4537	0.33	0.4229	0.27	0.3773	ND
SULFATE, TOTAL	mg/L	37.7	32.4	139.9	48.0	49.87	56.6	80.98	32.8	60.9	40.9
TOTAL DISSOLVED SOLIDS	mg/L	610	495	671.3	522	462.8	411 J	513	451	505.4	319
July 2023 Verification Sampling Event											
DATE	NA						7/11/2023				7/11/2023
pH	SU										
BORON, TOTAL	µg/L										
CALCIUM, TOTAL	µg/L										
CHLORIDE, TOTAL	mg/L						3.1				3.1
FLUORIDE, TOTAL	mg/L										
SULFATE, TOTAL	mg/L						57.7				
TOTAL DISSOLVED SOLIDS	mg/L										

NOTES:
1. Unit Abbreviations: µg/L - micrograms per liter, mg/L - milligrams per liter, SU - standard units.
2. J - Result is an estimated value.
3. 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. ND - Constituent was analyzed but was not detected above the Method Detection Limit (MDL) or the adjusted Practical Quantitation Limit (PQL) based on data validation and is considered a non-detect. Values displayed as ND.

Prepared By: GTM
Checked By: JSI
Reviewed By: MNH

Figures



TITLE

SIOUX ENERGY CENTER GROUNDWATER MONITORING PROGRAMS AND SAMPLE LOCATION MAP

Legend

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment (Closed)
- SCPB - Fly Ash Surface Impoundment (Closed)

Utility Waste Landfill Cells

- SCL4A - Dry CCR Disposal Area
- SCPC - Inactive FGD Surface Impoundment (Closure in Progress)
- SCPD - FGD Surface Impoundment

Monitoring Well Networks

- Corrective Action Monitoring Well
- SCPA Detection and Assessment Monitoring Well
- SCPB and Corrective Action Monitoring Well
- SCPB Detection Monitoring Well
- SCPC Detection Monitoring Well
- SCPD and SCPC Detection Monitoring Well
- SCPD Detection Monitoring Well
- SCL4A and Corrective Action Monitoring Well
- SCL4A Detection Monitoring Well
- Monitoring Well Used for Water Level Elevation Measurements Only

NOTES

1. All boundaries and locations are approximate.
2. FGD - Flue Gas Desulfurization.
3. CCR - Coal Combustion Residuals.

REFERENCES

1. Ameren Missouri Sioux Energy Center, Sioux Property Control Map, February 2011.

0 500 1,000 2,000 3,000 Feet

PROJECT
CCR RULE GROUNDWATER MONITORING PROGRAM

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

ROCKSMITH GEOENGINEERING

DESIGN	JSI	YYYY-MM-DD	2023-03-29
PREPARED	JSI	PROJECT No.	23009
REVIEW	GTM		
APPROVED	MNH		

FIGURE 1

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

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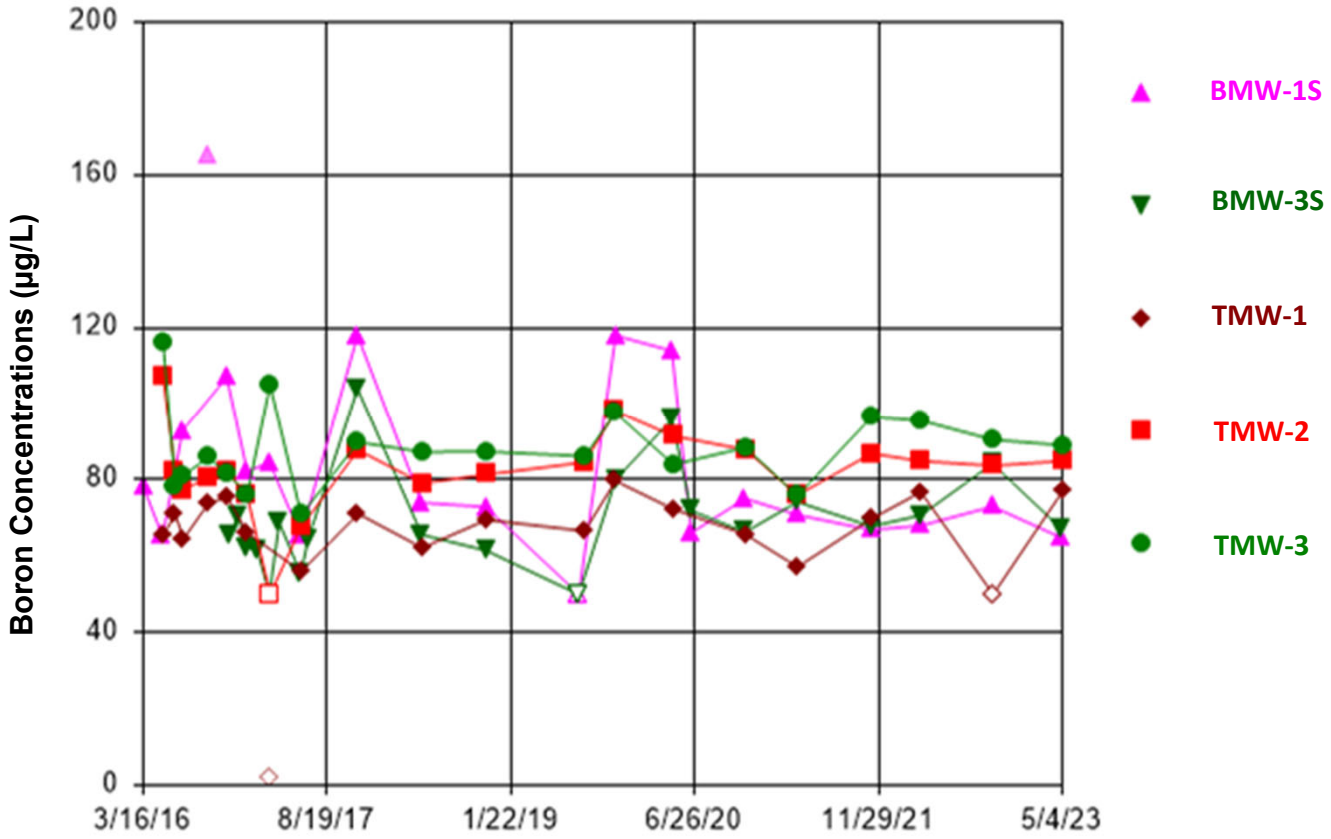
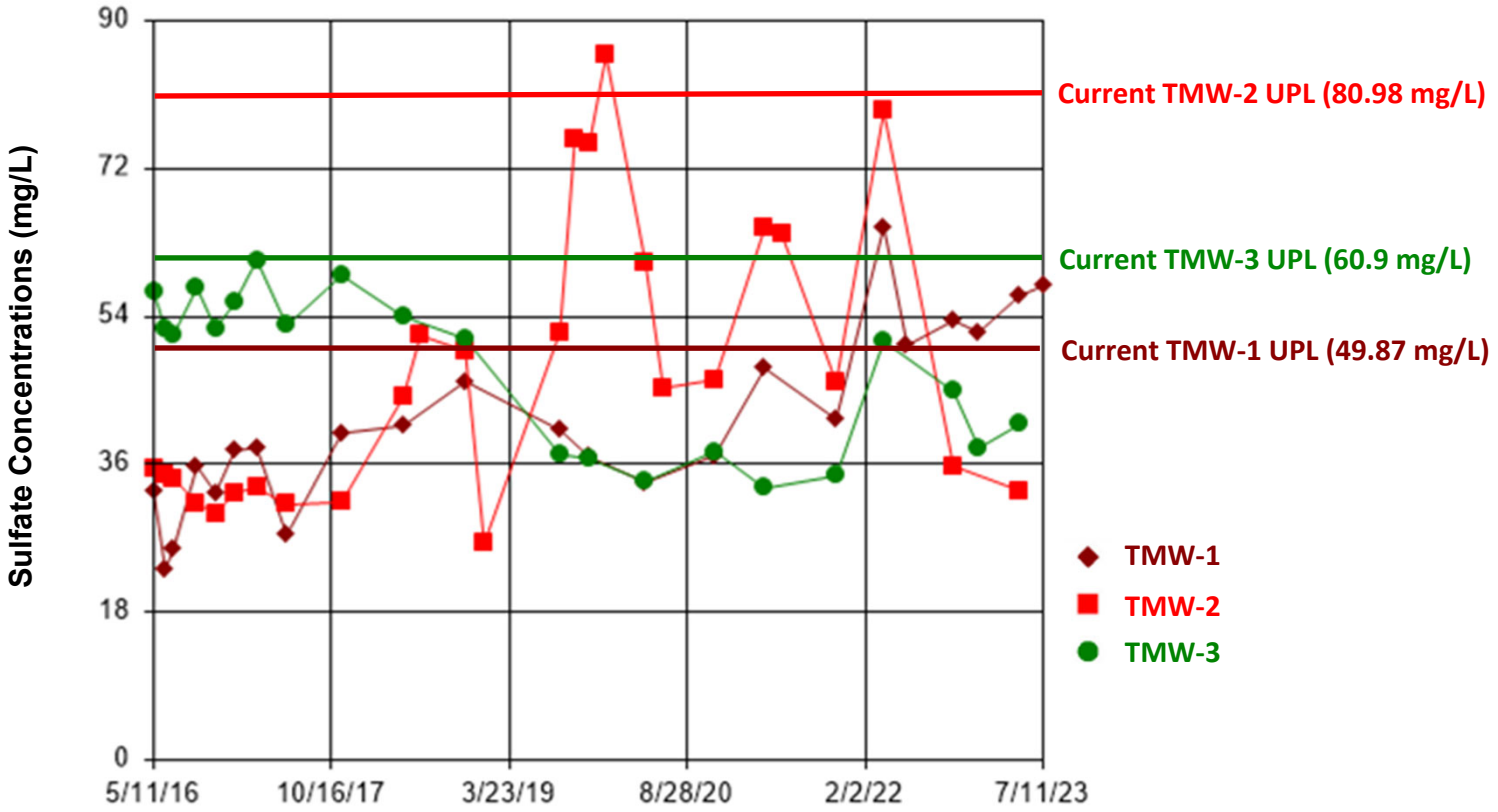


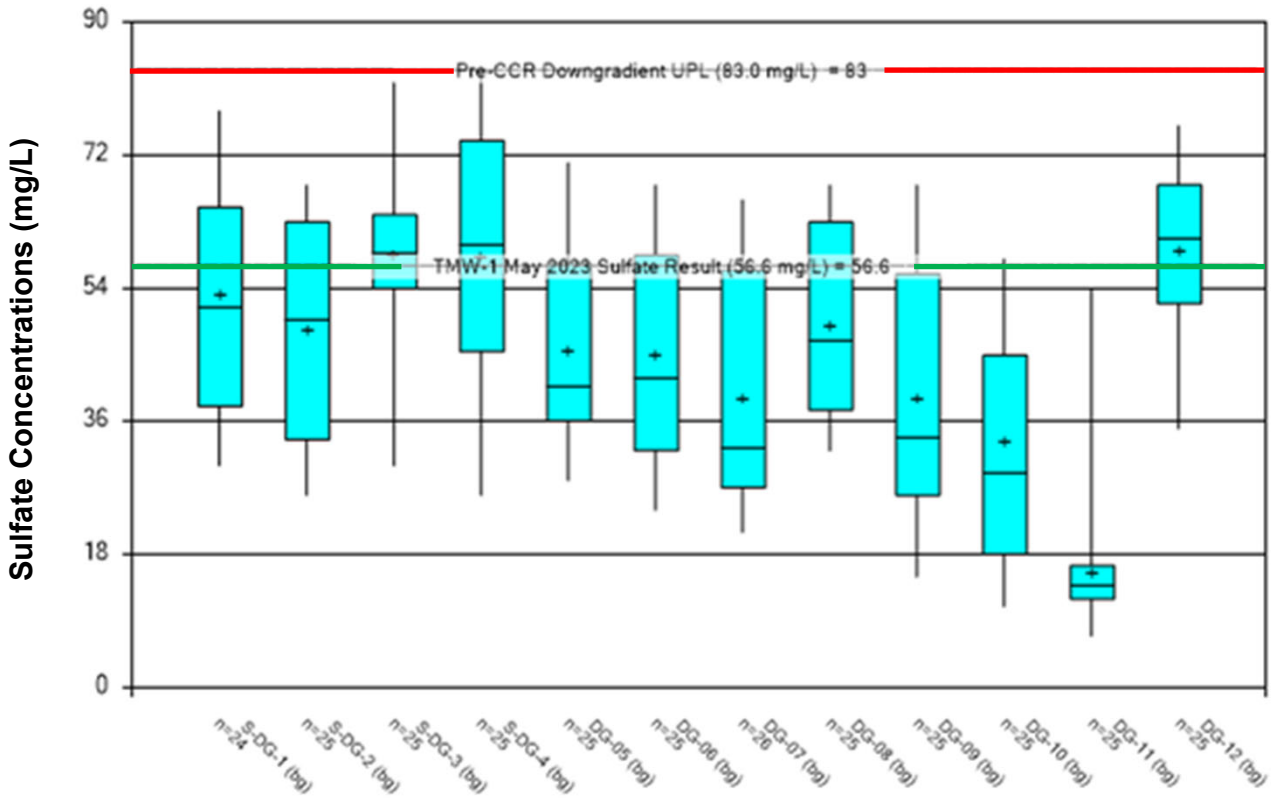
Notes
1) µg/L – Micrograms per liter.
2) Points not connected to lines are considered outliers as specified in the Updated Statistical Limit Technical Memorandum for the SCL4A.
3) Non-detected concentrations are depicted as unfilled points.

CLIENT/PROJECT					TITLE		
AMEREN MISSOURI SIOUX ENERGY CENTER					Timeseries Plot of Boron Concentrations		
DRAWN GTM	CHECKED JSI	REVIEWED MNH	DATE 2023-12-04		Rev No. NA	JOB NO. 23009	FIGURE 2



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

CLIENT/PROJECT					TITLE		
AMEREN MISSOURI SIOUX ENERGY CENTER					Time Series Plot for Sulfate Concentrations South of the SCL4A		
DRAWN	CHECKED	REVIEWED	DATE		Rev No.	JOB NO.	FIGURE
GTM	JSI	MNH	2023-12-04		NA	23009	3



Pre-CCR Downgradient UPL (83.0 mg/L)

TMW-1 May 2023 Sulfate Result (56.6 mg/L)

Notes
1) mg/L – Milligrams per liter.
2) UPL – Upper Prediction Limit.
3) CCR – Coal Combustion Residuals.

CLIENT/PROJECT					TITLE		
AMEREN MISSOURI SIOUX ENERGY CENTER					**Pre-CCR Sulfate Plots – Downgradient Monitoring Wells**		
DRAWN	CHECKED	REVIEWED	DATE		Rev No.	JOB NO.	FIGURE
GTM	JSI	MNH	2023-12-04		NA	23009	**4**

Appendix D

2023 Potentiometric Surface Maps

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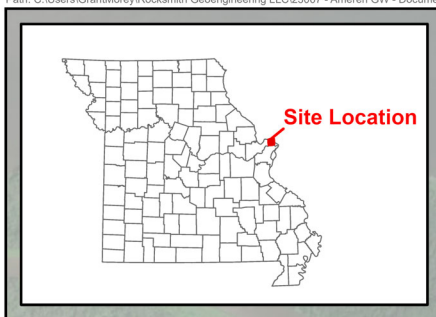

N

Mississippi River

Mississippi River Level
419.1

TP-2S (418.82)
TP-2M (418.80)
TP-2D (418.80)

TP-1S (418.84)
TP-1M (418.86)
TP-1D (418.86)

BMW-2S (418.43)
BMW-2D (418.45)

Sioux Energy Center

419

UMW-6D
(418.23)

PZ-2S (418.35)
PZ-2D (418.34)

PZ-3S (418.09)
PZ-3D (418.01)

AM-1S (418.58)
AM-1D (418.53)

418

LMW-9S (417.80)

UMW-5D (417.96)

BMW-1S (417.50)
BMW-1D (417.57)

BMW-3S (417.63)
BMW-3D (417.64)

UMW-1D (417.23)

LMW-1S
(417.35)

PZ-1S (417.22)
PZ-1D (417.19)

417

SCPA

LMW-8S (416.97)

UMW-4D
(416.99)

TP-3S (417.11)
TP-3M (417.11)
TP-3D (417.12)

SCPB

UMW-3D (416.35)

PZ-4S (416.09)
PZ-4D (416.32)

LMW-2S
(416.37)

LMW-7S (416.42)

UMW-2D (416.21)

416

LMW-6S (416.15)

PZ-9S (416.26)
PZ-9D (416.25)

LMW-3S (415.31)

LMW-4S
(415.31)

LMW-5S
(415.61)

TP-6S (414.82)
TP-6M (414.83)
TP-6D (414.82)

415

TP-5S (415.02)
TP-5M (415.04)
TP-5D (415.00)

UG-2 (414.75)

UG-1A (414.87)

UG-3 (415.22)

TP-4S (415.22)
TP-4M (415.21)
TP-4D (415.23)

414

SCL4A

SCPD

SCPC

TMW-2
(413.22)

413

TMW-1
(413.18)

DG-1 (412.91)

TMW-3
(412.95)

DG-2 (412.37)

DG-3
(412.13)

TMW-4
(412.50)

TMW-5
(412.60)

TMW-6
(412.84)

412

DG-5
(412.07)

DG-4
(411.97)

DG-6 (412.20)

DG-12 (413.50)

TP-7S (411.37)
TP-7M (411.35)
TP-7D (411.06)

DG-7 (412.36)

DG-9 (412.71)

TP-8S (411.29)
TP-8M (411.29)
TP-8D (411.27)

Estimated Missouri River Level
412.8

Missouri River

State of Missouri, Maxar

LEGEND

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment (Closed)
- SCPB - Fly Ash Surface Impoundment (Closed)
- SCPC - WFGD Surface Impoundment (Closure in Progress)
- SCL4A - Dry CCR Disposal Area
- SCPD - FGD Surface Impoundment

Groundwater Elevation Contour (FT MSL)

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

Ground/Surface Water Measurement Locations

- River Gauge Location
- Monitoring Well or Piezometer
- Groundwater Flow Direction

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 WSP.
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.) FGD - FLUE GAS DESULFURIZATION.

REFERENCES

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

TITLE
JANUARY 3, 2023 POTENTIOMETRIC SURFACE MAP

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

ROCKSMITH GEOENGINEERING

DESIGN	GTM	YYYY-MM-DD	2023-08-21
PREPARED	GTM	PROJECT No.	23009
REVIEW	JSI		
APPROVED	MNH		

FIGURE D1

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

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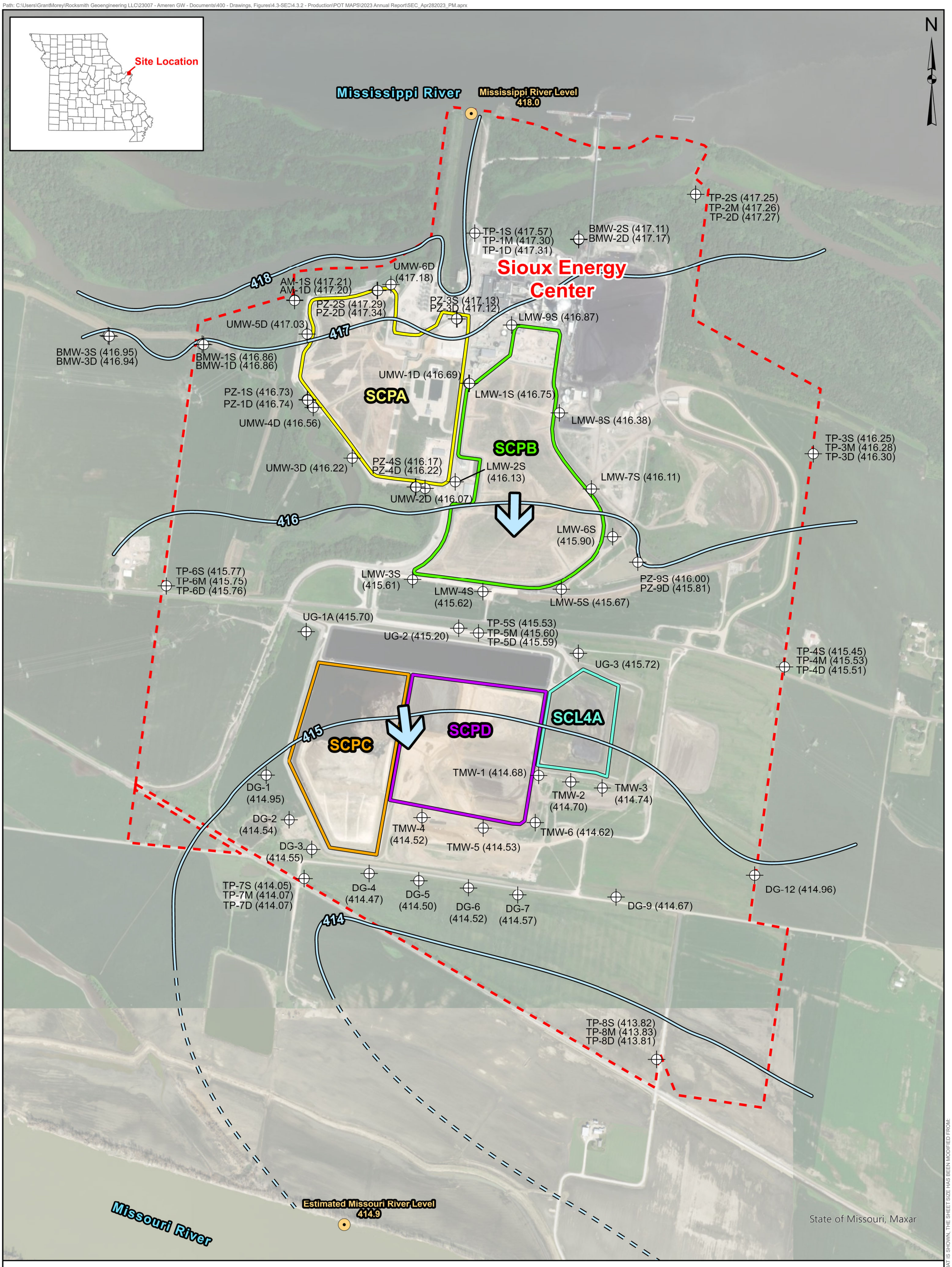

LEGEND

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment (Closed)
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- Groundwater Elevation Contour (FT MSL)
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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 ROCKSMITH.
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.) FGD - FLUE GAS DESULFURIZATION.

REFERENCES

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

TITLE
APRIL 28, 2023 POTENTIOMETRIC SURFACE MAP

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

ROCKSMITH GEOENGINEERING

DESIGN	GTM	YYYY-MM-DD	2023-08-23
PREPARED	GTM	PROJECT No.	23009
REVIEW	JSI		
APPROVED	MNH		

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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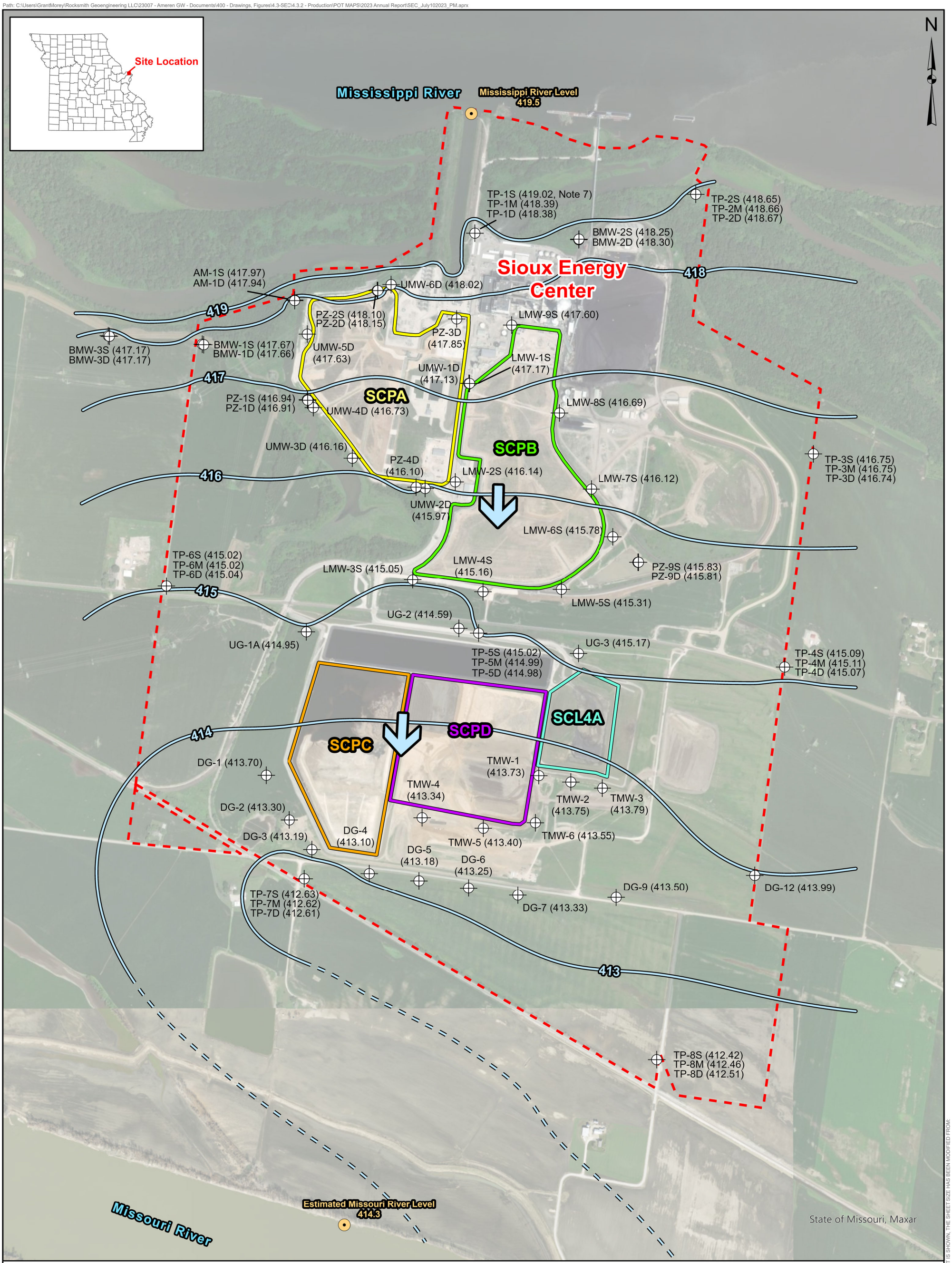

LEGEND

- Sioux Energy Center Property Boundary

CCR Units

- SCPA - Bottom Ash Surface Impoundment (Closed)
- SCPB - Fly Ash Surface Impoundment (Closed)
- SCPC - WFGD Surface Impoundment (Closure in Progress)
- SCL4A - Dry CCR Disposal Area
- SCPD - FGD Surface Impoundment

Groundwater Elevation Contour (FT MSL)

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

Ground/Surface Water Measurement Locations

- River Gauge Location
- Monitoring Well or Piezometer
- Groundwater Flow Direction

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 ROCKSMITH.
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.) FGD - FLUE GAS DESULFURIZATION.
7.) TP-1S NOT USED FOR POTENTIOMETRIC SURFACE CONTOURING.

REFERENCES

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

TITLE
JULY 10, 2023 POTENTIOMETRIC SURFACE MAP

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

ROCKSMITH GEOENGINEERING

DESIGN	GTM	YYYY-MM-DD	2023-08-23
PREPARED	GTM	PROJECT No.	23009
REVIEW	JSI		
APPROVED	MNH		

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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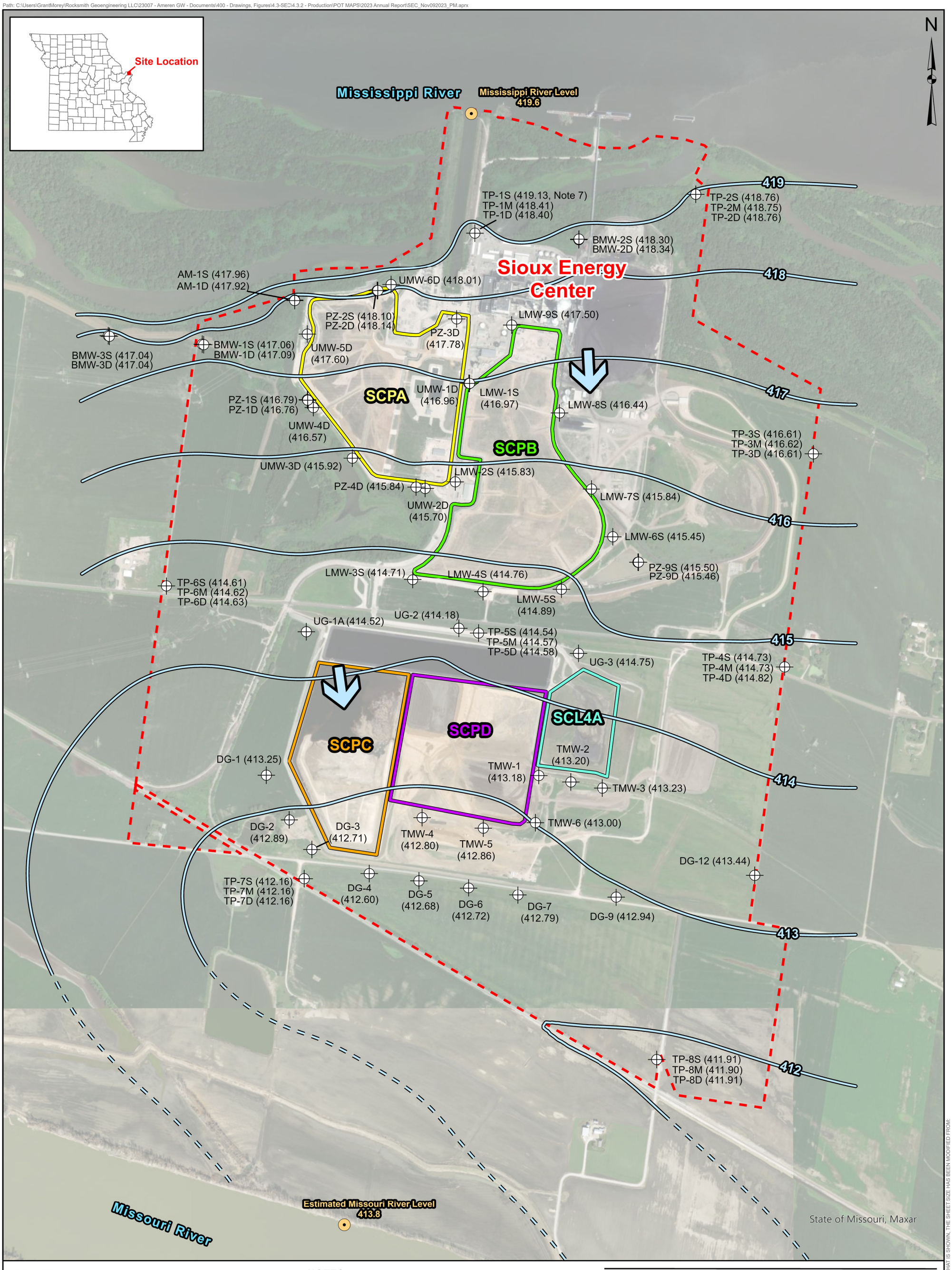

LEGEND

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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

TITLE
NOVEMBER 9, 2023 POTENTIOMETRIC SURFACE MAP

PROJECT
CCR GROUNDWATER MONITORING PROGRAM

CLIENT
AMEREN MISSOURI
SIOUX ENERGY CENTER

ROCKSMITH GEOENGINEERING

DESIGN	GTM	YYYY-MM-DD	2023-12-29
PREPARED	GTM	PROJECT No.	23009
REVIEW	JSI	FIGURE D4	
APPROVED	MNH		

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

Appendix E

MDNR Well Reconstruction Report and Well Construction Diagram for TMW-1

MISSOURI DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY PROGRAM

RECONSTRUCTION REGISTRATION REPORT

FOR OFFICE USE ONLY

REF NO.	DATE RECEIVED

ROUTE	APPROVED	DATE	ENTERED	STATE CERT. NO.	CHECK NO.	REVENUE NO.
/ /						

WELL OWNER INFORMATION

NAME	TELEPHONE NUMBER WITH AREA CODE
AMEREN Missouri - c/o Bill Kutosky	(314) 621-3222

MAILING ADDRESS	CITY	STATE	ZIP CODE
370 S Lindbergh Blvd	St. Louis	MO	63127

PHYSICAL ADDRESS OF PROPERTY WHERE WELL IS LOCATED (IF DIFFERENT THAN MAILING ADDRESS)	CITY	EMAIL ADDRESS
8501 MO-94	West Alton	WKutosky@ameren.com

GENERAL WELL INFORMATION

DATE WELL WAS RECONSTRUCTED	WELL CERTIFICATION OR REFERENCE NUMBER (IF KNOWN)	WELL NUMBER	VARIANCE NUMBER (IF ISSUED)	ORIGINAL DRILLER (If known)	DATE ORIGINALLY DRILLED (IF KNOWN)
08/30/2023	A206737 / 00305963	TMW-1	n/a	J. Drabek/Cascade	04/05/2016

TYPE OF REPAIR
- ☑ Raised casing
- ☐ Deepening of well
- ☐ Well conversion
- ☐ Lining of well
- ☑ Monitoring well

NAME OF SITE, BUSINESS, OR CLEANUP PROJECT: Sioux Energy Center

REGULATORY SITE ID NUMBER OF DNR/EPA PROJECT (IF APPLICABLE): N/A

LOCATION INFORMATION

Lat. 38 ° 54 ' 7.38 "
Long. 90 ° 17 ' 22.06 "

COUNTY: St. Charles

____ ¼ ____ ¼ ____ ¼ Section Township N Range ☐ E ☐ W

DRILL AREA (OFFICE USE ONLY)

WATER WELL INFORMATION

TYPE OF WELL

☐ Domestic ☐ High yield bedrock ☐ High yield unconsolidated ☐ Multi-family ☐ Public water supply ☐ Open loop water ☐ Oil/gas well conversion to water well

CASING DIAMETER	CASING LENGTH (IF KNOWN)	WELL CASING SEAL OR CONNECTION	STATIC WATER LEVEL (IF KNOWN)	WELL CHLORINATED AFTER RECONSTRUCTION	DRILLER NOTES
in.	ft.	☐ Well seal ☐ Pitless unit ☐ Pitless adaptor	ft.	☐ Yes ☐ No	

MONITORING WELL INFORMATION

TYPE OF REPAIR	LENGTH OF RISER ADDED	RISER MATERIAL	ORIGINAL RISER MATERIAL	METHOD OF ATTACHMENT	TYPE OF SURFACE COMPLETION
☐ Over-drill and reconstructed* ☐ Install or replace surface completion ☑ Raise or lower surface elevation *Attach diagram showing well reconstruction details	8.22 ft.	☑ Plastic ☐ Stainless steel	☑ Plastic ☐ Stainless steel	☐ Thread ☐ Weld ☑ Couple ☐ Fuse ☐ Glue ☐ Other	☑ Above ground ☐ Flush mount

LINER INFORMATION

USE (Choose one)	LENGTH	OUTSIDE DIAMETER	WEIGHT (LB.) OR SDR#, SCH#	MATERIAL
☐ Hold back formation ☐ Prevent rust ☐ Seal out undesirable conditions	ft.	in.		☐ Plastic ☐ Steel

DEPTH TO TOP OF LINER	PACKER USED ON PVC LINER	DEPTH PACKERS SET
ft.	☐ Yes ☐ No	/ / ft.

POSITION OF SEAL	GROUT TYPE (CHOOSE ONE)	NUMBER OF SACKS USED	METHOD OF GROUT INSTALLATION
☑ Full length ☐ Bottom	CEMENT ☐ Type I ☐ Type III BENTONITE ☑ Chips ☐ Granular ☐ Pellets ☐ Slurry	5 LBS PER SACK 50	☑ Gravity ☐ Pressure tremie ☐ As liner is installed

RAISED CASING INFORMATION

LENGTH ADDED	CASING MATERIAL	ORIGINAL CASING MATERIAL	METHOD OF ATTACHMENT
8.22 ft.	☑ Plastic ☐ Steel	☑ Plastic ☐ Steel	☐ Thread ☐ Weld ☑ Couple ☐ Glue

I hereby certify that the information herein described for this well is in accordance with the department of natural resources requirements. (All fields must be completed but only one signature is required.)

PRIMARY CONTRACTOR (If different than installation contractor)	PERMIT NUMBER	DATE
Robert Lodge	006744-M	09/05/2023
WELL OR PUMP INSTALLATION CONTRACTOR: Robert Lodge	006744-M	09/05/2023
WELL OR PUMP INSTALLATION APPRENTICE	PERMIT NUMBER	DATE

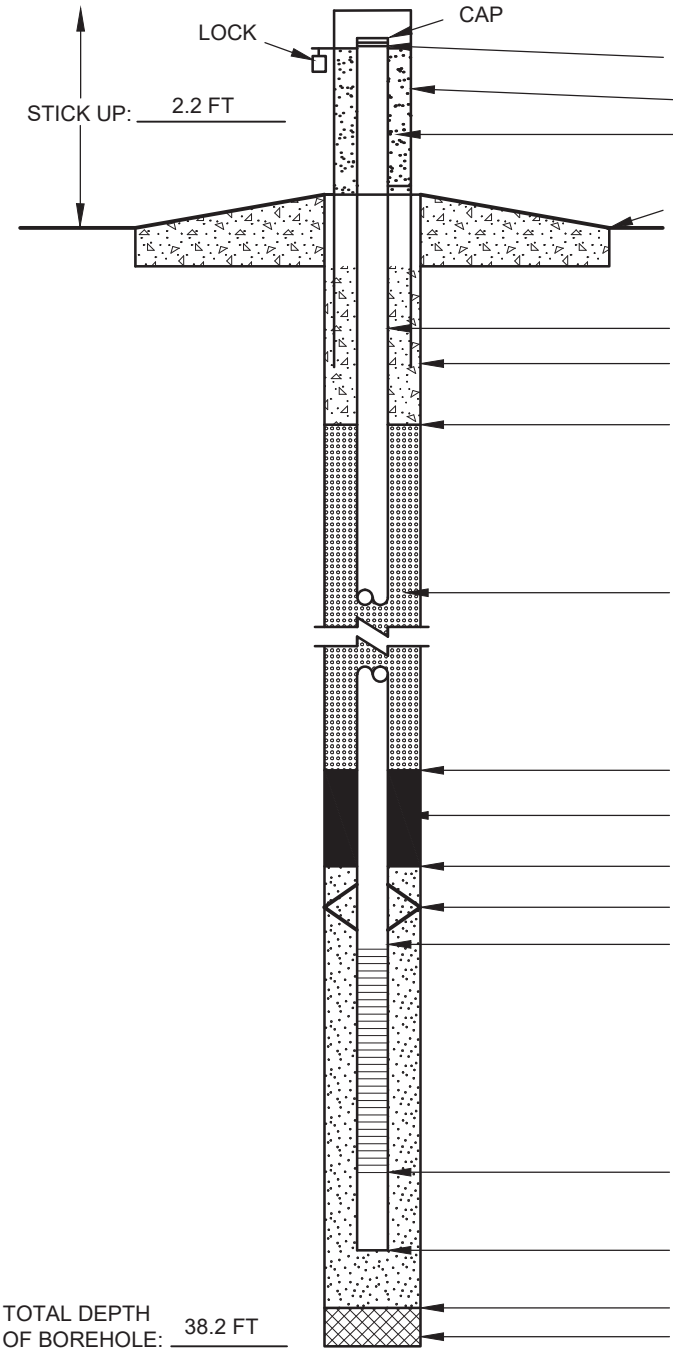
DEEPENING OF WELL INFORMATION

DEPTH TO	DEPTH FROM	FORMATION AND YIELD DESCRIPTION**

☐ **BORING LOG/WELL DIAGRAM ATTACHED

ABOVE GROUND MONITORING WELL CONSTRUCTION LOG TMW-1
(Modified)

PROJECT NAME: AMEREN CCR GW MONITORING		PROJECT NUMBER: 23009
SITE NAME: SIOUX ENERGY CENTER		LOCATION: TMW-1
CLIENT: AMEREN MISSOURI		SURFACE ELEVATION: 434.1 FT MSL
GEOLOGIST: J. INGRAM	NORTHING: 1117385.1	EASTING: 880121.2
DRILLER: J. DRABEK	STATIC WATER LEVEL: 22.11 FT BTOC	COMPLETION DATE: 4/5/2016
DRILLING COMPANY: CASCADE		DRILLING METHODS: SONIC



TOP OF CASING ELEVATION: 436.30 FT MSL

PROTECTIVE CASING (yes / no): 4" X 5' ALUMINUM

PEA GRAVEL OR SAND

GROUND SURFACE ELEVATION: 434.1 FT MSL

DIAMETER OF RISER PIPE (in.): 2.0

DIAMETER OF BOREHOLE (in.): 6.0

CONCRETE SEAL DEPTH (ft. bgs): 2.5

TYPE AND AMOUNT OF ANNULAR SEAL: NONE

TOP OF BENTONITE SEAL DEPTH (ft. bgs): 2.5

TYPE AND AMOUNT OF BENTONITE SEAL: 3/8" BENTONITE CHIPS: 300 LBS

TOP OF SAND PACK DEPTH (ft. bgs): COARSE: 22.2 FINE: 21.2

CENTRALIZER (yes / no) - TYPE: NONE

TOP OF SCREEN DEPTH (ft. bgs): 24.7

TYPE OF SCREEN: 2" X 9.8' SCHEDULE 40 PVC

SCREEN SLOT SIZE (in.): 0.010 IN

SIZE OF SAND PACK: COARSE: #1 FINE: #0

AMOUNT OF SAND: COARSE: 150 LBS FINE: 25 LBS

BOTTOM OF SCREEN DEPTH (ft. bgs): 34.5

BOTTOM OF WELL DEPTH (ft. bgs): 34.9

BOTTOM OF FILTER PACK (ft. bgs): 36.2

TYPE AND AMOUNT OF BACKFILL: 2.0 FT NATURAL CAVE IN

ADDITIONAL NOTES: FT BGS = FEET BELOW GROUND SURFACE. FT MSL = FEET ABOVE MEAN SEA LEVEL. 50 GALLONS OF H2O USED DURING DRILLING. HORIZONTAL DATUM: STATE PLANE COORDINATES NAD83 US SURVEY FEET (2000) MISSOURI EAST ZONE. VERTICAL DATUM: NAVD88. WELL RISER EXTENDED 8.22 FT AND NEW SURFACE COMPLETION INSTALLED BY BULLDOG DRILLING ON 8/30/2023. FT BTOC = FEET BELOW TOP OF CASING.

CHECKED BY: J. INGRAM

DATE CHECKED: 1/9/2024

PREPARED BY: G. MOREY